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Data Management

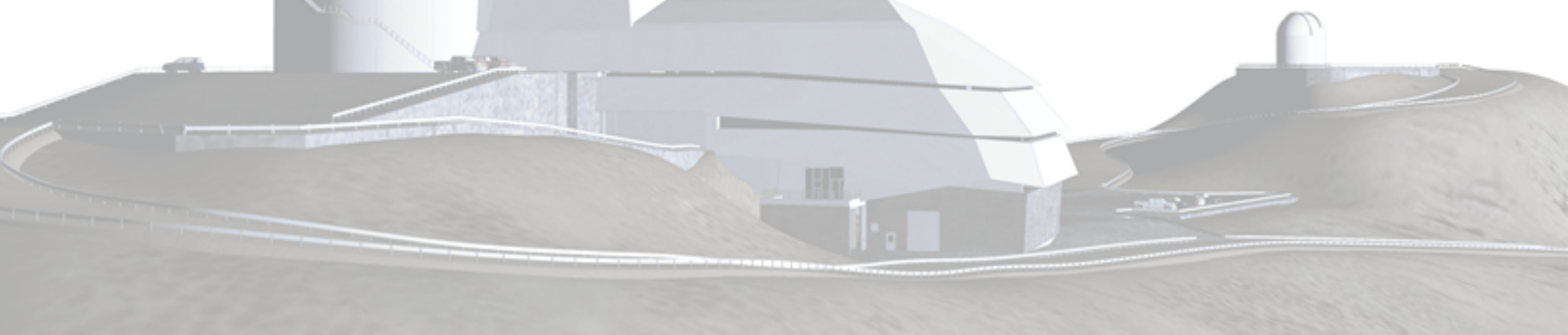
LSST Science Platform Test Specification

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LDM-540

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Abstract

This document describes the detailed test specification for the LSST Science Platform. It is a work in progress; the current version provides Test Cases covering all requirements on the LSST Science Platform, however only $\approx 10\%$ are currently fully specified. This document will be updated as work continues on completing Test Cases.

Draft

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LSST Science Platform Test Specification

1 Introduction

This document specifies the test procedure for the LSST Science Platform. The LSST Science Platform is the component of the LSST system which is responsible for providing data access and data analysis capabilities to users. It is aimed at meeting the needs of several categories of users, including:

- Science users with LSST data rights;
- LSST Project, and later, Operations staff doing algorithm development and the associated validations;
- LSST Project staff engaged in Commissioning and related activities; and
- LSST Operations staff engaged in science validation and other data quality analyses

A full description of this product is provided in LDM-542, with requirements enumerated in LDM-554.

1.1 Objectives

This document builds on the description of LSST Data Management's approach to testing as described in LDM-503 to describe the detailed tests that will be performed on the LSST Science Platform as part of the verification of the DM system.

It identifies test cases and procedures for the tests, and the pass/fail criteria for each test.

1.2 Scope

This document describes the test procedures for the following components of the LSST system (as described in LDM-542), and their deployment over the resources and services of the LSST Data Facility:

- The science database, especially its Qserv component;
- The API Aspect of the Science Platform, comprising:
 - Catalog query via TAP and related VO services;
 - Image metadata query via TAP and SIAv2;
 - Image retrieval and cutout generation;
 - User Workspace database creation and access; and
 - User Workspace file system access.
- The Portal Aspect of the Science Platform, comprising a set of Web-based tools for:
 - Data discovery for Project-generated and user-generated data;
 - Catalog and image query;
 - Image display;
 - Catalog data visualization;
 - Exploratory data analysis; and
 - Alert subscription control.
- The Notebook Aspect of the Science Platform, comprising:
 - A deployment of the JupyterHub and JupyterLab interactive computing environments;
 - Access to the API Aspect services from within that environment;
 - Direct access to elements of the data systems underlying those services, e.g., access to the User File Workspace as a mounted filesystem rather than through the VOSpace API;
 - A customizable, persistent user environment; and
 - The provision of pre-built deployments of releases of the LSST Stack, usable to configure the computational environment provided by JupyterLab.

1.3 Applicable Documents

LDM-148 LSST DM System Architecture
LDM-294 LSST DM Organization & Management
LDM-503 LSST DM Test Plan
LDM-542 LSST Science Platform Design
LDM-554 LSST Science Platform Requirements
LSE-61 LSST DM Subsystem Requirements
LSE-319 LSST Science Platform Vision Document
LSE-163 LSST Data Products Definition Document

1.4 References

- [1] **[LSE-61]**, Dubois-Felsmann, G., Jenness, T., 2018, *LSST Data Management Subsystem Requirements*, LSE-61, URL <https://ls.st/LSE-61>
- [2] **[LDM-542]**, Dubois-Felsmann, G., Lim, K.T., Wu, X., et al., 2017, *LSST Science Platform Design*, LDM-542, URL <https://ls.st/LDM-542>
- [3] **[LDM-554]**, Dubois-Felsmann, G., Ciardi, D., Mueller, F., Economou, F., 2018, *Science Platform Requirements*, LDM-554, URL <https://ls.st/LDM-554>
- [4] **[LSE-319]**, Jurić, M., Ciardi, D., Dubois-Felsmann, G., 2017, *LSST Science Platform Vision Document*, LSE-319, URL <https://ls.st/LSE-319>
- [5] **[LSE-163]**, Jurić, M., et al., 2017, *LSST Data Products Definition Document*, LSE-163, URL <https://ls.st/LSE-163>
- [6] **[LDM-148]**, Lim, K.T., Bosch, J., Dubois-Felsmann, G., et al., 2018, *Data Management System Design*, LDM-148, URL <https://ls.st/LDM-148>
- [7] **[LDM-502]**, Nidever, D., Economou, F., 2016, *The Measurement and Verification of DM Key Performance Metrics*, LDM-502, URL <https://ls.st/LDM-502>
- [8] **[LDM-294]**, O'Mullane, W., Swinbank, J., Jurić, M., DMLT, 2018, *Data Management Organization and Management*, LDM-294, URL <https://ls.st/LDM-294>

- [9] **[LDM-503]**, O'Mullane, W., Swinbank, J., Jurić, M., Economou, F., 2018, *Data Management Test Plan*, LDM-503, URL <https://ls.st/LDM-503>
- [10] **[LPM-122]**, Petravick, D., 2015, *LSST Information Classification Policy*, LPM-122, URL <https://ls.st/LPM-122>

2 Approach

The major activities to be performed are to:

- Verify that the LSST Science Platform components are capable of performing the functions defined in the relevant DM System Requirements, LSE-61, and in the Science Platform Requirements, LDM-554.
- Ensure that the components of the Science Platform match the documented design.
- Test all the interfaces among components of the Science Platform.
- Test all the interfaces between components of the Science Platform and other DM system components.
- Within the limits of available integration and test hardware platforms and datasets, verify that the Science Platform components meet the performance requirements set forth in the above documents, or extrapolate appropriately from the test systems available to verify that the performance requirements should be met on a fully provisioned hardware platform.
- Repeat these tests when the full hardware platform becomes available.
- Ensure that the test procedures developed are also relevant to pre-deployment testing in the Operations era.
- Ensure that the observed behavior of the Science Platform components when under test is consistent with the available documentation produced by their developers or by other authors.

2.1 Tasks and criteria

The following are the major items under test:

- The LSST science database;
- The API Aspect of the Science Platform, encompassing Web APIs for access to LSST Data Products, both within the science database and within the Data Backbone, and enabling the creation, sharing, and management of User Generated Data Products;
- The Portal Aspect of the Science Platform, encompassing user interfaces for data discovery, retrieval, visualization, and exploratory data analysis, as well as an interface for the control of the alert subscription and “mini-broker” filtering mechanism; and
- The Notebook Aspect of the Science Platform, providing interactive computing services for LSST science users and project-internal analysts.

2.2 Features to be tested

- Availability and, where relevant, proper interpretation of Prompt Data Products through each Aspect of the Science Platform;
- Availability and, where relevant, proper interpretation of Data Release Data Products through each Aspect of the Science Platform;
- Creation of, access to, and management of User Generated Data Products through each Aspect of the Science Platform;
- Features related to authentication and authorization of users, including those related to custom access controls to User Generated Data Products;
- Features related to the manageability of the Science Platform as an operational service; and
- Integration of the components of the Science Platform with each other and with the underlying services on which they run.

2.3 Features not to be tested

This document does not describe facilities for periodically generating or collecting key performance metrics (KPMs), except insofar as those KPMs are incidentally measured as part of executing the documented testcases. The KPMs and the system being used to track KPMs and to ensure compliance with documented requirements are described in LDM-502.

2.4 Pass/fail criteria

The results of all tests will be assessed using the criteria described in LDM-503 §4.

Note that, when executing pipelines, tasks or individual algorithms, any unexplained or unexpected errors or warnings appearing in the associated log or on screen output must be described in the documentation for the system under test. Any warning or error for which this is not the case must be filed as a software problem report and filed with the DMCCB.

2.5 Suspension criteria and resumption requirements

Refer to individual test cases where applicable.

2.6 Naming convention

With the introduction of Jira ATM plugin, the adopted naming convention is based on the corresponding Jira objects:

LVV : Is the label for the “LSST Verification and Validation” project in Jira.

LVV-XXX : Are Verification Elements, where XXX is the Verification Element identifier. Each Verification Element has at least one Test Case.

LVV-TYYY : Are Test Cases. Each Test Case is associated with a Verification Element, where YYY is the Test Case identifier.

A few deprecated test cases are still reporting in the name the old identification, that was according to the pattern LSP-XX-YY where:

LSP The product under test: the LSST Science Platform

xx Test specification number (in increments of 10)

yy Test case number (in increments of 5)

3 Test Cases Summary

Test Id	Test Name	
LVV-T622	Verify LSP only available to authenticated users	Approved
LVV-T807	Verify synchronous TAP queries	Approved
LVV-T1334	LDM-503-10a: Portal Aspect tests for LSP with Authentication and TAP milestone	Approved
LVV-T1436	LDM-503-10a: Notebook Aspect tests for LSP with Authentication and TAP milestone	Approved
LVV-T1437	LDM-503-10a: API Aspect tests for LSP with Authentication and TAP milestone	Approved
LVV-T1818	DM-SUIT-8: Verify Portal integration with workspace (via WebDAV)	Approved
LVV-T598	Verify access to All Released or Authorized Data Products	Draft
LVV-T600	Verify LSP provides a portal aspect	Draft
LVV-T601	Verify LSP provides a notebook aspect	Draft
LVV-T602	Verify LSP provides web API	Draft
LVV-T603	Verify data access through multiple linked aspects	Draft
LVV-T604	Verify use of VO standards	Draft
LVV-T605	Verify that LSP complies with LSST data access policies	Draft
LVV-T606	Verify semantic linkages between data items	Draft
LVV-T607	Verify semantic linkages between data items and uncertainties	Draft
LVV-T608	Verify transfer of Portal data references to Notebook aspect	Draft
LVV-T609	Verify providing user file storage in LSP	Draft
LVV-T610	Verify providing user generated database in LSP	Draft
LVV-T611	Verify access controls in user workspace	Draft
LVV-T612	Verify ability to download data from LSP	Draft
LVV-T613	Verify ability to upload data to LSP	Draft
LVV-T614	Verify ability to transfer data to and from the Workspace	Draft
LVV-T615	Verify file formats provided for tabular data download	Draft
LVV-T616	Verify file formats provided for image data download	Draft

Test Id	Test Name	
LVV-T617	Verify support for peak volume of moderate-sized queries	Draft
LVV-T618	Verify support for peak volume of queries on all Objects	Draft
LVV-T619	Verify LSP handles peak volume of queries	Draft
LVV-T620	Verify LSP supports required download bandwidth	Draft
LVV-T621	Verify LSP user reference and documentation	Draft
LVV-T623	Verify support for new LSP users	Draft
LVV-T624	Verify implementation of common identity across LSP aspects	Draft
LVV-T625	Verify authentication via external identity providers	Draft
LVV-T626	Verify LSP identity can have multiple associated credentials	Draft
LVV-T627	Verify implementation of Acceptable Use Policy	Draft
LVV-T628	Verify LSP connections encrypted	Draft
LVV-T629	Verify privacy of users' activities	Draft
LVV-T630	Verify multiple LSP instances	Draft
LVV-T631	Verify LSP access from the public Internet (IPv4)	Draft
LVV-T632	Verify LSP access from the public Internet (IPv6)	Draft
LVV-T633	Verify indication of system availability	Draft
LVV-T634	Verify Portal is a web application	Draft
LVV-T635	Verify Portal discovery of all data products	Draft
LVV-T636	Verify Portal access to Workspace	Draft
LVV-T637	Verify Portal provides semantic linkages between data products	Draft
LVV-T638	Verify access to calibration products via Portal	Draft
LVV-T639	Verify associations between single images and coadds	Draft
LVV-T640	Verify access to external archives from Portal	Draft
LVV-T641	Verify API for Access to Portal Session State	Draft
LVV-T642	Verify Portal supports both synchronous and asynchronous queries	Draft
LVV-T643	Verify capability to run long queries in the background	Draft
LVV-T644	Verify user notification of query status	Draft
LVV-T645	Verify limitation of query results size	Draft
LVV-T646	Verify ability to browse query history	Draft
LVV-T647	Verify implementation of saving of queries	Draft
LVV-T648	Verify implementation of generic queries in API aspect	Draft
LVV-T649	Verify implementation of form-based generic query in API aspect	Draft
LVV-T650	Verify implementation of ADQL-based generic query in API aspect	Draft
LVV-T651	Verify estimation of query result size	Draft

Test Id	Test Name	
LVV-T652	Verify query by unique identifier	Draft
LVV-T653	Verify query by object or source identifier	Draft
LVV-T654	Verify query by Solar System object identifier	Draft
LVV-T655	Verify query by position on the sky	Draft
LVV-T656	Verify query by list of positions	Draft
LVV-T657	Verify implementation of astrophysical coordinate systems	Draft
LVV-T658	Verify positional query by astrophysical source name	Draft
LVV-T659	Verify positional query by Source or Object name	Draft
LVV-T660	Verify positional query based on Solar System object names	Draft
LVV-T661	Verify query by cone search	Draft
LVV-T662	Verify query by box search	Draft
LVV-T663	Verify query by time of observation	Draft
LVV-T664	Verify implementation of user-friendly tabular query	Draft
LVV-T666	Verify query by image metadata	Draft
LVV-T667	Verify queries on the alerts database	Draft
LVV-T668	Verify access to original alert state	Draft
LVV-T669	Verify query for single-epoch visit images	Draft
LVV-T670	Verify query for single-epoch raft images	Draft
LVV-T671	Verify query for single-epoch CCD images	Draft
LVV-T672	Verify metadata query for single-epoch images	Draft
LVV-T673	Verify query for coadds by image metadata	Draft
LVV-T674	Verify query for coadd image cutouts	Draft
LVV-T675	Verify query for single-epoch image cutouts	Draft
LVV-T676	Verify display of native single-visit images	Draft
LVV-T677	Verify Portal provides visualization of tabular and image data	Draft
LVV-T678	Verify visualization of ancillary information	Draft
LVV-T679	Verify visualization linking image and tabular data	Draft
LVV-T680	Verify visualization tool for uploaded tabular or image data	Draft
LVV-T681	Verify visualization of workspace data	Draft
LVV-T682	Verify availability of property sheets for table rows	Draft
LVV-T683	Verify visualization of alerts	Draft
LVV-T684	Verify display of tabular data	Draft
LVV-T685	Verify column selection from tables	Draft
LVV-T686	Verify capability to re-order columns in displayed tabular data	Draft

Test Id	Test Name	
LVV-T687	Verify capability of copying data in tables	Draft
LVV-T688	Verify row selection from tables	Draft
LVV-T689	Verify capability to display tabular data in paged format	Draft
LVV-T690	Verify creation and display of X-Y scatter plots	Draft
LVV-T691	Verify creation and display of histogram plots	Draft
LVV-T692	Verify capability to change symbol shapes, sizes, and colors in XY(Z) scatter plots	Draft
LVV-T693	Verify visualization of uncertainties in plots	Draft
LVV-T694	Verify visualization of asymmetric uncertainties	Draft
LVV-T695	Verify visualization of upper and lower limits in plots	Draft
LVV-T696	Verify visualization of multiple XY plots on the same display	Draft
LVV-T697	Verify display of raft and full focal-plane single-visit images	Draft
LVV-T698	Verify display of cutout from single-visit image	Draft
LVV-T699	Verify display of native coadd images	Draft
LVV-T700	Verify display of coadd cutouts and mosaics	Draft
LVV-T701	Verify display of calibration images	Draft
LVV-T702	Verify display of user-provided images	Draft
LVV-T703	Verify display of image property sheet	Draft
LVV-T704	Verify that coordinate display tools are provided for images	Draft
LVV-T705	Verify image pixel content display	Draft
LVV-T706	Verify spatial manipulation of images	Draft
LVV-T707	Verify multi-image scaling and alignment	Draft
LVV-T708	Verify manipulation of image appearance	Draft
LVV-T709	Verify display of image mask and variance overlays	Draft
LVV-T710	Verify display of plot overlays on images	Draft
LVV-T711	Verify capability to adjust the appearance of plot overlays on images	Draft
LVV-T712	Verify display all-sky HEALPix image	Draft
LVV-T713	Verify ability to zoom in/out on a HEALPix image	Draft
LVV-T714	Verify panning in HEALPix image display	Draft
LVV-T715	Verify selection of HEALPix pixels	Draft
LVV-T716	Verify retrieval of HEALPix-associated data	Draft
LVV-T717	Verify broad applicability of coordinate display	Draft
LVV-T718	Verify point coordinate display	Draft
LVV-T719	Verify distance measurement tool	Draft

Test Id	Test Name	
LVV-T720	Verify coordinate grid overlays	Draft
LVV-T721	Verify astrophysical compass overlay	Draft
LVV-T722	Verify geometric figure overlays	Draft
LVV-T723	Verify sorting of tabular data by column	Draft
LVV-T724	Verify simple filtering of tabular data	Draft
LVV-T725	Verify calculated filtering of tabular data	Draft
LVV-T726	Verify filtering data by multiple table columns	Draft
LVV-T727	Verify calculated tabular data columns	Draft
LVV-T728	Verify statistical measurements on tabular data	Draft
LVV-T729	Verify saving of displayed tabular data	Draft
LVV-T730	Verify creation and display of false-color images	Draft
LVV-T731	Verify statistical measurements on user-selected regions of images	Draft
LVV-T732	Verify overlay of catalog sources/objects on images	Draft
LVV-T733	Verify overlay of LSST-derived orbits on images	Draft
LVV-T734	Verify overlay of user-supplied catalogs on images	Draft
LVV-T735	Verify overlay of user-supplied region files on images	Draft
LVV-T736	Verify overlay of camera artifacts on images	Draft
LVV-T737	Verify single-object time-domain image view	Draft
LVV-T738	Verify position-based time-domain image view	Draft
LVV-T739	Verify display of light curves	Draft
LVV-T740	Verify linked tables, plots, and images	Draft
LVV-T741	Verify capability to select data from a plot or image	Draft
LVV-T742	Verify saving data selection from a plot or image	Draft
LVV-T743	Verify access to user databases	Draft
LVV-T744	Verify tabular data download	Draft
LVV-T745	Verify image data download	Draft
LVV-T746	Verify selected image download	Draft
LVV-T747	Verify estimation of data download volume	Draft
LVV-T748	Verify notification of long download completion	Draft
LVV-T749	Verify API for visualization components	Draft
LVV-T750	Verify implementation of storage quotas status	Draft
LVV-T751	Verify implementation of computational quotas status	Draft
LVV-T752	Verify saved Portal display preferences	Draft
LVV-T753	Verify alert subscription service	Draft

Test Id	Test Name	
LVV-T754	Verify availability of pre-defined alert filters	Draft
LVV-T755	Verify availability of user-defined alert filters	Draft
LVV-T756	Verify monitoring of alert subscription	Draft
LVV-T757	Verify access to survey documentation	Draft
LVV-T758	Verify access to Portal documentation	Draft
LVV-T759	Verify access to Portal API documentation	Draft
LVV-T760	Verify tolerance of database changes	Draft
LVV-T761	Verify implementation of system-busy notification	Draft
LVV-T762	Verify availability of interactive Python environment	Draft
LVV-T763	Verify availability of Unix shell access	Draft
LVV-T764	Verify availability of containerized software releases	Draft
LVV-T765	Verify latency of release deployment	Draft
LVV-T766	Verify availability of data access middleware	Draft
LVV-T767	Verify availability of standard astronomy software	Draft
LVV-T768	Verify availability of user package installation	Draft
LVV-T769	Verify availability of user development environment	Draft
LVV-T770	Verify availability of persistent user home file space	Draft
LVV-T771	Verify availability of Notebook aspect documentation	Draft
LVV-T772	Verify new-user onboarding	Draft
LVV-T773	Verify availability of shared file space	Draft
LVV-T774	Verify API and Portal aspects accessible from Notebook	Draft
LVV-T775	Verify access to User File Workspace	Draft
LVV-T776	Verify access to VOspace services from Notebook aspect	Draft
LVV-T777	Verify user database workspace access from Notebook aspect	Draft
LVV-T778	Verify access to batch system	Draft
LVV-T779	Verify implementation of quotas in Notebook aspect	Draft
LVV-T780	Verify access to all data products from Notebook aspect	Draft
LVV-T781	Verify ease of Notebook aspect deployment	Draft
LVV-T782	Verify workload for deployment in Kubernetes	Draft
LVV-T783	Verify monitoring of Notebook system health	Draft
LVV-T784	Verify visualization of images in Notebook aspect	Draft
LVV-T785	Verify availability of scientific plotting tools in Notebook aspect	Draft
LVV-T786	Verify linkage of visualization tools in Notebook aspect	Draft
LVV-T787	Verify interactivity of visualizations in Notebook aspect	Draft

Test Id	Test Name	
LVV-T788	Verify interactive scaling of visualizations in Notebook aspect	Draft
LVV-T789	Verify access to Portal queries from Notebook aspect	Draft
LVV-T790	Verify access to Portal visualization API from Notebook aspect	Draft
LVV-T791	Verify ability to launch a notebook with access to Portal query results	Draft
LVV-T792	Verify implementation of secure protocol for Notebook aspect	Draft
LVV-T793	Verify implementation of authentication and authorization service in Notebook aspect	Draft
LVV-T794	Verify secure implementation of Notebook aspect	Draft
LVV-T795	Verify access to Notebook aspect via IPv6	Draft
LVV-T796	Verify web APIs use CAOM2	Draft
LVV-T797	Verify API access to image and visit metadata	Draft
LVV-T798	Verify API access to catalog data products	Draft
LVV-T799	Verify API access to observatory metadata	Draft
LVV-T800	Verify API enforcement of information classification	Draft
LVV-T801	Verify API access to reference catalogs	Draft
LVV-T802	Verify API access to virtual data products	Draft
LVV-T803	Verify API access to FITS image data	Draft
LVV-T804	Verify API access to multiple data releases	Draft
LVV-T805	Verify API provides catalog metadata	Draft
LVV-T806	Verify availability of TAP service	Draft
LVV-T808	Verify asynchronous TAP queries	Draft
LVV-T809	Verify availability of ADQL for queries	Draft
LVV-T810	Verify SIA service for image availability	Draft
LVV-T811	Verify availability of SODA service for image data	Draft
LVV-T812	Verify API SODA cutout image support	Draft
LVV-T813	Verify query history retrieval	Draft
LVV-T814	Verify availability of cached query result retrieval	Draft
LVV-T815	Verify retrieval of query specifications	Draft
LVV-T816	Verify Butler interface to data products	Draft
LVV-T817	Verify availability of VOSpace service	Draft
LVV-T818	Verify availability of WebDAV service	Draft
LVV-T819	Verify VOTable 1.3 support	Draft
LVV-T820	Verify support for VOTable TABLEDATA payload	Draft

Test Id	Test Name	
LVV-T821	Verify support for VOTable BINARY2 payload	Draft
LVV-T822	Verify JSON support for TAP outputs	Draft
LVV-T823	Verify CSV support for TAP outputs	Draft
LVV-T824	Verify SQLite support for TAP outputs	Draft
LVV-T825	Verify support for tabular result download to Workspace	Draft
LVV-T826	Verify support for tabular upload to Workspace	Draft
LVV-T827	Verify ability to drop catalogs from Workspace	Draft
LVV-T828	Verify API uses secure protocols	Draft
LVV-T829	Verify API authentication	Draft
LVV-T830	Verify API uses project authorization infrastructure	Draft
LVV-T831	Verify secure implementation of APIs	Draft
LVV-T832	Verify containerized deployment of API services	Draft
LVV-T833	Verify support for compression of API results	Draft
LVV-T834	Verify API upgradeability	Draft
LVV-T835	Verify API logging and monitoring	Draft
LVV-T1824	Portal Aspect access to processed HSC data in the LSP	Draft
LVV-T1825	Notebook Aspect access to processed HSC data in the LSP	Draft

4 Active Test Cases

This section documents all active test cases that have a status in the Jira/ATM system of Draft, Defined or Approved.

4.1 Approved Test Cases

4.1.1 LVV-T622 - Verify LSP only available to authenticated users

Version	Status	Priority	Verification Type	Owner
1	Approved	Normal	Inspection	Jeffrey Carlin

Open LVV-T622 in Jira

4.1.1.1 Verification Elements

- LVV-9830 - DMS-LSP-REQ-0020-V-01: Authenticated User Access_1

4.1.1.2 Test Items

Verify that the functions and services of all three aspects of the LSP are accessible only to authenticated users.

4.1.1.3 Test Procedure

Step 1	Description
	Attempt to navigate to the Portal Aspect of the LSP instance under test. Verify that credentials are requested and that a Portal interface is not displayed.
Expected Result	
	No direct access to Portal; credential request screen displayed.

Step 2	Description
--------	-------------

Enter the (presumably invalid) credentials user=foo, password=xyzyz, and verify that access to the Portal Aspect interface is not granted.

Test Data

user=foo, password=xyzyz

Expected Result

No access to Portal Aspect; credential request screen displayed again. Record any error message that is shown.

Step 3	Description
--------	-------------

Enter a set of valid credentials, and verify that access to the Portal interface is granted.

This test does not involve any exploration of the Portal behavior at this point.

Test Data

Credentials for the user executing the test.

Expected Result

Access to some version of the Portal interface is granted. (The exact nature of that interface will be evolving in the course of LSST construction and system integration.)

Step 4	Description
--------	-------------

Log out from the Portal.

Expected Result

A logout or LSP landing page is displayed.

Step 5	Description
--------	-------------

Attempt to navigate to the Notebook Aspect of the LSP instance under test. Verify that credentials are requested and that no other Notebook Aspect functionality is exposed.

Expected Result

No direct access to the Notebook Aspect; credential request screen displayed.

Step 6	Description
--------	-------------

Enter the (presumably invalid) credentials user=foo, password=xyzyz, and verify that access to the Notebook Aspect interface is not granted.

Test Data

user=foo, password=xyzyz

Expected Result

No access to Notebook Aspect; credential request screen displayed again. Record any error message that is shown.

Step 7 Description

Enter a set of valid credentials, and verify that access to the Notebook Aspect interface is granted.

This test does not involve any exploration of the Notebook Aspect behavior at this point.

Test Data

Credentials for the user executing the test.

Expected Result

An initial page of the JupyterHub system is displayed. Note briefly what is seen, but no further testing is required.

Step 8 Description

Log out of the Notebook Aspect.

Expected Result

Step 9 Description

From a Unix prompt on a system with network access to the TAP service in the LSP instance under test, verify using the “curl” command below that an attempt to access the TAP service without credentials is rejected.

Expected Result

Step 10 Description

From a Unix prompt on a system with network access to the TAP service in the LSP instance under test, verify using the “curl” command below that an attempt to access the TAP service with invalid credentials is rejected.

Replace “lsst-lsp-int.ncsa.illinois.edu” in the “curl” command with the appropriate root URL for the LSP instance under test.

Example Code

```
curl -w 'HTTP status code: %{http_code}\nContent-Type: %{content_type}\nTotal time: %{time_total}\nBytes received: %{size_download}\nFinal URL: %{url_effective}\n' -L 'https://lsst-lsp-int.ncsa.illinois.edu/api/tap/sync?LANG=ADQL&REQUEST=doQuery&QUERY=SELECT+*+FROM+TAP_SCHE'
```

Expected Result

Step 11	Description
----------------	--------------------

Using a web browser, navigate to the token-access endpoint (/auth/tokens) of the LSP instance under test. Authenticate with valid LSST credentials. Obtain a token for the “read:tap” capability. Leave the resulting web page displayed. It is not necessary to expose the full token text.

Expected Result

A token is granted.

Step 12	Description
----------------	--------------------

From a Unix prompt on a system with network access to the TAP service in the LSP instance under test, and a “bash”-style shell, verify using the “export” and “curl” commands below that an attempt to access the TAP service with the token from the previous step is successful.

Replace “lsst-lsp-int.ncsa.illinois.edu” in the “curl” command with the appropriate root URL for the LSP instance under test.

Use the “copy to clipboard” function from the token-access page from the previous step to paste the token into the (blind) prompt that results from the first “export” command.

Ensure that the token is deleted from the test environment after the “curl” command is complete, and that the token is invalidated via the token-access web interface.

Example Code

```
export ACCESS_TOKEN
read -p token -s ACCESS_TOKEN
curl -w 'HTTP status code: %{http_code}\nContent-Type: %{content_type}\nTotal time: %{time_total}\nBytes received: %{size_download}\nFinal URL: %{url_effective}\n' -L -header "Authorization: Bearer ${ACCESS_TOKEN}" -o tap-tables.xml 'https://lsst-lsp-int.ncsa.illinois.edu/api/tap/sync?LAN
unset ACCESS_TOKEN
```

Expected Result

The “curl” command should return HTTP status code 200 and a VOTable containing a list of tables in the TAP service should be obtained.

Retain the VOTable file in the test records.

4.1.2 LVV-T807 - Verify synchronous TAP queries

Version	Status	Priority	Verification Type	Owner
1	Approved	Normal	Inspection	Jeffrey Carlin

Open LVV-T807 in Jira

4.1.2.1 Verification Elements

- LVV-10014 - DMS-API-REQ-0007-V-01: Synchronous TAP Support_1

4.1.2.2 Test Items

Verify that the API Aspect TAP endpoint supports synchronous queries as described by the IVOA TAP 1.1 specification.

4.1.2.3 Test Procedure

Step 1-1 from LVV-T1591	Description
Using a Web browser, navigate to the "/auth/tokens" endpoint of the LSP instance under test.	
Expected Result	
A credential-entry screen should be displayed, unless the test user is already logged in in another window or tab of the browser.	
Step 1-2 from LVV-T1591	Description
If necessary, enter a valid set of credentials. They may be NCSA or non-NCSA credentials.	
Expected Result	
The token-request UI is displayed.	
Step 1-3 from LVV-T1591	Description
Request a token for the "read:tap" capability.	
Expected Result	
A screen confirming the creation of the token.	
Step 1-4 from LVV-T1591	Description
Leave the resulting page's browser tab/window open for use in subsequent test steps.	

In many cases you may be asked in a subsequent step to use the “copy token to clipboard” UI element on this page in order to transfer your token to a prompt in another window.

Expected Result

Step 2	Description
--------	-------------

From a Unix prompt on a system with network access to the TAP service in the LSP instance under test, and a “bash”-style shell, verify using the “export” and “curl” commands below that an attempt to access the TAP service with the token from the previous step is successful.

Replace “lsst-lsp-int.ncsa.illinois.edu” in the “curl” command with the appropriate root URL for the LSP instance under test.

Use the “copy to clipboard” function from the token-access page from the previous step to paste the token into the (blind) prompt that results from the “read” command.

Ensure that the token is deleted from the test environment after the “curl” command is complete, and that the token is invalidated via the token-access web interface.

Example Code

```
export ACCESS_TOKEN
read -p token -s ACCESS_TOKEN
curl -w 'HTTP status code: %{http_code}\nContent-Type: %{content_type}\nTotal time: %{time_total}\nBytes received: %{size_download}\nFinal URL: %{url_effective}\n' -L -header "Authorization: Bearer ${ACCESS_TOKEN}" -o tap-tables.xml 'https://lsst-lsp-int.ncsa.illinois.edu/api/tap/sync?LAN
unset ACCESS_TOKEN
```

Expected Result

Step 3	Description
--------	-------------

Verify by inspection that the file resulting from the “curl” command above has the general form of a VOTable. (A separate test case will verify the VOTable format itself.)

Save this file as part of the test records using LSST standard procedures.

Expected Result

4.1.3 LVV-T1334 - LDM-503-10a: Portal Aspect tests for LSP with Authentication and TAP milestone

Version	Status	Priority	Verification Type	Owner
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1	Approved	Normal	Test	Gregory Dubois-Felsmann
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Open LVV-T1334 in Jira

4.1.3.1 Verification Elements

- LVV-9811 - DMS-LSP-REQ-0002-V-01: Portal Aspect_1
- LVV-9809 - DMS-LSP-REQ-0005-V-01: Linkage of Aspects_1
- LVV-9812 - DMS-LSP-REQ-0006-V-01: Use of VO Standards_1
- LVV-9830 - DMS-LSP-REQ-0020-V-01: Authenticated User Access_1
- LVV-9831 - DMS-LSP-REQ-0022-V-01: Common Identity_1
- LVV-9834 - DMS-LSP-REQ-0023-V-01: Use of External Identity Providers_1
- LVV-9835 - DMS-LSP-REQ-0024-V-01: Use of Multiple Sets of Credentials_1
- LVV-9841 - DMS-PRTL-REQ-0001-V-01: Portal is a Web Application_1
- LVV-9857 - DMS-PRTL-REQ-0015-V-01: Generic Query_1
- LVV-9856 - DMS-PRTL-REQ-0016-V-01: Generic Query - Form-based_1
- LVV-9855 - DMS-PRTL-REQ-0017-V-01: Generic Query - ADQL-based_1
- LVV-9866 - DMS-PRTL-REQ-0020-V-01: Positional Query: Position on the Sky_1
- LVV-9869 - DMS-PRTL-REQ-0026-V-01: Positional Query by Region: Cone-Search_1
- LVV-9891 - DMS-PRTL-REQ-0049-V-01: Display of Tabular Data_1
- LVV-9932 - DMS-PRTL-REQ-0095-V-01: Saving Displayed Tabular Data_1

4.1.3.2 Test Items

This test case verifies that the Portal Aspect of the Science Platform is accessible to authorized users through a login process, and that TAP searches can be performed from the Portal

Aspect UI.

In so doing and in conjunction with the other LDM-503-10a test cases collected under LVV-P48, it addresses all or part of the following requirements:

- DMS-LSP-REQ-0002, DMS-LSP-REQ-0005, DMS-LSP-REQ-0006, DMS-LSP-REQ-0020, DMS-LSP-REQ-0022, DMS-LSP-REQ-0023, DMS-LSP-REQ-0024
- DMS-PRTL-REQ-0001, DMS-PRTL-REQ-0015, DMS-PRTL-REQ-0016, DMS-PRTL-REQ-0017, DMS-PRTL-REQ-0020, DMS-PRTL-REQ-0026, DMS-PRTL-REQ-0049, and DMS-PRTL-REQ-0095, primarily

Note this test was not designed to perform a full verification of the above requirements, but rather to demonstrate having reached a certain level of partial capability during construction.

4.1.3.3 Environment Needs

4.1.3.3.1 Software

The test requires only the use of a Web browser. Depending on the location / IP address of the browser host, a VPN connection to NCSA may be required.

4.1.3.4 Test Procedure

Step 1	Description
	Navigate to the https://lsst-lsp-stable.ncsa.illinois.edu/ endpoint of the LSP at the LDF. From the displayed page, navigate to the Portal Aspect.
Test Data	
	n/a
Expected Result	
	A login screen should be displayed.

Step 2	Description
Log in to the Portal Aspect with NCSA credentials. Verify that a Portal TAP search screen comes up. Note the user name displayed in the upper left of the Portal. Log out.	
Test Data	
(NCSA credentials for an authorized user)	
Expected Result	
Following login, the Portal Aspect TAP search screen should be displayed, or a clearly visible UI element allowing one-click access to that screen. A user name corresponding to the credentials entered should be displayed.	
Step 3	Description
Log in to the Portal Aspect with alternate credentials that are associated with the same identity.	
Expected Result	
The Portal application should come up just as in the previous step; the user name displayed in the upper left of the Portal should be the same as in the previous step.	
Step 4	Description
Navigate to the TAP search screen, if necessary, and ensure that the LSST TAP service associated with the chosen LSP instance is selected.	
Expected Result	
A TAP search screen should either already be displayed after the previous step, or should be displayed after a one-click action from the Portal's initial page. On the TAP screen, a UI element allowing the choice of TAP service to user should be available, and an LSST TAP service associated with the LSP instance under test should be pre-selected as the default.	
Step 5	Description
Verify that the same WISE and SDSS catalog tables that were explored in DMTR-52 are now visible in the TAP service.	
Expected Result	
The SDSS Stripe 82 2013 processing's deep detection and forced photometry catalogs, and the WISE mission's principal catalog, forced photometry catalog, and single-epoch source catalog should be accessible.	
Step 6	Description
Perform a TAP search on the AllWISE source catalog around the equatorial coordinates (2, 0) (degrees), with a 30 arcminute radius, using the Portal UI to specify the query (select the "Single Table" radio button).	
To find the AllWISE source catalog, select the "wise_00" schema from the schema menu, and then the "wise_00.allwise_p3as_psd" table from the table menu.	
When the query completes, note the total number of rows in the table, as displayed in the table header, and record it.	

Test Data

Equatorial coordinates: (2, 0), cone radius 30 arcmin

Expected Result

This query should return about 12,000 rows of data. It should be displayed in a table, as an overlay on a context image, and as a configurable 2D density plot.

Step 7 Description

Using the table viewer UI, save the result of this search as a text file in CSV format. Use a line-counting tool to find the number of rows in the result, record it, and compare it with the reported number from the previous step. Ensure that the CSV file's name is "LVV-T1334-output.csv" and save it to the designated repository for test outputs.

Expected Result

Allowing for the CSV header row, the number of rows in the file should match the number of rows in the table header in the UI.

Step 8 Description

Return to the TAP search screen in the UI (this can be done with the "TAP Searches" button near the top of the window), select the "ADQL" radio button, and view and record the ADQL text displayed for the query performed. Select "Cancel" to dismiss the search screen.

Expected Result

The query should appear to have the expected form for an ADQL cone search, using the CONTAINS() and CIRCLE() functions.

Step 9 Description

Select the "i"-in-a-circle button in the table header. In the resulting dialog box, click on the copy-to-clipboard icon for the TAP job URL for the query and paste the URL into the test record.

Expected Result

Step 10 Description

In a separate browser window, access the page available at the URL obtained from the previous step. Observe and record the ADQL text for the query, in the '<uws:parameter id="query">' XML element. Verify that it matches the ADQL text obtained from the UI in a previous step.

Expected Result

The ADQL code matches that from Step 8.

4.1.4 LVV-T1436 - LDM-503-10a: Notebook Aspect tests for LSP with Authentication and TAP milestone

Version	Status	Priority	Verification Type	Owner
1	Approved	Normal	Test	Gregory Dubois-Felsmann

Open LVV-T1436 in Jira

4.1.4.1 Verification Elements

- LVV-9810 - DMS-LSP-REQ-0003-V-01: Notebook Aspect_1
- LVV-9809 - DMS-LSP-REQ-0005-V-01: Linkage of Aspects_1
- LVV-9812 - DMS-LSP-REQ-0006-V-01: Use of VO Standards_1
- LVV-9830 - DMS-LSP-REQ-0020-V-01: Authenticated User Access_1
- LVV-9831 - DMS-LSP-REQ-0022-V-01: Common Identity_1
- LVV-9834 - DMS-LSP-REQ-0023-V-01: Use of External Identity Providers_1
- LVV-9835 - DMS-LSP-REQ-0024-V-01: Use of Multiple Sets of Credentials_1
- LVV-9836 - DMS-LSP-REQ-0026-V-01: Using secure protocols_1
- LVV-10000 - DMS-NB-REQ-0001-V-01: Secure Protocol_1
- LVV-9998 - DMS-NB-REQ-0002-V-01: Authentication and Authorization_1
- LVV-9971 - DMS-NB-REQ-0005-V-01: Interactive Python Environment_1
- LVV-9976 - DMS-NB-REQ-0006-V-01: Unix Shell Access_1
- LVV-9973 - DMS-NB-REQ-0013-V-01: Persistent User Home File Space_1
- LVV-9980 - DMS-NB-REQ-0017-V-01: Access to the API and Portal Aspects_1
- LVV-9996 - DMS-NB-REQ-0029-V-01: Access to Portal-Initiated Queries_1

4.1.4.2 Test Items

This test case verifies that the Notebook Aspect of the Science Platform is accessible to authorized users through a login process, and that TAP searches can be performed from Python code in the Notebook Aspect.

In so doing and in conjunction with the other LDM-503-10a test cases collected under LVV-P48, it addresses all or part of the following requirements:

- DMS-LSP-REQ-0003, DMS-LSP-REQ-0005, DMS-LSP-REQ-0006, DMS-LSP-REQ-0020, DMS-LSP-REQ-0022, DMS-LSP-REQ-0023, DMS-LSP-REQ-0024
- DMS-NB-REQ-0001, DMS-NB-REQ-0002, DMS-NB-REQ-0005, DMS-NB-REQ-0006, DMS-NB-REQ-0013, DMS-NB-REQ-0017, and DMS-NB-REQ-0029, primarily

Note this test was not designed to perform a full verification of the above requirements, but rather to demonstrate having reached a certain level of partial capability during construction.

4.1.4.3 Environment Needs

4.1.4.3.1 Software

As client-side software, the test requires only the use of a Web browser. Depending on the location / IP address of the browser host, a VPN connection to NCSA may be required. Within the Notebook Aspect, a dedicated test notebook is required.

4.1.4.4 Test Procedure

Step 1	Description
	If LVV-T1334 (1.0) has just been carried out, the tester will already be logged in to the Portal Aspect; skip to the next step.

Otherwise, use a Web browser to navigate to the landing page of the LSP instance under test, and click through to the Portal

Aspect link. This should trigger a login process; the tester should log in. Non-NCSA credentials should be used (or have been used) to log in to the Portal Aspect.

Expected Result

The web browser should display a Portal Aspect page with the user's name noted in the upper right hand corner.

Step 2 Description

Use the same Web browser (in a new page or tab) to navigate to the landing page of the LSP instance under test, and click through to the Notebook Aspect link.

Expected Result

No login credentials should be requested. A page allowing the creation of a Notebook Aspect session should be visible.

Step 3 Description

Use the Notebook Aspect UI to create a "small" session using the most recent "recommended" (weekly) release image.

Expected Result

The main JupyterLab UI should appear.

Step 4 Description

Close any Portal Aspect window/tab(s) that are open.

Expected Result

Step 5 Description

Use the JupyterLab Terminal application to create a small file in the user's home directory.

Example Code

To be executed in the Terminal at the shell prompt, e.g.:

```
touch ~/test-20190915.txt
```

(Use the current date.)

Expected Result

The test file should be visible in the JupyterLab file browser.

Step 6 Description

Log out of the Notebook Aspect.

Expected Result

Step 7	Description
--------	-------------

Navigate to the landing page for the LSP instance under test. Navigate to the Portal Aspect from that page. (Do not log in if a login is requested.)

Expected Result

A login should be requested when the Portal Aspect is accessed. (This verifies that *logout* is cross-Aspect.)

Step 8	Description
--------	-------------

Close the login window and quit the web browser in use.

Expected Result

Step 9	Description
--------	-------------

Launch a web browser and navigate to the landing page for the LSP instance under test. Navigate to the Notebook Aspect. When prompted for a login, use NCSA credentials (for the same user as the non-NCSA credentials used above). Request a session of the “medium” category with the most recent “recommended” (weekly) release image.

Expected Result

The usual JupyterLab UI should be displayed.

Step 10	Description
---------	-------------

Examine the JupyterLab file browser for the file created in **Step 5** above. If convenient (e.g., based on other distinctive files or persistent settings), verify further that the same user environment has been reached as with the non-NCSA credentials above.

Expected Result

The same file should be visible. (This verifies that the two sets of credentials lead to the same Notebook Aspect user environment.)

Step 11	Description
---------	-------------

Clone the test notebook for LDM-503-10a, “LDM-503-10a-test.ipynb”, into the user environment from the TBD tag of the TBD Github repository. Record the SHA that applies to the version of the test notebook that has been cloned.

Expected Result

Step 12	Description
---------	-------------

Copy the file “LW-T1334-output.csv” that was saved in the output repository for the LWV-T1334 test case into the home directory of the notebook session.

Expected Result

Step 13	Description
---------	-------------

	Open the test notebook and insert the URL saved from the execution of LVV-T1334, Step 9 into the input cell that reads "portal_job_url = "".
--	--

	Expected Result
--	-----------------

Step 14	Description
---------	-------------

	Execute the entire notebook.
--	------------------------------

	Expected Result
--	-----------------

Step 15	Description
---------	-------------

	Record the success and/or failure indications that appear in the final output cell of the notebook. If the notebook execution produced an exception, record that.
--	--

	Expected Result
--	-----------------

Step 16	Description
---------	-------------

	Save and close the test notebook. Save the fully-executed notebook in TBD location as a record of the test.
--	---

	Expected Result
--	-----------------

Step 17	Description
---------	-------------

	Without logging out, open a new browser window or tab, and navigate to the Portal Aspect of the LSP instance under test. Verify that the Portal Aspect can be accessed without a further login. Verify that the username displayed at the upper right is the same one as in Step 1 above.
--	--

	Expected Result
--	-----------------

Step 18	Description
---------	-------------

	Log out of the Notebook Aspect, close the Portal Aspect windows, and quit the Web browser in use.
--	---

	Expected Result
--	-----------------

4.1.5 LVV-T1437 - LDM-503-10a: API Aspect tests for LSP with Authentication and TAP milestone

Version	Status	Priority	Verification Type	Owner
1	Approved	Normal	Test	Gregory Dubois-Felsmann

Open LVV-T1437 in Jira

4.1.5.1 Verification Elements

- LVV-9808 - DMS-LSP-REQ-0004-V-01: API (Data Access) Aspect_1
- LVV-9809 - DMS-LSP-REQ-0005-V-01: Linkage of Aspects_1
- LVV-9812 - DMS-LSP-REQ-0006-V-01: Use of VO Standards_1
- LVV-9830 - DMS-LSP-REQ-0020-V-01: Authenticated User Access_1
- LVV-9831 - DMS-LSP-REQ-0022-V-01: Common Identity_1
- LVV-9834 - DMS-LSP-REQ-0023-V-01: Use of External Identity Providers_1
- LVV-9835 - DMS-LSP-REQ-0024-V-01: Use of Multiple Sets of Credentials_1
- LVV-10034 - DMS-API-REQ-0003-V-01: Authentication_1
- LVV-10035 - DMS-API-REQ-0004-V-01: Authorization_1
- LVV-10015 - DMS-API-REQ-0006-V-01: TAP Service for Tabular Queries_1
- LVV-10014 - DMS-API-REQ-0007-V-01: Synchronous TAP Support_1
- LVV-10013 - DMS-API-REQ-0008-V-01: Asynchronous TAP Support_1
- LVV-10012 - DMS-API-REQ-0009-V-01: ADQL Support_1
- LVV-10002 - DMS-API-REQ-0023-V-01: Access to Catalog Data Products_1
- LVV-10019 - DMS-API-REQ-0039-V-01: Cached Query Result Retrieval_1
- LVV-10037 - DMS-API-REQ-0001-V-01: Secure Protocols_1

4.1.5.2 Test Items

This test case verifies that the TAP service in the API Aspect of the Science Platform is accessible to authorized users through a login process, and that TAP searches can be performed using the IVOA TAP protocol from remote sites.

In so doing and in conjunction with the other LDM-503-10a test cases collected under LVV-P48, it addresses all or part of the following requirements:

- DMS-LSP-REQ-0004, DMS-LSP-REQ-0005, DMS-LSP-REQ-0006, DMS-LSP-REQ-0020, DMS-LSP-REQ-0022, DMS-LSP-REQ-0023, DMS-LSP-REQ-0024
- DMS-API-REQ-0003, DMS-API-REQ-0004, DMS-API-REQ-0006, DMS-API-REQ-0007, DMS-API-REQ-0008, DMS-API-REQ-0009, DMS-API-REQ-0023, and DMS-API-REQ-0039, primarily

Note this test was not designed to perform a full verification of the above requirements, but rather to demonstrate having reached a certain level of partial capability during construction.

4.1.5.3 Environment Needs

4.1.5.3.1 Software

The user's computer must have software installed that will permit running a Jupyter notebook, preferably under JupyterLab.

4.1.5.4 Test Procedure

Step 1	Description
	On the local computer, clone the test notebook for LDM-503-10a, "LDM-503-10a-test.ipynb", into the user environment from the TBD tag of the TBD Github repository. Note the SHA that applies to the version of the test notebook that has been cloned.
	Expected Result

Step 2 Description

On the local computer, execute the command “pip install pyvo jupyterlabutils” in the local environment. (It is suggested to do this in a venv or conda environment.)

Expected Result

Step 3 Description

Copy the file “LVV-T1334-output.csv” that was saved in the output repository for the LVV-T1334 test case into the home directory of the JupyterLab session.

Expected Result

Step 4 Description

Obtain an access token for the TAP service from the LSP instance under test, by navigating to the <https://lsst-lsp-stable.ncsa.illinois.edu/auth/tokens> endpoint in a web browser and logging in. NCSA credentials for the tester should be used. Copy the access token to the clipboard.

Expected Result

Step 5 Description

Within the Posix shell session from which JupyterLab is to be launched, set the environment variable “ACCESS_TOKEN” to the value of the token obtained in the previous step. To do this without exposing the token unnecessarily, it is suggested to use the “read -s” command, pasting the token in at the no-echo prompt this command produces.

Example Code

```
export ACCESS_TOKEN
read -s ACCESS_TOKEN
```

Expected Result

Step 6 Description

Launch a LOCAL instance of JupyterLab (i.e., by running “jupyter lab”) on the computer to be used for testing. Ensure that the test notebook is visible from within JupyterLab. **NB: as a reminder, this test case must NOT be run in the Notebook Aspect.**

Expected Result

Step 7 Description

Open the test notebook and insert the URL saved from the execution of LVV-T1334, Step 9 into the input cell that reads “portal_job_url = ”.

Expected Result

Step 8	Description
Execute the entire notebook.	

Expected Result

Step 9	Description
Record the success and/or failure indications that appear in the final output cell of the notebook. If the notebook execution produced an exception, record that.	

Expected Result

Step 10	Description
Save and close the test notebook. Save the fully-executed notebook in TBD location as a record of the test.	

Expected Result

4.1.6 LVV-T1818 - DM-SUIT-8: Verify Portal integration with workspace (via WebDAV)

Version	Status	Priority	Verification Type	Owner
1	Approved	Normal	Demonstration	Gregory Dubois-Felsmann

Open LVV-T1818 in Jira

4.1.6.1 Verification Elements

- LVV-9886 - DMS-PRTL-REQ-0046-V-01: Visualization of Workspace Data_1
- LVV-9846 - DMS-PRTL-REQ-0003-V-01: Portal Access to Workspace_1
- LVV-9932 - DMS-PRTL-REQ-0095-V-01: Saving Displayed Tabular Data_1
- LVV-9951 - DMS-PRTL-REQ-0111-V-01: Image Data Download_1
- LVV-9954 - DMS-PRTL-REQ-0110-V-01: Tabular Data Download_1

4.1.6.2 Test Items

This test case verifies that the Portal Aspect software is capable of accessing a file-oriented workspace via the WebDAV protocol.

In so doing, it partially verifies several Portal Aspect requirements that relate to this capability - “partially” because some of these requirements depend on workspace capabilities which were not present in the prototype WebDAV service delivered by the DAX group, because some of the requirements also cover the User Database Workspace (not relevant to this milestone, and not yet available), and also because the milestone was not envisioned as an exhaustive test covering edge cases:

- DMS-PRTL-REQ-0003 (LVV-9846, Portal access to workspace) is covered at “demonstration” level, with basic tests of saving image and tabular data to the workspace, and only for the User File Workspace (there is currently no User Database Workspace prototype available);
- DMS-PRTL-REQ-0046 (LVV-9886, Visualization of workspace data) is covered at “demonstration” level for a couple of FITS image and table files, and only for the User File Workspace;
- DMS-PRTL-REQ-0110 (LVV-9954, Tabular data download) is covered at “demonstration” level, only for catalog data (there was no image metadata in the LSP deployment at the time of test), and only for the User File Workspace;
- DMS-PRTL-REQ-0095 (LVV-9932, Saving Displayed Tabular Data) is covered at “demonstration” level for a simple subset operation in the table browser; and
- DMS-PRTL-REQ-0111 (LVV-9951, Image data download) is covered at “demonstration” level, and only for download from an image display screen itself (as LSST-style image metadata services, e.g., ObsTAP, were not available in the LSP at the time of testing).

4.1.6.3 Environment Needs

4.1.6.3.1 Software

A Web browser

4.1.6.3.2 Hardware

A computer with access, whitelisted or via VPN, to the NCSA-hosted LSP instances

4.1.6.4 Test Procedure

Step 1	Description
	Using a web browser, navigate to the home page of the selected instance of the LSP at the LDF. From the displayed page, navigate to the Portal Aspect and log in with valid credentials for the instance under test.
	Expected Result
	Successful login to the Portal should display the TAP search screen by default.
Step 2	Description
	Navigate to the TAP search screen, if necessary (in case the default Portal screen was changed since this test was written), and ensure that the LSST TAP service associated with the chosen LSP instance is selected.
	Expected Result
	The lists of schemas and tables available in the services should be displayed as selectable menus.
Step 3	Description
	Perform a TAP search on the AllWISE source catalog around the equatorial coordinates (2, 0) (degrees), with a 30 arcminute radius, using the Portal UI to specify the query (select the "Single Table" radio button). To find the AllWISE source catalog, select the "wise_00" schema from the schema menu, and then the "wise_00.allwise_p3as_psd" table from the table menu. Use the column selector pane of the search screen to select the "ra, decl, source_id, w1mpro, w2mpro, w3mpro, w4mpro" columns for retrieval. When the query completes, note the total number of rows in the table, as displayed in the table header, and record it.
	Test Data
	Equatorial coordinates: (2, 0), cone radius 30 arcmin
	Expected Result
	This query should return about 12,000 rows of data. It should be displayed in a table, as an overlay on a context image, and as a configurable 2D density plot.
Step 4	Description
	Using the table viewer UI, save the result of this search as a text file in CSV format, specifying that the file be saved to the "workspace". Ensure that the CSV file's name is "LVV-T1818-ufw-table.csv".

Expected Result

A UI indication that the file has been successfully saved to the workspace.

Step 5 Description

In the table viewer UI, use the “funnel” icon in the table toolbar, if necessary, to make the column-header filtering text boxes visible. Locate the “w1mpro” column (band W1 magnitude), enter the filter expression “<8”, and hit TAB or RETURN to apply the filter. Note the number of rows remaining following the application of the filter.

Test Data

Filter expression “< 8” for the “w1mpro” column.

Expected Result

Approximately 10 rows should remain visible.

Step 6 Description

Using the table viewer UI, save the result of this search as a text file in CSV format, specifying that the file be saved to the “workspace”. Ensure that the CSV file’s name is “LVV-T1818-ufw-table-w1m8.csv”.

Expected Result

A UI indication that the file has been successfully saved to the workspace.

Step 7 Description

Navigate to the legacy IRSA image access screen, using the blue “External Images” button at the top of the screen.

Note that this and the following step are being done exclusively to load an image into the viewer, not itself to demonstrate an LSP-Portal-specific capability; these steps simply bypass the lack of a current image query service in the LSP.

Expected Result

The “IRSA Viewer” image-search screen will be displayed.

Step 8 Description

Use the UI to load a WISE band W1 image for the coordinates (2,0) without a cutout size limit:

1. Choose Image Type: “View FITS Images”
 2. Select Image Source: “Search”
 3. Select Target: “Name or Position” set to “2 0”; “Cutout size” left blank
 4. Select Data Set:
 - a. If “WISE AllWISE Atlas” is not immediately visible under “Selection”, use the “MISSION” checkbox on the left to narrow the scope to “WISE”.
 - b. Use the disclosure triangle to the left of “WISE AllWISE Atlas” to reveal the filter band selection boxes, and select “W1”.
-

- Click on the "Search" button at the bottom of the screen.

Test Data

Equatorial coordinates (2, 0) expressed as "2 0" ("2, 0" will also work).

Expected Result

An image for the selected region of sky should be displayed. As the chosen coordinates are not centered in one of the WISE coadded atlas sky tiles, a "target" glyph will be seen displayed off-center at the (2,0) coordinates.

Step 9 Description

Use the "save" action from the image toolbar - the "floppy disk" icon at the far left of the toolbar (in the version of Firefly current at the time of writing) to save the image in FITS format to the workspace. Ensure that the image name is "LVW-T1818-ufw-image.fits".

Expected Result

A UI indication of a successful file-save action.

Step 10 Description

Close the web browser tab or window being used for the test, but do not quit the browser or clear credentials. (That is only for convenience; it is also acceptable to log out entirely and log in again.)

Expected Result

Step 11 Description

Using the same web browser, navigate to the home page of the selected instance of the LSP at the LDF. From the displayed page, navigate to the Portal Aspect.

Expected Result

No credentials should be needed unless an explicit logout or credential-clearing action was performed.

The Portal Aspect UI should be displayed with the TAP search screen in the foreground and no image or tabular search results present.

Step 12 Description

Select the blue "Upload" button at the top of the screen. On the resulting screen, choose to upload from the workspace. Verify that the image file saved in Step 9 above, "LVW-T1818-ufw-image.fits", is visible. Select the file and open it with the UI. Verify qualitatively that it seems to be the same image as displayed above in Step 8.

Expected Result

The saved image should be displayed. Depending on the Portal Aspect software version deployed at the time of test, the image may be displayed immediately, or it may be necessary to navigate through a UI for choosing which extension in the file to

display.

Step 13	Description
	Select "Upload" again. This time choose the filtered table file, "LVV-T1818-ufw-table-w1m8.csv". Note the number of rows displayed and verify qualitatively that the sky coordinates correspond to the region around the original (2,0) search center.

Expected Result
The small, filtered table should be displayed, with the same number of rows as previously.

Step 14	Description
	Select "Upload" again. This time choose the full table file, "LVV-T1818-ufw-table.csv". Note the number of rows displayed and verify qualitatively that the sky coordinates correspond to the region around the original (2,0) search center.

Expected Result
The original query table should be displayed, with the same number of rows as previously.

4.2 Draft Test Cases

4.2.1 LVV-T598 - Verify access to All Released or Authorized Data Products

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T598 in Jira

4.2.1.1 Verification Elements

- LVV-9807 - DMS-LSP-REQ-0001-V-01: Access to All Released or Authorized Data Products_1

4.2.1.2 Test Items

Verify that the LSP can access all data products defined in the DPDD, and additional data products.

4.2.1.3 Test Procedure

Step 1	Description
	Expected Result

4.2.2 LVV-T600 - Verify LSP provides a portal aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Michael Wood-Vasey

Open LVV-T600 in Jira

4.2.2.1 Verification Elements

- LVV-9811 - DMS-LSP-REQ-0002-V-01: Portal Aspect_1

4.2.2.2 Test Items

Verify that the LSP provides a web-based “Portal” to access LSST data products and user storage resources.

The Portal is defined by further requirements.

4.2.2.3 Test Procedure

Step 1	Description
	Open LSP Portal Aspect in a browser
	Expected Result
	LSP Portal Home Page appears
Step 2	Description
	Log in through LSP credentials

Expected Result

SSO Login page presented and log-in successful. Success of login is indicated by some visual cue.

Step 3 Description

Look for available datasets and releases.

Expected Result

LSP will show available datasets and data releases.

Step 4 Description

Look for user-stored data. Upload a sample catalog. Upload a sample image.

Expected Result

LSP should show user products in an easy-to-find way.

Step 5 Description

Upload a sample catalog. Upload a sample image.

Expected Result

Sample catalog and image should appear in user data area.

Step 6 Description

Visually navigate to a selected region of the sky.

Expected Result

Image will be shown for regions of sky with imaging. If navigating to a region of sky not in the selected dataset, then a clear indication of no image available will be shown.

Step 7 Description

Navigate to a specific RA, Dec.

Expected Result

Image shown for given RA, Dec.

Step 8 Description

Ask for overlay of catalog of objects at current image view.

Expected Result

Boxes or circles or similar markers should appear on image.

Step 9	Description
Mouse-over a catalog object.	
Expected Result	
Information about that catalog object should appear	
Step 10	Description
Select a region on the image. Look at table display.	
Expected Result	
See that table display is now restricted to images within the select area.	
Step 11	Description
Initiate a query against some other dataset.	
Expected Result	
Expect to see a new table with results from same region of sky.	
Step 12	Description
Download image of selected region	
Expected Result	
Download interface presents to user with offer to download selected file in available formats (presumably at least FITS).	
Step 13	Description
Download tables for selected region	
Expected Result	
Download interface will present offering option to download tables in any of the supported formats.	

4.2.3 LVV-T601 - Verify LSP provides a notebook aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Michael Wood-Vasey

Open LVV-T601 in Jira

4.2.3.1 Verification Elements

- LVV-9810 - DMS-LSP-REQ-0003-V-01: Notebook Aspect_1

4.2.3.2 Test Items

Verify that the LSP provides an interactive Python computing environment, accessible via web browser, with access to LSST data products and user storage resources.

4.2.3.3 Test Procedure

Step 1	Description
Log in to Portal	
Expected Result	
SSO interface to authenticate to Portal service.	
Step 2	Description
Launch/Access Notebook interface	
Expected Result	
Notebook will present with loaded Python environment and give an input cell for entry.	
Step 3	Description
Use Python API to query for available images that cover a given RA, Dec	
Expected Result	
List of available images will be return	
Step 4	Description
Use Python API to download an image	
Expected Result	
Image object will be returned to user	

Step 5	Description
Inspect Image object	
Expected Result	
Image metadata will be shown to user	
Step 6	Description
Save Image object to user storage area.	
Expected Result	
An inspection of the user-storage area will reveal a newly created image.	
Step 7	Description
Retrieve a table of objects in the region of the selected image.	
Expected Result	
Table object available in Notebook kernel.	
Step 8	Description
Plot a color-color diagram for retrieved objects from image.	
Expected Result	
Rendered plot in notebook about color-color diagram.	
Step 9	Description
Expected Result	

4.2.4 LVV-T602 - Verify LSP provides web API

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Michael Wood-Vasey

Open LVV-T602 in Jira

4.2.4.1 Verification Elements

- LVV-9808 - DMS-LSP-REQ-0004-V-01: API (Data Access) Aspect_1

4.2.4.2 Test Items

Verify that the LSP provides a web API for access to LSST data products and user storage resources.

4.2.4.3 Test Procedure

Step 1	Description
Upload a table to the LSP using the web API. Likely launched from a Python session or shell.	
Expected Result	
Inspection of user area will show file now uploaded	
Step 2	Description
Upload 5 tables to LSP using the web API.	
Expected Result	
Inspection of user area will show 5 tables.	
Step 3	Description
Query contents of LSP User Storage area	
Expected Result	
One image and Five tables	
Step 4	Description
Download one of the tables using the web API	
Expected Result	
local file created that matches table	
Step 5	Description
Query RA, Dec region for table of objects using web API	

Expected Result

File or object returned with requested objects

4.2.5 LVV-T603 - Verify data access through multiple linked aspects

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T603 in Jira

4.2.5.1 Verification Elements

- LVV-9809 - DMS-LSP-REQ-0005-V-01: Linkage of Aspects_1

4.2.5.2 Test Items

Verify that the LSP facilitates access of the same LSST or user data through multiple aspects.

4.2.5.3 Test Procedure

Step 1	Description
	Expected Result

4.2.6 LVV-T604 - Verify use of VO standards

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T604 in Jira

4.2.6.1 Verification Elements

- LVV-9812 - DMS-LSP-REQ-0006-V-01: Use of VO Standards_1

4.2.6.2 Test Items

Verify that the LSP utilizes stable and accepted Virtual Observatory standards for public APIs.

4.2.6.3 Test Procedure

Step 1	Description
	Expected Result

4.2.7 LVV-T605 - Verify that LSP complies with LSST data access policies

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T605 in Jira

4.2.7.1 Verification Elements

- LVV-9806 - DMS-LSP-REQ-0007-V-01: Abide by the Data Access Policies_1

4.2.7.2 Test Items

Verify that the LSP complies with the public data access policy and access restrictions defined by the LSST Project.

4.2.7.3 Test Procedure

Step 1	Description
	Expected Result

4.2.8 LVV-T606 - Verify semantic linkages between data items

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T606 in Jira

4.2.8.1 Verification Elements

- LVV-9814 - DMS-LSP-REQ-0008-V-01: Semantic Linkage_1

4.2.8.2 Test Items

Verify that the LSP provides access to linkages between data items that reflect their provenance and data dependencies.

4.2.8.3 Test Procedure

Step 1	Description
	Expected Result

4.2.9 LVV-T607 - Verify semantic linkages between data items and uncertainties

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T607 in Jira

4.2.9.1 Verification Elements

- LVV-9813 - DMS-LSP-REQ-0009-V-01: Semantic Linkage: Uncertainties_1

4.2.9.2 Test Items

Verify that the LSP provides methods to identify uncertainties associated with a given quantity.

4.2.9.3 Test Procedure

Step 1	Description
	Expected Result

4.2.10 LVV-T608 - Verify transfer of Portal data references to Notebook aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T608 in Jira

4.2.10.1 Verification Elements

- LVV-9815 - DMS-LSP-REQ-0010-V-01: Transfer of Portal Data References to Notebook_1

4.2.10.2 Test Items

Verify that data references derived from Portal exploration can be transferred and used in to

retrieve the same data in the Notebook aspect.

4.2.10.3 Test Procedure

Step 1	Description
	Expected Result

4.2.11 LVV-T609 - Verify providing user file storage in LSP

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T609 in Jira

4.2.11.1 Verification Elements

- LVV-9817 - DMS-LSP-REQ-0011-V-01: User File Workspace_1

4.2.11.2 Test Items

Verify that the LSP provides a user file workspace for storage of user generated data files. These shall be accessible from all three aspects.

4.2.11.3 Test Procedure

Step 1	Description
	Expected Result

4.2.12 LVV-T610 - Verify providing user generated database in LSP

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T610 in Jira

4.2.12.1 Verification Elements

- LVV-9816 - DMS-LSP-REQ-0012-V-01: User Database Workspace_1

4.2.12.2 Test Items

Verify that the LSP allows for creation, use, and management of User Generated databases, and interaction with user databases by the same facilities as Project databases, where feasible.

4.2.12.3 Test Procedure

Step 1	Description
	Expected Result

4.2.13 LVV-T611 - Verify access controls in user workspace

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T611 in Jira

4.2.13.1 Verification Elements

- LVV-9818 - DMS-LSP-REQ-0013-V-01: User Workspace Access Controls_1

4.2.13.2 Test Items

Verify that LSP users can place access restrictions on data in the User File and Database workspaces, and that these restrictions are enforced across all aspects.

4.2.13.3 Test Procedure

Step 1	Description
	Expected Result

4.2.14 LVV-T612 - Verify ability to download data from LSP

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T612 in Jira

4.2.14.1 Verification Elements

- LVV-9819 - DMS-LSP-REQ-0014-V-01: Download Data_1

4.2.14.2 Test Items

Verify that the LSP provides a means to download data from queries, user workspaces, or other operations, to the user's system.

4.2.14.3 Test Procedure

Step 1	Description
	Expected Result

4.2.15 LVV-T613 - Verify ability to upload data to LSP

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T613 in Jira

4.2.15.1 Verification Elements

- LVV-9823 - DMS-LSP-REQ-0015-V-01: Upload Data_1

4.2.15.2 Test Items

Verify that LSP users can upload data from their system for use in the LSP aspects and storage in their user workspace.

4.2.15.3 Test Procedure

Step 1	Description
	Expected Result

4.2.16 LVV-T614 - Verify ability to transfer data to and from the Workspace

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T614 in Jira

4.2.16.1 Verification Elements

- LVV-9822 - DMS-LSP-REQ-0016-V-01: Transfer Data to Workspace_1

4.2.16.2 Test Items

Verify that users can transfer data between all features of the LSP that allow for upload and download of data.

4.2.16.3 Test Procedure

Step 1	Description
	Expected Result

4.2.17 LVV-T615 - Verify file formats provided for tabular data download

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T615 in Jira

4.2.17.1 Verification Elements

- LVV-9821 - DMS-LSP-REQ-0017-V-01: Tabular Data Download File Formats_1

4.2.17.2 Test Items

Verify that the LSP allows tabular data from search results to be downloaded in FITS, VOTable,

and ASCII delimiter-separated tables (e.g., CSV).

4.2.17.3 Test Procedure

Step 1	Description
	Expected Result

4.2.18 LVV-T616 - Verify file formats provided for image data download

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T616 in Jira

4.2.18.1 Verification Elements

- LVV-9820 - DMS-LSP-REQ-0018-V-01: Image Data Download File Format_1

4.2.18.2 Test Items

Verify that LSST image data products can be downloaded via the LSP in FITS format, with appropriate metadata included.

4.2.18.3 Test Procedure

Step 1	Description
	Expected Result

4.2.19 LVV-T617 - Verify support for peak volume of moderate-sized queries

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T617 in Jira

4.2.19.1 Verification Elements

- LVV-9824 - DMS-LSP-REQ-0028-V-01: Peak Volume for Moderate-Sized Queries_1

4.2.19.2 Test Items

Verify that the LSP can handle a peak usage of 50 simultaneous queries without degradation, where the queries include input selection of up to 1E7 objects in the catalog, result data set of up to 0.1GB, and a response time of 10 seconds.

4.2.19.3 Test Procedure

Step 1	Description
	Expected Result

4.2.20 LVV-T618 - Verify support for peak volume of queries on all Objects

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T618 in Jira

4.2.20.1 Verification Elements

- LVV-9825 - DMS-LSP-REQ-0029-V-01: Peak Volume for Queries on all Objects_1

4.2.20.2 Test Items

Verify that the LSP can handle a peak usage of 20 simultaneous queries without degradation, where the queries include input selection of up to the entire object database, result data set of up to 6 GB, and a response time of 1 hour.

4.2.20.3 Test Procedure

Step 1	Description
	Expected Result

4.2.21 LVV-T619 - Verify LSP handles peak volume of queries

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T619 in Jira

4.2.21.1 Verification Elements

- LVV-9826 - DMS-LSP-REQ-0030-V-01: Peak Volume of In-process Queries_1

4.2.21.2 Test Items

Verify that the LSP can simultaneously handle peak usage of 20*6 GB = 120 GB of downloads.

4.2.21.3 Test Procedure

Step 1	Description
Expected Result	

4.2.22 LVV-T620 - Verify LSP supports required download bandwidth

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T620 in Jira

4.2.22.1 Verification Elements

- LVV-9827 - DMS-LSP-REQ-0031-V-01: Query Result Download Bandwidth_1

4.2.22.2 Test Items

Verify that the LSP supports a download rate of at least 6 Gbps for query results including tables and images.

4.2.22.3 Test Procedure

Step 1	Description
Expected Result	

4.2.23 LVV-T621 - Verify LSP user reference and documentation

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T621 in Jira

4.2.23.1 Verification Elements

- LVV-9828 - DMS-LSP-REQ-0019-V-01: Documentation_1

4.2.23.2 Test Items

Verify that the LSP provides user reference and documentation for all of its aspects.

4.2.23.3 Test Procedure

Step 1	Description
	Expected Result

4.2.24 LVV-T623 - Verify support for new LSP users

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T623 in Jira

4.2.24.1 Verification Elements

- LVV-9832 - DMS-LSP-REQ-0021-V-01: New-user Support_1

4.2.24.2 Test Items

Verify that guidance is provided to new users about how to become authenticated users of the LSP.

4.2.24.3 Test Procedure

Step 1	Description
	Expected Result

4.2.25 LVV-T624 - Verify implementation of common identity across LSP aspects

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Leanne Guy

Open LVV-T624 in Jira

4.2.25.1 Verification Elements

- LVV-9831 - DMS-LSP-REQ-0022-V-01: Common Identity_1

4.2.25.2 Test Items

Verify that users can authenticate and access all three aspects of the LSP using the same credentials.

4.2.25.3 Test Procedure

Step 1	Description
	Expected Result

4.2.26 LVV-T625 - Verify authentication via external identity providers

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Leanne Guy

Open LVV-T625 in Jira

4.2.26.1 Verification Elements

- LVV-9834 - DMS-LSP-REQ-0023-V-01: Use of External Identity Providers_1

4.2.26.2 Test Items

Verify that LSP users can be authenticated using external credentials from trusted identity providers.

4.2.26.3 Test Procedure

Step 1	Description
	Expected Result

4.2.27 LVV-T626 - Verify LSP identity can have multiple associated credentials

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T626 in Jira

4.2.27.1 Verification Elements

- LVV-9835 - DMS-LSP-REQ-0024-V-01: Use of Multiple Sets of Credentials_1

4.2.27.2 Test Items

Verify that an LSP user can have multiple credentials, from different providers, associated

with the same identity within the LSP.

4.2.27.3 Test Procedure

Step 1	Description
	Expected Result

4.2.28 LVV-T627 - Verify implementation of Acceptable Use Policy

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T627 in Jira

4.2.28.1 Verification Elements

- LVV-9829 - DMS-LSP-REQ-0025-V-01: Acceptable Use Policy_1

4.2.28.2 Test Items

Verify that non-Project users of the LSP are required to agree to and abide by an Acceptable Use Policy.

4.2.28.3 Test Procedure

Step 1	Description
	Expected Result

4.2.29 LVV-T628 - Verify LSP connections encrypted

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T628 in Jira

4.2.29.1 Verification Elements

- LVV-9836 - DMS-LSP-REQ-0026-V-01: Using secure protocols_1

4.2.29.2 Test Items

Verify that all external connections to the LSP are encrypted in accordance with LSST cyber-security policy.

4.2.29.3 Test Procedure

Step 1	Description
	Expected Result

4.2.30 LVV-T629 - Verify privacy of users' activities

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T629 in Jira

4.2.30.1 Verification Elements

- LVV-9833 - DMS-LSP-REQ-0027-V-01: Privacy of User Activities_1

4.2.30.2 Test Items

Verify that users' activities on the LSP are not visible to other users without the originating user's explicit permission.

4.2.30.3 Test Procedure

Step 1	Description
	Expected Result

4.2.31 LVV-T630 - Verify multiple LSP instances

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T630 in Jira

4.2.31.1 Verification Elements

- LVV-9839 - DMS-LSP-REQ-0032-V-01: Multiple installations_1

4.2.31.2 Test Items

Verify that separate instances of the LSP accessible to the public, and only within the LSST Project, are available and maintained.

4.2.31.3 Test Procedure

Step 1	Description
	Expected Result

4.2.32 LVV-T631 - Verify LSP access from the public Internet (IPv4)

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T631 in Jira

4.2.32.1 Verification Elements

- LVV-9837 - DMS-LSP-REQ-0033-V-01: Internet-Accessible (IPv4)_1

4.2.32.2 Test Items

Verify that the LSP is accessible from the public Internet using IPv4 protocols.

4.2.32.3 Test Procedure

Step 1	Description
	Expected Result

4.2.33 LVV-T632 - Verify LSP access from the public Internet (IPv6)

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T632 in Jira

4.2.33.1 Verification Elements

- LVV-9838 - DMS-LSP-REQ-0034-V-01: Internet-Accessible (IPv6)_1

4.2.33.2 Test Items

Verify that the LSP is accessible from the public Internet using IPv6 protocols.

4.2.33.3 Test Procedure

Step 1	Description
	Expected Result

4.2.34 LVV-T633 - Verify indication of system availability

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T633 in Jira

4.2.34.1 Verification Elements

- LVV-9840 - DMS-LSP-REQ-0035-V-01: System-Availability Indication_1

4.2.34.2 Test Items

Verify that the LSP informs users when services are unavailable due to maintenance or excessive load.

4.2.34.3 Test Procedure

Step 1	Description
Expected Result	

4.2.35 LVV-T634 - Verify Portal is a web application

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T634 in Jira

4.2.35.1 Verification Elements

- LVV-9841 - DMS-PRTL-REQ-0001-V-01: Portal is a Web Application_1

4.2.35.2 Test Items

Verify that the Portal is a web application that is accessible to users via common web browsers and without downloading and installing local software.

4.2.35.3 Test Procedure

Step 1	Description
Expected Result	

4.2.36 LVV-T635 - Verify Portal discovery of all data products

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T635 in Jira

4.2.36.1 Verification Elements

- LVV-9847 - DMS-PRTL-REQ-0002-V-01: Portal Discovery of all Data Products_1

4.2.36.2 Test Items

Verify that the Portal enables discovery of all data products released by the Project, including all products enumerated in the DPDD, the calibration database, and the reformatted EFD, as well as user data products to which the user has access.

4.2.36.3 Test Procedure

Step 1	Description
	Expected Result

4.2.37 LVV-T636 - Verify Portal access to Workspace

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T636 in Jira

4.2.37.1 Verification Elements

- LVV-9846 - DMS-PRTL-REQ-0003-V-01: Portal Access to Workspace_1

4.2.37.2 Test Items

Verify that users can discover and retrieve data and images within their Workspace.

4.2.37.3 Test Procedure

Step 1	Description
	Expected Result

4.2.38 LVV-T637 - Verify Portal provides semantic linkages between data products

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T637 in Jira

4.2.38.1 Verification Elements

- LVV-9848 - DMS-PRTL-REQ-0004-V-01: Semantic Linkage: Portal Workflows_1

4.2.38.2 Test Items

Verify that the Portal aspect provides users the means to identify and retrieve semantically linked data. The Portal should provide straightforward UI workflows for starting from a selected data item (image or catalog entry) and identifying related data, including both direct data-dependency and provenance linkages and more scientifically oriented linkages such as the ability to navigate from an Object to its associated ForcedSources.

4.2.38.3 Test Procedure

Step 1	Description
	Expected Result

4.2.39 LVV-T638 - Verify access to calibration products via Portal

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T638 in Jira

4.2.39.1 Verification Elements

- LVV-9842 - DMS-PRTL-REQ-0005-V-01: Access to Calibration Products_1

4.2.39.2 Test Items

Verify that calibration products are accessible from the Portal aspect, both directly and via linkages from science data products that use them. This is a sub-requirement of DMS-PRTL-REQ-0004 (associated test case: LVV-T637).

4.2.39.3 Test Procedure

Step 1	Description
	Expected Result

4.2.40 LVV-T639 - Verify associations between single images and coadds

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T639 in Jira

4.2.40.1 Verification Elements

- LVV-9845 - DMS-PRTL-REQ-0006-V-01: Coadded Image to Single-Epoch Image Associations_1

4.2.40.2 Test Items

Verify that users can discover the associations between coadded images and the single-epoch images that contributed to the coadds. This is a sub-requirement of DMS-PRTL-REQ-0004 (associated test case: LVV-T637).

4.2.40.3 Test Procedure

Step 1	Description
	Expected Result

4.2.41 LVV-T640 - Verify access to external archives from Portal

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T640 in Jira

4.2.41.1 Verification Elements

- LVV-9843 - DMS-PRTL-REQ-0007-V-01: Access to External Archives_1

4.2.41.2 Test Items

Verify that an interface to outside catalog and image data is available, that allows a user to determine what external astronomical data are associated with a given location on the sky

and return those data for use within the Portal.

4.2.41.3 Test Procedure

Step 1	Description
Expected Result	

4.2.42 LVV-T641 - Verify API for Access to Portal Session State

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T641 in Jira

4.2.42.1 Verification Elements

- LVV-9844 - DMS-PRTL-REQ-0008-V-01: API for Access to Portal Session State_1

4.2.42.2 Test Items

Verify that the Portal aspect provides a network API that allows authenticated remote access by a user to aspects of their session state in the Portal. The minimal requirement is for access to the list of queries performed in that session.

4.2.42.3 Test Procedure

Step 1	Description
Expected Result	

4.2.43 LVV-T642 - Verify Portal supports both synchronous and asynchronous queries

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T642 in Jira

4.2.43.1 Verification Elements

- LVV-9854 - DMS-PRTL-REQ-0009-V-01: Support Synchronous and Asynchronous Queries_1

4.2.43.2 Test Items

Verify that the Portal aspect provides UI models for both synchronous and asynchronous queries. This Portal capability should include an interface to initiate, monitor, and control the execution of both sync and async queries, as well as browse their results. Long running queries may be forced to be asynchronous.

4.2.43.3 Test Procedure

Step 1	Description
	Expected Result

4.2.44 LVV-T643 - Verify capability to run long queries in the background

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T643 in Jira

4.2.44.1 Verification Elements

- LVV-9849 - DMS-PRTL-REQ-0010-V-01: Long Query Backgrounding_1

4.2.44.2 Test Items

Verify that the Portal aspect will notify the user if a query is estimated to take longer than 60 seconds, and will allow the user to put the query in background if desired.

4.2.44.3 Test Procedure

Step 1	Description
	Expected Result

4.2.45 LVV-T644 - Verify user notification of query status

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T644 in Jira

4.2.45.1 Verification Elements

- LVV-9853 - DMS-PRTL-REQ-0011-V-01: Query Status and Termination Notification_1

4.2.45.2 Test Items

Verify that the Portal notifies the user of the status of user-initiated queries, including whether the query has been terminated for any reason.

4.2.45.3 Test Procedure

Step 1	Description
	Expected Result

4.2.46 LVV-T645 - Verify limitation of query results size

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T645 in Jira

4.2.46.1 Verification Elements

- LVV-9851 - DMS-PRTL-REQ-0012-V-01: Query Results Size Limitation_1

4.2.46.2 Test Items

Verify that the Portal aspect estimates query results size, and notifies user if the query result exceeds thresholds and has been disallowed or terminated as a result.

4.2.46.3 Test Procedure

Step 1	Description
	Expected Result

4.2.47 LVV-T646 - Verify ability to browse query history

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T646 in Jira

4.2.47.1 Verification Elements

- LVV-9850 - DMS-PRTL-REQ-0013-V-01: Query History Inspection_1

4.2.47.2 Test Items

Verify that a user interface exists where users can browse the history of queries they have performed, and subsequently re-execute them if desired.

4.2.47.3 Test Procedure

Step 1	Description
	Expected Result

4.2.48 LVV-T647 - Verify implementation of saving of queries

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T647 in Jira

4.2.48.1 Verification Elements

- LVV-9852 - DMS-PRTL-REQ-0014-V-01: Query Saving - Portal_1

4.2.48.2 Test Items

The Portal aspect shall provide a UI for the saving of a specification artifact for a user-performed

query, either for downloading or for saving to the Workspace, and a UI for re-executing a saved query found in the Workspace or uploaded remotely.

4.2.48.3 Test Procedure

Step 1	Description
	Expected Result

4.2.49 LVV-T648 - Verify implementation of generic queries in API aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T648 in Jira

4.2.49.1 Verification Elements

- LVV-9857 - DMS-PRTL-REQ-0015-V-01: Generic Query_1

4.2.49.2 Test Items

The Portal aspect shall enable the generation of queries against any tabular data exposed in the API aspect.

4.2.49.3 Test Procedure

Step 1	Description
	Expected Result

4.2.50 LVV-T649 - Verify implementation of form-based generic query in API aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T649 in Jira

4.2.50.1 Verification Elements

- LVV-9856 - DMS-PRTL-REQ-0016-V-01: Generic Query - Form-based_1

4.2.50.2 Test Items

The Portal aspect shall provide a search-builder form-based interface for generic table queries. This facility may have reduced functionality for user tables for which the user has not provided full, or accurate, metadata.

4.2.50.3 Test Procedure

Step 1	Description
	Expected Result

4.2.51 LVV-T650 - Verify implementation of ADQL-based generic query in API aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T650 in Jira

4.2.51.1 Verification Elements

- LVV-9855 - DMS-PRTL-REQ-0017-V-01: Generic Query - ADQL-based_1

4.2.51.2 Test Items

The Portal aspect shall provide a means for entering a query against any table directly in ADQL. This facility shall be available for every table, including user-supplied tables.

4.2.51.3 Test Procedure

Step 1	Description
	Expected Result

4.2.52 LVV-T651 - Verify estimation of query result size

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T651 in Jira

4.2.52.1 Verification Elements

- LVV-9858 - DMS-PRTL-REQ-0018-V-01: Query Result Size_1

4.2.52.2 Test Items

Verify that UI support exists to estimate (or determine exactly) the size of results that would be returned by a query without returning the full set of results.

4.2.52.3 Test Procedure

Step 1	Description
	Expected Result

4.2.53 LVV-T652 - Verify query by unique identifier

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T652 in Jira

4.2.53.1 Verification Elements

- LVV-9859 - DMS-PRTL-REQ-0028-V-01: Query by Identifier_1

4.2.53.2 Test Items

Verify that queries can be performed to find data on any LSST data product with a unique ID by that ID.

4.2.53.3 Test Procedure

Step 1	Description
	Expected Result

4.2.54 LVV-T653 - Verify query by object or source identifier

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T653 in Jira

4.2.54.1 Verification Elements

- LVV-9860 - DMS-PRTL-REQ-0029-V-01: Query by LSST Object and Source Identifiers: Specific Match to Identifier_1

4.2.54.2 Test Items

Verify that queries can be performed for a given object or source ID (e.g., (DIA)Object, (DIA)Source, ForcedSource), and return catalog, image, and metadata associated with measurements of the object/source.

4.2.54.3 Test Procedure

Step 1	Description
	Expected Result

4.2.55 LVV-T654 - Verify query by Solar System object identifier

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T654 in Jira

4.2.55.1 Verification Elements

- LVV-9861 - DMS-PRTL-REQ-0030-V-01: Query by Solar System Objects: Specific Match to Identifier_1

4.2.55.2 Test Items

Verify that the UI supports queries and returns data associated with a specific Solar System Object.

4.2.55.3 Test Procedure

Step 1	Description
	Expected Result

4.2.56 LVV-T655 - Verify query by position on the sky

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T655 in Jira

4.2.56.1 Verification Elements

- LVV-9866 - DMS-PRTL-REQ-0020-V-01: Positional Query: Position on the Sky_1

4.2.56.2 Test Items

Verify that the Portal aspect supports queries based on astrophysical coordinates on the sky.

4.2.56.3 Test Procedure

Step 1	Description
	Expected Result

4.2.57 LVV-T656 - Verify query by list of positions

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T656 in Jira

4.2.57.1 Verification Elements

- LVV-9865 - DMS-PRTL-REQ-0021-V-01: Positional Query: Multiple Positions/Objects_1

4.2.57.2 Test Items

Verify that the Portal supports queries based on a list of object positions. The coordinates may be specified by any of the supported means of specifying positions.

4.2.57.3 Test Procedure

Step 1	Description
	Expected Result

4.2.58 LVV-T657 - Verify implementation of astrophysical coordinate systems

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T657 in Jira

4.2.58.1 Verification Elements

- LVV-9862 - DMS-PRTL-REQ-0022-V-01: Positional Query: Astrophysical Coordinate Systems_1

4.2.58.2 Test Items

Verify that the Portal aspect supports positional queries based on equatorial, ecliptic, and Galactic astrophysical coordinate systems.

4.2.58.3 Test Procedure

Step 1	Description
	Expected Result

4.2.59 LVV-T658 - Verify positional query by astrophysical source name

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T658 in Jira

4.2.59.1 Verification Elements

- LVV-9863 - DMS-PRTL-REQ-0023-V-01: Positional Query: Astrophysical Source Name Lookup_1

4.2.59.2 Test Items

Verify that the Portal aspect supports queries based on the use of source names in commonly-used astrophysical source name lookup services (e.g., NED, Simbad, Horizons).

4.2.59.3 Test Procedure

Step 1-1 from LVV-T849 Description

Navigate to the Portal Aspect endpoint. The stable version should be used for this test and is currently located at: <https://lsst-lsp-stable.ncsa.illinois.edu/portal/app/>.

Expected Result

A credential-entry screen should be displayed.

Step 1-2 from LVV-T849 Description

Enter a valid set of credentials for an LSST user with LSP access on the instance under test.

Expected Result

The Portal Aspect UI should be displayed following authentication.

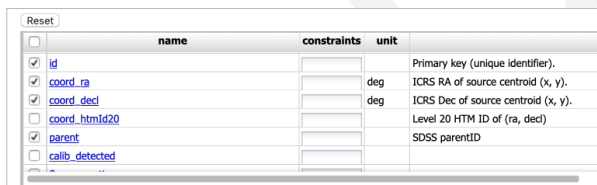
Step 2-1 from LVV-T851 Description

The default catalog (SDSS Stripe 82, 2013 LSST Processing) is fine for this.

Choose columns to return by:

- 1) unchecking the top box in the column selection box
- 2) checking columns for id, coord_ra, coord_dec, and parent.

The result should look like the following:



	name	constraints	unit
<input type="checkbox"/>			
<input checked="" type="checkbox"/>	id		Primary key (unique identifier).
<input checked="" type="checkbox"/>	coord_ra		deg ICRS RA of source centroid (x, y).
<input checked="" type="checkbox"/>	coord_dec		deg ICRS Dec of source centroid (x, y).
<input type="checkbox"/>	coord_htmlid20		Level 20 HTM ID of (ra, dec)
<input checked="" type="checkbox"/>	parent		SDSS parentID
<input type="checkbox"/>	calib_detected		

Expected Result

The column box should be configured to return a minimal useful set of columns.

Step 2-2 from LVV-T851 Description

Enter an object name for the portal to resolve. We will use NGC 359, a large elliptical galaxy in the Stripe 82 coverage.

To do this, enter the name "NGC 359" in the "Name or Position" text input box.

Leave the other defaults in place.

Name or Position:

NGC 359 resolved by NED
 16.07069, -0.7649 Equ J2000 or 1h04m16.97s, -0d45m53.6s Equ J2000

Search Method:

Radius:

Valid range between: 1" and 360000"

Expected Result

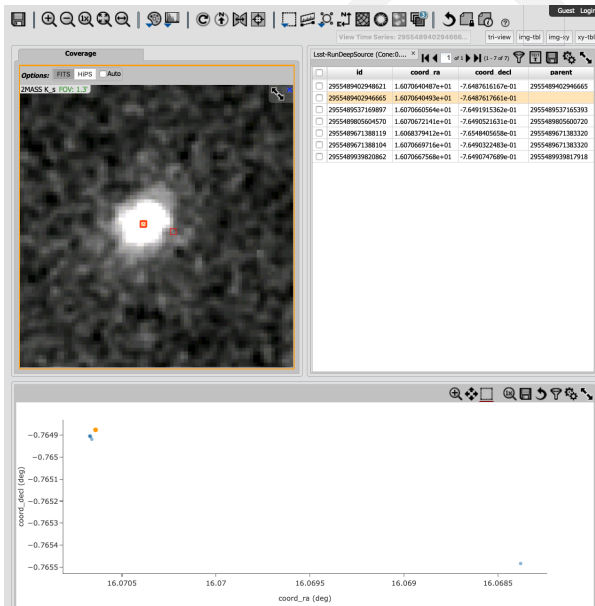
There should be a message like "NGC 359 resolved by NED". The example coordinates should also changed to the coordinates of NGC 359.

Step 2-3 from LVV-T851 Description

Submit the query to the portal query engine by clicking the "Search" button in the lower left corner of the interface.

Expected Result

A firefly app with the summary image overlay and catalog widgets side by side. A plot of RA vs. Dec is displayed below the side by side widgets.



Step 3-1 from LVV-T850 Description

Currently, there is no logout mechanism on the portal. This should be updated as the system matures.

Simply close the browser window.

Expected Result

Closed browser window. When navigating to the portal endpoint, expect to execute the steps in LVV-T849.

4.2.60 LVV-T659 - Verify positional query by Source or Object name

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T659 in Jira

4.2.60.1 Verification Elements

- LVV-9864 - DMS-PRTL-REQ-0024-V-01: Positional Query: LSST Object and Source Identifiers_1

4.2.60.2 Test Items

Verify that positional queries can be performed for coordinates based on a given object or source ID (e.g., (DIA)Object, (DIA)Source, ForcedSource).

4.2.60.3 Test Procedure

Step 1	Description
Expected Result	

4.2.61 LVV-T660 - Verify positional query based on Solar System object names

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T660 in Jira

4.2.61.1 Verification Elements

- LVV-9867 - DMS-PRTL-REQ-0025-V-01: Positional Query: Solar System Object Names_1

4.2.61.2 Test Items

Verify that positional queries can be performed for coordinates based on a given Solar System object name.

4.2.61.3 Test Procedure

Step 1	Description
	Expected Result

4.2.62 LVV-T661 - Verify query by cone search

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T661 in Jira

4.2.62.1 Verification Elements

- LVV-9869 - DMS-PRTL-REQ-0026-V-01: Positional Query by Region: Cone-Search_1

4.2.62.2 Test Items

Verify that Portal supports position-based queries based on a cone-shaped radial search.

4.2.62.3 Test Procedure

Step 1-1 from LVV-T849 Description

Navigate to the Portal Aspect endpoint. The stable version should be used for this test and is currently located at: <https://lsst-lsp-stable.ncsa.illinois.edu/portal/app/>.

Expected Result

A credential-entry screen should be displayed.

Step 1-2 from LVV-T849 Description

Enter a valid set of credentials for an LSST user with LSP access on the instance under test.

Expected Result

The Portal Aspect UI should be displayed following authentication.

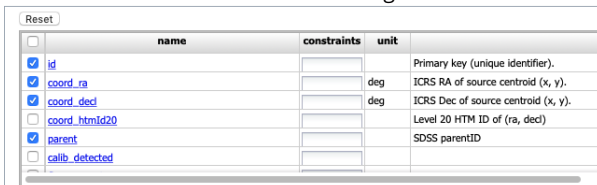
Step 2 Description

The default catalog (SDSS Stripe 82, 2013 LSST Processing) is fine for this.

Choose columns to return by:

- 1) unchecking the top box in the column selection box
- 2) checking columns for id, coord_ra, coord_dec, and parent.

The result should look like the following:



name	constraints	unit	
<input checked="" type="checkbox"/> id			Primary key (unique identifier).
<input checked="" type="checkbox"/> coord_ra		deg	ICRS RA of source centroid (x, y).
<input checked="" type="checkbox"/> coord_dec		deg	ICRS Dec of source centroid (x, y).
<input type="checkbox"/> coord_htmId20			Level 20 HTM ID of (ra, dec)
<input checked="" type="checkbox"/> parent			SDSS parentID
<input type="checkbox"/> calib_detected			

Expected Result

The column box should be configured to return a minimal useful set of columns.

Step 3 Description

Attempt to access data using sexagesimal format by:

- 1) entering an arbitrary position in the Stripe 82 footprint into the “Name or Position:” input text box: 22h2m1s 0d15m0.3s
- 2) change the radius of the query by changing the default value in the “Radius:” box to 15.

Expected Result

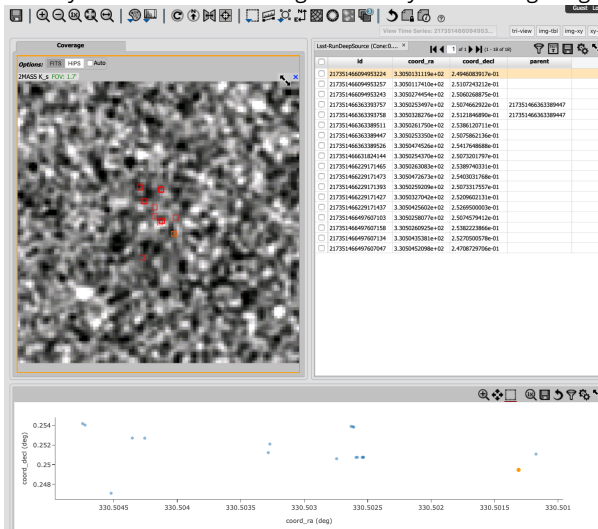
The cone search parameters are expected to be configured in a way as to return data from the service.

Step 4 Description

Call the service by clicking the “Search” button in the lower left corner of the interface.

Expected Result

A firefly instance with the image summary and catalog widgets side by side with the plot of sky coordinates below:



Step 5 Description

Return to the query interface by clicking the “LSST Data” button in the upper left of the interface.

Expected Result

Expect to be returned to the query interface with the previous search criteria pre-filled in the appropriate boxes.

Step 6 Description

Modify the query to use decimal inputs by changing “22h2m1s 0d15m0.3s” to “330.504167 0.250083”.

Expected Result

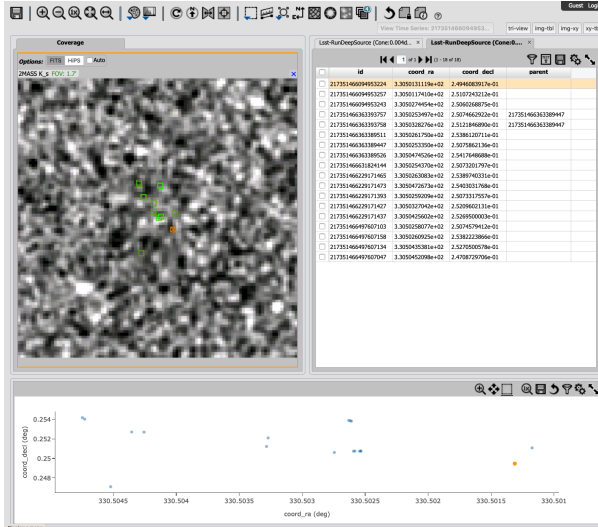
The parameters updated for the decimal format.

Step 7 Description

Execute the modified query by clicking the “Search” button at the bottom left of the interface.

Expected Result

A firefly instance as in step 4 but with two catalog tabs instead of just one:



Step 8 Description

Verify the two returned catalogs are the same by clicking between the two catalog tabs.

Expected Result

Identical catalogs from the two queries.

Step 9-1 from LVV-T850 Description

Currently, there is no logout mechanism on the portal. This should be updated as the system matures.

Simply close the browser window.

Expected Result

Closed browser window. When navigating to the portal endpoint, expect to execute the steps in LVV-T849.

4.2.63 LVV-T662 - Verify query by box search

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T662 in Jira

4.2.63.1 Verification Elements

- LVV-9868 - DMS-PRTL-REQ-0027-V-01: Positional Query by Region: Box-Search_1

4.2.63.2 Test Items

Verify that the Portal supports positional queries based on a coordinate system box search.

4.2.63.3 Test Procedure

Step 1	Description
	Expected Result

4.2.64 LVV-T663 - Verify query by time of observation

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T663 in Jira

4.2.64.1 Verification Elements

- LVV-9870 - DMS-PRTL-REQ-0019-V-01: Query by Date and Time: Time Range of Observation_1

4.2.64.2 Test Items

Verify that the Portal supports queries based on time or ranges of date/time values in both

UT and (barycentric) Julian date.

4.2.64.3 Test Procedure

Step 1	Description
	Expected Result

4.2.65 LVV-T664 - Verify implementation of user-friendly tabular query

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T664 in Jira

4.2.65.1 Verification Elements

- LVV-9874 - DMS-PRTL-REQ-0031-V-01: Tabular Data Query Specifications_1

4.2.65.2 Test Items

The Portal aspect shall provide a user interface to execute queries of the (DIA)Object and (DIA)Source tables, driven by the data dictionary associated with the tables.

4.2.65.3 Test Procedure

Step 1	Description
	Expected Result

4.2.66 LVV-T666 - Verify query by image metadata

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T666 in Jira

4.2.66.1 Verification Elements

- LVV-9873 - DMS-PRTL-REQ-0032-V-01: Query Tabular Data based upon Image Meta-Data_1

4.2.66.2 Test Items

Verify that the Portal supports queries on image metadata (e.g., airmass, moon angle, etc.) from the images the catalog measurements were made from.

4.2.66.3 Test Procedure

Step 1	Description
	Expected Result

4.2.67 LVV-T667 - Verify queries on the alerts database

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T667 in Jira

4.2.67.1 Verification Elements

- LVV-9872 - DMS-PRTL-REQ-0033-V-01: Queries on the Alerts Database_1

4.2.67.2 Test Items

Verify that the Portal supports queries on parameters in the Alerts Database.

4.2.67.3 Test Procedure

Step 1	Description
	Expected Result

4.2.68 LVV-T668 - Verify access to original alert state

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T668 in Jira

4.2.68.1 Verification Elements

- LVV-9871 - DMS-PRTL-REQ-0034-V-01: Access to Original Alert State_1

4.2.68.2 Test Items

Verify that alerts as they were originally raised are accessible via the Portal.

4.2.68.3 Test Procedure

Step 1	Description
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Expected Result

4.2.69 LVV-T669 - Verify query for single-epoch visit images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T669 in Jira

4.2.69.1 Verification Elements

- LVV-9878 - DMS-PRTL-REQ-0035-V-01: Query for Single Epoch Visit Images_1

4.2.69.2 Test Items

Verify that users with a list of visits (either directly, or from a visit-selection query) can query for single-epoch images corresponding to those visits.

4.2.69.3 Test Procedure

Step 1	Description
	Expected Result

4.2.70 LVV-T670 - Verify query for single-epoch raft images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T670 in Jira

4.2.70.1 Verification Elements

- LVV-9877 - DMS-PRTL-REQ-0036-V-01: Query for Single Epoch Raft Images_1

4.2.70.2 Test Items

Verify that users of the single-epoch query service (LVV-9878) can limit the returned visit images to only a specified raft.

4.2.70.3 Test Procedure

Step 1	Description
	Expected Result

4.2.71 LVV-T671 - Verify query for single-epoch CCD images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T671 in Jira

4.2.71.1 Verification Elements

- LVV-9876 - DMS-PRTL-REQ-0037-V-01: Query for Single Epoch CCD Image_1

4.2.71.2 Test Items

Verify that users of the single-epoch query service (LVV-9878) can limit the returned visit im-

ages to only a specified CCD.

4.2.71.3 Test Procedure

Step 1	Description
	Expected Result

4.2.72 LVV-T672 - Verify metadata query for single-epoch images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T672 in Jira

4.2.72.1 Verification Elements

- LVV-9879 - DMS-PRTL-REQ-0038-V-01: Single-Epoch Image Query Specifications_1

4.2.72.2 Test Items

Verify that the Portal provides an option to query for visits and single-epoch images of a certain type based on image metadata or parameters from the reformatted EFD.

4.2.72.3 Test Procedure

Step 1	Description
	Expected Result

4.2.73 LVV-T673 - Verify query for coadds by image metadata

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T673 in Jira

4.2.73.1 Verification Elements

- LVV-9875 - DMS-PRTL-REQ-0039-V-01: Coadded Image Query Specifications_1

4.2.73.2 Test Items

Verify that the Portal aspect supports queries based on image metadata describing the provenance of the contributing images, that return the corresponding coadd image(s).

4.2.73.3 Test Procedure

Step 1	Description
	Expected Result

4.2.74 LVV-T674 - Verify query for coadd image cutouts

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T674 in Jira

4.2.74.1 Verification Elements

- LVV-9880 - DMS-PRTL-REQ-0041-V-01: Query for Coadded Image Cutouts_1

4.2.74.2 Test Items

Verify that Portal users can query based on image metadata for coadds, then obtain a list of sub-images (cutouts) with a specified center position and size.

4.2.74.3 Test Procedure

Step 1	Description
	Expected Result

4.2.75 LVV-T675 - Verify query for single-epoch image cutouts

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T675 in Jira

4.2.75.1 Verification Elements

- LVV-9881 - DMS-PRTL-REQ-0040-V-01: Query for Single Epoch Image Cutouts_1

4.2.75.2 Test Items

Verify that Portal users can query based on image metadata for single-epoch images, then obtain a list of sub-images (cutouts) with a specified center position and size.

4.2.75.3 Test Procedure

Step 1	Description
Expected Result	

4.2.76 LVV-T676 - Verify display of native single-visit images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T676 in Jira

4.2.76.1 Verification Elements

- LVV-9905 - DMS-PRTL-REQ-0062-V-01: Display Native Single-Visit Image Data Products_1

4.2.76.2 Test Items

Verify that the Portal aspect provides a means to display the native single-visit image data products, including raw images, Processed Visit Images (PVIs), and difference images, as well as the standard single-exposure calibration images used as inputs for flats, bias frames, etc.

4.2.76.3 Test Procedure

Step 1	Description
Expected Result	

4.2.77 LVV-T677 - Verify Portal provides visualization of tabular and image data

Version	Status	Priority	Verification Type	Owner
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1 Draft Normal Inspection Jeffrey Carlin

Open LVV-T677 in Jira

4.2.77.1 Verification Elements

- LVV-9884 - DMS-PRTL-REQ-0042-V-01: Visualization of Tabular and Image Data_1

4.2.77.2 Test Items

Verify that the Portal aspect provides the capability to visualize all tabular and image data defined in the DPDD, as well as user data products.

4.2.77.3 Test Procedure

Step 1-1 from LVV-T849	Description
Navigate to the Portal Aspect endpoint. The stable version should be used for this test and is currently located at: https://lsst-lsp-stable.ncsa.illinois.edu/portal/app/ .	

Expected Result
A credential-entry screen should be displayed.

Step 1-2 from LVV-T849	Description
Enter a valid set of credentials for an LSST user with LSP access on the instance under test.	

Expected Result
The Portal Aspect UI should be displayed following authentication.

Step 2-1 from LVV-T851	Description
The default catalog (SDSS Stripe 82, 2013 LSST Processing) is fine for this.	

- Choose columns to return by:
- 1) unchecking the top box in the column selection box
 - 2) checking columns for id, coord_ra, coord_dec, and parent.

The result should look like the following:

<input type="checkbox"/>	name	constraints	unit
<input type="checkbox"/>	id		Primary key (unique identifier).
<input checked="" type="checkbox"/>	coord_ra		deg ICRS RA of source centroid (x, y).
<input checked="" type="checkbox"/>	coord_dec		deg ICRS Dec of source centroid (x, y).
<input type="checkbox"/>	coord_htmlid20		Level 20 HTM ID of (ra, dec)
<input checked="" type="checkbox"/>	parent		SDSS parentID
<input type="checkbox"/>	calib_detected		

Expected Result

The column box should be configured to return a minimal useful set of columns.

Step 2-2 from LVV-T851 Description

Enter an object name for the portal to resolve. We will use NGC 359, a large elliptical galaxy in the Stripe 82 coverage.

To do this, enter the name “NGC 359” in the “Name or Position” text input box.

Leave the other defaults in place.

Name or Position: Try NED then Simbad ▾

NGC 359 resolved by NED

16.07069, -0.7649 Equ J2000 or 1h04m16.97s, -0d45m53.6s Equ J2000

Search Method: Cone ▾

Radius: arcseconds ▾

Valid range between: 1" and 360000"

Expected Result

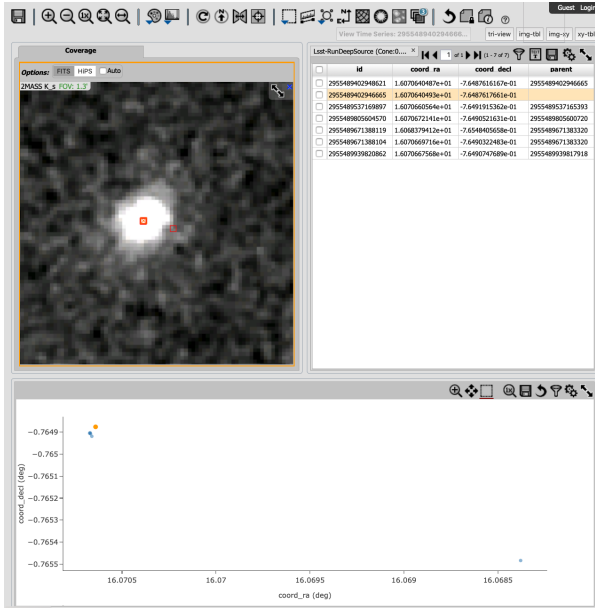
There should be a message like “NGC 359 resolved by NED”. The example coordinates should also changed to the coordinates of NGC 359.

Step 2-3 from LVV-T851 Description

Submit the query to the portal query engine by clicking the “Search” button in the lower left corner of the interface.

Expected Result

A firefly app with the summary image overlay and catalog widgets side by side. A plot of RA vs. Dec is displayed below the side by side widgets.



Step 3 Description

Examine tabular view to verify that the selected quantities are displayed.

Expected Result

An interactive view

4.2.78 LVV-T678 - Verify visualization of ancillary information

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T678 in Jira

4.2.78.1 Verification Elements

- LVV-9883 - DMS-PRTL-REQ-0043-V-01: Visualization of Ancillary Information_1

4.2.78.2 Test Items

Verify that the Portal provides the ability to visualize certain ancillary information produced by the LSST pipeline, including, but not limited to, image regions, image bit-planes, survey footprints, focal-plane footprints and PSF representations.

4.2.78.3 Test Procedure

Step 1	Description
	Expected Result

4.2.79 LVV-T679 - Verify visualization linking image and tabular data

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T679 in Jira

4.2.79.1 Verification Elements

- LVV-9882 - DMS-PRTL-REQ-0044-V-01: Linking Visualization of Image Data to Tabular Data_1

4.2.79.2 Test Items

Verify that the Portal aspect provides a capability for users to navigate between visualization and tabular data for a given tabular entry.

4.2.79.3 Test Procedure

Step 1	Description
	Expected Result

4.2.80 LVV-T680 - Verify visualization tool for uploaded tabular or image data

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T680 in Jira

4.2.80.1 Verification Elements

- LVV-9885 - DMS-PRTL-REQ-0045-V-01: Visualization of Uploaded Tabular and Image Data_1

4.2.80.2 Test Items

Verify that the Portal provides a means of visualizing uploaded tables or images.

4.2.80.3 Test Procedure

Step 1	Description
	Expected Result

4.2.81 LVV-T681 - Verify visualization of workspace data

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T681 in Jira

4.2.81.1 Verification Elements

- LVV-9886 - DMS-PRTL-REQ-0046-V-01: Visualization of Workspace Data_1

4.2.81.2 Test Items

Verify that data selected in a workspace browser can be conveniently visualized.

4.2.81.3 Test Procedure

Step 1	Description
	Expected Result

4.2.82 LVV-T682 - Verify availability of property sheets for table rows

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T682 in Jira

4.2.82.1 Verification Elements

- LVV-9888 - DMS-PRTL-REQ-0047-V-01: Table Row Property Sheet_1

4.2.82.2 Test Items

Verify that the Portal permits inspection of a row in tabular data query results, summarizing metadata such as units, semantic information, and relationships between columns.

4.2.82.3 Test Procedure

Step 1	Description
	Expected Result

4.2.83 LVV-T683 - Verify visualization of alerts

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T683 in Jira

4.2.83.1 Verification Elements

- LVV-9887 - DMS-PRTL-REQ-0048-V-01: Alert Visualization_1

4.2.83.2 Test Items

Verify that the Portal aspect provides for the users a “property sheet” for the contents of an alert packet including, but not necessarily limited to, the alert postage stamp image, the postage stamp time series, the photometric time series, the source and object information (e.g., position, brightness).

4.2.83.3 Test Procedure

Step 1	Description
	Expected Result

4.2.84 LVV-T684 - Verify display of tabular data

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T684 in Jira

4.2.84.1 Verification Elements

- LVV-9891 - DMS-PRTL-REQ-0049-V-01: Display of Tabular Data_1

4.2.84.2 Test Items

Verify that the Portal provides an interactive environment that displays table data by columns and rows.

4.2.84.3 Test Procedure

Step 1	Description
	Expected Result

4.2.85 LVV-T685 - Verify column selection from tables

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T685 in Jira

4.2.85.1 Verification Elements

- LVV-9889 - DMS-PRTL-REQ-0050-V-01: Column Selection of Tabular Data_1

4.2.85.2 Test Items

Verify that the Portal provides the capability to select specific columns from tabular data, for display and download.

4.2.85.3 Test Procedure

Step 1	Description
	Expected Result

4.2.86 LVV-T686 - Verify capability to re-order columns in displayed tabular data

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T686 in Jira

4.2.86.1 Verification Elements

- LVV-9892 - DMS-PRTL-REQ-0051-V-01: Display Order of Columns of Tabular Data_1

4.2.86.2 Test Items

Verify that the Portal provides capability to change the order in which columns of tabular data are displayed.

4.2.86.3 Test Procedure

Step 1	Description
Expected Result	

4.2.87 LVV-T687 - Verify capability of copying data in tables

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T687 in Jira

4.2.87.1 Verification Elements

- LVV-9890 - DMS-PRTL-REQ-0052-V-01: Copying of Tabular Data_1

4.2.87.2 Test Items

Verify that data can be interactively selected and copied from displayed tables in the Portal aspect.

4.2.87.3 Test Procedure

Step 1	Description
Expected Result	

4.2.88 LVV-T688 - Verify row selection from tables

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T688 in Jira

4.2.88.1 Verification Elements

- LVV-9894 - DMS-PRTL-REQ-0053-V-01: Row Selection of Tabular Data_1

4.2.88.2 Test Items

Verify that the Portal provides the capability to select specific rows from tabular data, for display and download.

4.2.88.3 Test Procedure

Step 1	Description
	Expected Result

4.2.89 LVV-T689 - Verify capability to display tabular data in paged format

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T689 in Jira

4.2.89.1 Verification Elements

- LVV-9893 - DMS-PRTL-REQ-0054-V-01: Paging of Tabular Data_1

4.2.89.2 Test Items

Verify that the Portal aspect provides the capability to display tabular data in a paged format,

in the case that database queries return results too large to display on a single page.

4.2.89.3 Test Procedure

Step 1-1 from LVV-T849 Description

Navigate to the Portal Aspect endpoint. The stable version should be used for this test and is currently located at: <https://lsst-lsp-stable.ncsa.illinois.edu/portal/app/>.

Expected Result

A credential-entry screen should be displayed.

Step 1-2 from LVV-T849 Description

Enter a valid set of credentials for an LSST user with LSP access on the instance under test.

Expected Result

The Portal Aspect UI should be displayed following authentication.

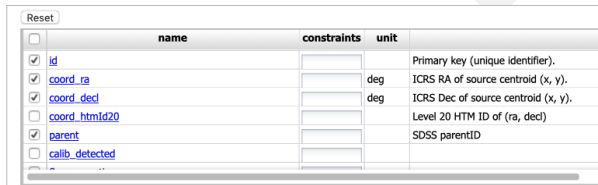
Step 2-1 from LVV-T851 Description

The default catalog (SDSS Stripe 82, 2013 LSST Processing) is fine for this.

Choose columns to return by:

- 1) unchecking the top box in the column selection box
- 2) checking columns for id, coord_ra, coord_dec, and parent.

The result should look like the following:



Expected Result

The column box should be configured to return a minimal useful set of columns.

Step 2-2 from LVV-T851 Description

Enter an object name for the portal to resolve. We will use NGC 359, a large elliptical galaxy in the Stripe 82 coverage.

To do this, enter the name "NGC 359" in the "Name or Position" text input box.

Leave the other defaults in place.

Name or Position: Try NED then Simbad ▾

NGC 359 resolved by NED

16.07069, -0.7649 Equ J2000 or 1h04m16.97s, -0d45m53.6s Equ J2000

Search Method: ▾

Radius: arcseconds ▾

Valid range between: 1" and 360000"

Expected Result

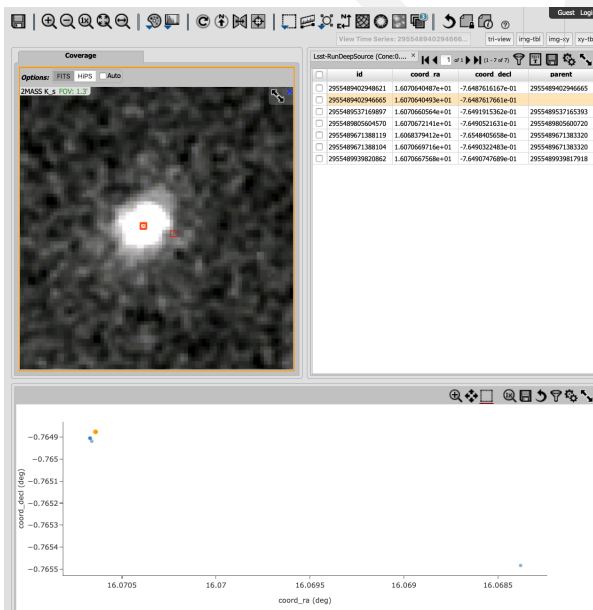
There should be a message like "NGC 359 resolved by NED". The example coordinates should also changed to the coordinates of NGC 359.

Step 2-3 from LVV-T851 Description

Submit the query to the portal query engine by clicking the "Search" button in the lower left corner of the interface.

Expected Result

A firefly app with the summary image overlay and catalog widgets side by side. A plot of RA vs. Dec is displayed below the side by side widgets.



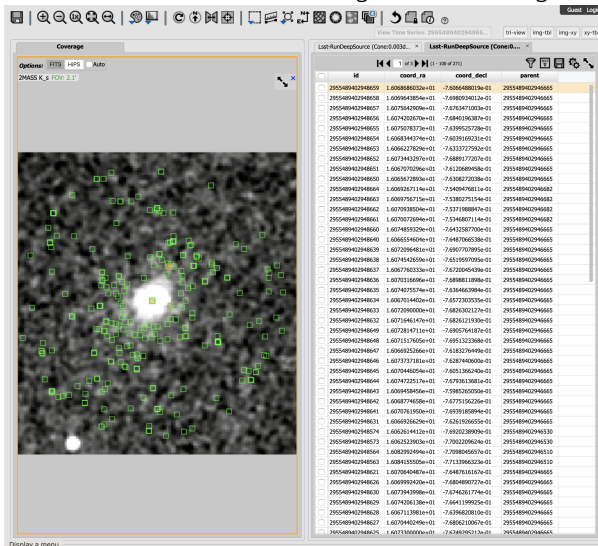
Step 3 Description

Extend the size of the returned table by:

- 1) returning to the query interface by clicking the “LSST Data” button in the upper left of the interface
- 2) update the query by increasing the query radius from 10 to 60 arcseconds
- 3) execute the modified query by clicking the “Search” button in the lower left of the query interface

Expected Result

An additional table tab of the catalog visualization widget:



Step 4 Description

Verify the ability to page through the catalog by using the navigation icons at the upper left of the catalog visualization widget. Page forward to the end of the catalog. Use the “back to beginning” button.



Expected Result

Expect to be able to page through the catalog and to navigate to the first or last page from any intervening page.

Step 5-1 from LVV-T850 Description

Currently, there is no logout mechanism on the portal. This should be updated as the system matures.

Simply close the browser window.

Expected Result

Closed browser window. When navigating to the portal endpoint, expect to execute the steps in LVV-T849.

4.2.90 LVV-T690 - Verify creation and display of X-Y scatter plots

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T690 in Jira

4.2.90.1 Verification Elements

- LVV-9901 - DMS-PRTL-REQ-0055-V-01: XY Scatter Plots_1

4.2.90.2 Test Items

Verify that the Portal provides the capability to create and display 2-dimensional X-Y scatter plots from tabular data.

4.2.90.3 Test Procedure

Step 1	Description
	Expected Result

4.2.91 LVV-T691 - Verify creation and display of histogram plots

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T691 in Jira

4.2.91.1 Verification Elements

- LVV-9895 - DMS-PRTL-REQ-0056-V-01: Histograms_1

4.2.91.2 Test Items

Verify that the Portal provides the capability to create and display 1-dimensional and 2-dimensional histogram plots from tabular data.

4.2.91.3 Test Procedure

Step 1	Description
	Expected Result

4.2.92 LVV-T692 - Verify capability to change symbol shapes, sizes, and colors in XY(Z) scatter plots

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T692 in Jira

4.2.92.1 Verification Elements

- LVV-9900 - DMS-PRTL-REQ-0057-V-01: Symbol Size, Shape, and Color Coding in XY(Z) Scatter Plots_1

4.2.92.2 Test Items

Verify that users can change the shape, size, and color of symbols in XY(Z) scatter plots to indicate information from additional dimensions of tabular data.

4.2.92.3 Test Procedure

Step 1	Description
Expected Result	

4.2.93 LVV-T693 - Verify visualization of uncertainties in plots

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T693 in Jira

4.2.93.1 Verification Elements

- LVV-9898 - DMS-PRTL-REQ-0058-V-01: Plot Quantitative Uncertainties_1

4.2.93.2 Test Items

Verify the capability to represent uncertainties in plots of tabular data.

4.2.93.3 Test Procedure

Step 1	Description
Expected Result	

4.2.94 LVV-T694 - Verify visualization of asymmetric uncertainties

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T694 in Jira

4.2.94.1 Verification Elements

- LVV-9897 - DMS-PRTL-REQ-0059-V-01: Plot Asymmetric Quantitative Uncertainties_1

4.2.94.2 Test Items

Verify that the Portal aspect can display uncertainties that are asymmetric (i.e., differ in the positive and negative directions).

4.2.94.3 Test Procedure

Step 1	Description
	Expected Result

4.2.95 LVV-T695 - Verify visualization of upper and lower limits in plots

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T695 in Jira

4.2.95.1 Verification Elements

- LVV-9899 - DMS-PRTL-REQ-0060-V-01: Plot Upper and Lower Quantitative Limits_1

4.2.95.2 Test Items

Verify that the Portal is capable of displaying quantities that represent upper or lower limits

(provided, for example, for non-detections).

4.2.95.3 Test Procedure

Step 1	Description
	Expected Result

4.2.96 LVV-T696 - Verify visualization of multiple XY plots on the same display

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T696 in Jira

4.2.96.1 Verification Elements

- LVV-9896 - DMS-PRTL-REQ-0061-V-01: Multiple XY-Plots on the Same Display_1

4.2.96.2 Test Items

Verify that the Portal provides the capability to display multiple XY plots on a single display canvas.

4.2.96.3 Test Procedure

Step 1	Description
	Expected Result

4.2.97 LVV-T697 - Verify display of raft and full focal-plane single-visit images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T697 in Jira

4.2.97.1 Verification Elements

- LVV-9906 - DMS-PRTL-REQ-0063-V-01: Display Raft- and Focal-Plane-Level Single-Visit Image Data_1

4.2.97.2 Test Items

Verify that the Portal aspect has the ability to generate a single-visit image display of a raft and full focal-plane image.

4.2.97.3 Test Procedure

Step 1	Description
	Expected Result

4.2.98 LVV-T698 - Verify display of cutout from single-visit image

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T698 in Jira

4.2.98.1 Verification Elements

- LVV-9907 - DMS-PRTL-REQ-0064-V-01: Display Single Visit Image Cut-Out_1

4.2.98.2 Test Items

Verify that the Portal is capable of displaying a cutout from a single-visit image.

4.2.98.3 Test Procedure

Step 1	Description
	Expected Result

4.2.99 LVV-T699 - Verify display of native coadd images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T699 in Jira

4.2.99.1 Verification Elements

- LVV-9904 - DMS-PRTL-REQ-0065-V-01: Display Native Coadded Image Data Products_1

4.2.99.2 Test Items

Verify that the Portal can display native coadd image products (i.e., patch-level images).

4.2.99.3 Test Procedure

Step 1	Description
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Expected Result

4.2.100 LVV-T700 - Verify display of coadd cutouts and mosaics

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T700 in Jira

4.2.100.1 Verification Elements

- LVV-9903 - DMS-PRTL-REQ-0066-V-01: Display Coadded Image Cutouts / Mosaics_1

4.2.100.2 Test Items

Verify that the Portal aspect has the capability to display cutout or mosaic images created from coadds.

4.2.100.3 Test Procedure

Step 1	Description
Expected Result	

4.2.101 LVV-T701 - Verify display of calibration images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T701 in Jira

4.2.101.1 Verification Elements

- LVV-9902 - DMS-PRTL-REQ-0067-V-01: Display Calibration Image Data Products_1

4.2.101.2 Test Items

Verify that the Portal is capable of displaying calibration image data products, including synthetic flats, bias frames, etc.

4.2.101.3 Test Procedure

Step 1	Description
	Expected Result

4.2.102 LVV-T702 - Verify display of user-provided images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T702 in Jira

4.2.102.1 Verification Elements

- LVV-9908 - DMS-PRTL-REQ-0068-V-01: Display User-provided Images_1

4.2.102.2 Test Items

Verify that the Portal has the capability of displaying user-provided images in widely-used

astronomical data formats, and properly interprets commonly-used WCS specifications from the image headers. This includes FITS format, and may be extended to others.

4.2.102.3 Test Procedure

Step 1	Description
	Expected Result

4.2.103 LVV-T703 - Verify display of image property sheet

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T703 in Jira

4.2.103.1 Verification Elements

- LVV-9909 - DMS-PRTL-REQ-0069-V-01: Image Property Sheet_1

4.2.103.2 Test Items

Verify that the Portal has the ability to display a property sheet for an image data product or user-provided image, displaying image format and other header data.

4.2.103.3 Test Procedure

Step 1	Description
	Expected Result

4.2.104 LVV-T704 - Verify that coordinate display tools are provided for images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T704 in Jira

4.2.104.1 Verification Elements

- LVV-9914 - DMS-PRTL-REQ-0070-V-01: Provide Coordinate Display Tools for Images_1

4.2.104.2 Test Items

Verify that the Portal provides all the capabilities in the Coordinate Display Tools section in LDM-554 for image displays. Specific capabilities will depend on the availability of WCS information for an image.

4.2.104.3 Test Procedure

Step 1	Description
	Expected Result

4.2.105 LVV-T705 - Verify image pixel content display

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T705 in Jira

4.2.105.1 Verification Elements

- LVV-9911 - DMS-PRTL-REQ-0071-V-01: Image Pixel Content Display_1

4.2.105.2 Test Items

Verify that the Portal provides the capability to inspect the pixel contents of an image at the cursor position.

4.2.105.3 Test Procedure

Step 1	Description
	Expected Result

4.2.106 LVV-T706 - Verify spatial manipulation of images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T706 in Jira

4.2.106.1 Verification Elements

- LVV-9912 - DMS-PRTL-REQ-0072-V-01: Image Spatial Manipulation_1

4.2.106.2 Test Items

Verify that the Portal allows users to spatially manipulate displayed images, including resizing, rescaling, reprojecting, zooming, and cropping.

4.2.106.3 Test Procedure

Step 1	Description
Expected Result	

4.2.107 LVV-T707 - Verify multi-image scaling and alignment

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T707 in Jira

4.2.107.1 Verification Elements

- LVV-9913 - DMS-PRTL-REQ-0073-V-01: Multi-Image Scaling and Aligning_1

4.2.107.2 Test Items

Verify that the Portal has the capability to display multiple images on a common astrophysical coordinate scale, aligned on the screen in a common orientation.

4.2.107.3 Test Procedure

Step 1	Description
Expected Result	

4.2.108 LVV-T708 - Verify manipulation of image appearance

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T708 in Jira

4.2.108.1 Verification Elements

- LVV-9910 - DMS-PRTL-REQ-0074-V-01: Image Appearance Manipulation_1

4.2.108.2 Test Items

Verify that the Portal enables users to manipulate the appearance of displayed images, including changing the stretch, color table, or displayed data range.

4.2.108.3 Test Procedure

Step 1	Description
	Expected Result

4.2.109 LVV-T709 - Verify display of image mask and variance overlays

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T709 in Jira

4.2.109.1 Verification Elements

- LVV-9915 - DMS-PRTL-REQ-0075-V-01: Image Mask and Variance Overlays_1

4.2.109.2 Test Items

Verify that the Portal enables overlaying pixel-based data on top of already displayed images,

including image masks (bit planes) and variance data.

4.2.109.3 Test Procedure

Step 1	Description
	Expected Result

4.2.110 LVV-T710 - Verify display of plot overlays on images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T710 in Jira

4.2.110.1 Verification Elements

- LVV-9917 - DMS-PRTL-REQ-0076-V-01: Image Plot Overlays_1

4.2.110.2 Test Items

Verify that the Portal has the capability to overlay tabular data on an image, based on input image or astrophysical coordinates, as supported by availability of coordinate system information.

4.2.110.3 Test Procedure

Step 1	Description
	Expected Result

4.2.111 LVV-T711 - Verify capability to adjust the appearance of plot overlays on images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T711 in Jira

4.2.111.1 Verification Elements

- LVV-9916 - DMS-PRTL-REQ-0077-V-01: Image Overlays: Adjustment of Colors and Positions_1

4.2.111.2 Test Items

Verify that the Portal enables users to adjust the annotations, colors, transparency, and positions of plot overlays displayed on top of images.

4.2.111.3 Test Procedure

Step 1	Description
	Expected Result

4.2.112 LVV-T712 - Verify display all-sky HEALPix image

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T712 in Jira

4.2.112.1 Verification Elements

- LVV-9918 - DMS-PRTL-REQ-0078-V-01: Display All-Sky HEALPix Image_1

4.2.112.2 Test Items

Verify that the Portal aspect is able to display an all-sky image in the HEALPix format.

4.2.112.3 Test Procedure

Step 1	Description
	Expected Result

4.2.113 LVV-T713 - Verify ability to zoom in/out on a HEALPix image

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T713 in Jira

4.2.113.1 Verification Elements

- LVV-9922 - DMS-PRTL-REQ-0079-V-01: Zoom In and Out on a HEALPix Image_1

4.2.113.2 Test Items

Verify that the Portal enables users to zoom in and out on a displayed HEALPix image, adapting the displayed spatial scale and traversing different levels of the image hierarchy.

4.2.113.3 Test Procedure

Step 1	Description
	Expected Result

4.2.114 LVV-T714 - Verify panning in HEALPix image display

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T714 in Jira

4.2.114.1 Verification Elements

- LVV-9920 - DMS-PRTL-REQ-0080-V-01: Pan Around on a HEALPix Image_1

4.2.114.2 Test Items

Verify that the Portal enables panning (i.e., moving around within) a displayed HEALPix image, provided that the entire image is not already displayed.

4.2.114.3 Test Procedure

Step 1	Description
	Expected Result

4.2.115 LVV-T715 - Verify selection of HEALPix pixels

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T715 in Jira

4.2.115.1 Verification Elements

- LVV-9919 - DMS-PRTL-REQ-0081-V-01: HEALPix Pixel Selection_1

4.2.115.2 Test Items

Verify that Portal users can select individual HEALPix pixels or groups of pixels and obtain references from them for use in other LSP aspects.

4.2.115.3 Test Procedure

Step 1	Description
	Expected Result

4.2.116 LVV-T716 - Verify retrieval of HEALPix-associated data

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T716 in Jira

4.2.116.1 Verification Elements

- LVV-9921 - DMS-PRTL-REQ-0082-V-01: Retrieve HEALPix-Associated Data_1

4.2.116.2 Test Items

Verify that the Portal enables users to retrieve metadata and data associated with selected

HEALPixels and display that data in tabular or image form as appropriate.

4.2.116.3 Test Procedure

Step 1	Description
	Expected Result

4.2.117 LVV-T717 - Verify broad applicability of coordinate display

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T717 in Jira

4.2.117.1 Verification Elements

- LVV-9924 - DMS-PRTL-REQ-0083-V-01: Coordinate Display Applicability_1

4.2.117.2 Test Items

Verify that the Portal aspect provides the coordinate display and measurement tools for all applicable two-dimensional data displays where the two coordinates have a spatial interpretation.

4.2.117.3 Test Procedure

Step 1	Description
	Expected Result

4.2.118 LVV-T718 - Verify point coordinate display

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T718 in Jira

4.2.118.1 Verification Elements

- LVV-9928 - DMS-PRTL-REQ-0084-V-01: Point Coordinate Display_1

4.2.118.2 Test Items

Verify that the Portal aspect displays the coordinates corresponding to the position of the mouse cursor. When coordinate conversion information is available, all available coordinates should be displayed.

4.2.118.3 Test Procedure

Step 1	Description
	Expected Result

4.2.119 LVV-T719 - Verify distance measurement tool

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T719 in Jira

4.2.119.1 Verification Elements

- LVV-9926 - DMS-PRTL-REQ-0085-V-01: Distance Measurement Tool_1

4.2.119.2 Test Items

Verify that the Portal provides a tool to measure the distance between two points in an image or a 2-dimensional plot. Distances should be calculated in both image/plot coordinates (electronic or spatial X and Y) and in astrophysical coordinates (if applicable). Calculations shall be performed in spherical geometry where appropriate.

4.2.119.3 Test Procedure

Step 1	Description
	Expected Result

4.2.120 LVV-T720 - Verify coordinate grid overlays

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T720 in Jira

4.2.120.1 Verification Elements

- LVV-9925 - DMS-PRTL-REQ-0086-V-01: Coordinate Grid Overlays_1

4.2.120.2 Test Items

Verify that the Portal provides the capability to overlay one or more coordinate grids atop images or 2-dimensional plots with known coordinate systems. (For example, it should be

possible to overlay equatorial, Galactic, and ecliptic coordinate grids simultaneously.)

4.2.120.3 Test Procedure

Step 1	Description
Expected Result	

4.2.121 LVV-T721 - Verify astrophysical compass overlay

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T721 in Jira

4.2.121.1 Verification Elements

- LVV-9923 - DMS-PRTL-REQ-0087-V-01: Astrophysical Compass Overlay_1

4.2.121.2 Test Items

Verify that the Portal provides the capability to overlay a North-East compass atop images or 2-dimensional plots with known astrophysical coordinate systems.

4.2.121.3 Test Procedure

Step 1	Description
Expected Result	

4.2.122 LVV-T722 - Verify geometric figure overlays

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T722 in Jira

4.2.122.1 Verification Elements

- LVV-9927 - DMS-PRTL-REQ-0088-V-01: Geometric Figure Overlays_1

4.2.122.2 Test Items

Verify that the Portal aspect enables the drawing, display, and selection of a closed 2-dimensional polygon on any 2-dimensional image.

4.2.122.3 Test Procedure

Step 1	Description
	Expected Result

4.2.123 LVV-T723 - Verify sorting of tabular data by column

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T723 in Jira

4.2.123.1 Verification Elements

- LVV-9934 - DMS-PRTL-REQ-0089-V-01: Sorting of Tabular Data by Column_1

4.2.123.2 Test Items

Verify that the Portal aspect enables users to sort tabular data by a single column within the table and redisplay the sorted data.

4.2.123.3 Test Procedure

Step 1-1 from LVV-T849 Description

Navigate to the Portal Aspect endpoint. The stable version should be used for this test and is currently located at: <https://lsst-lsp-stable.ncsa.illinois.edu/portal/app/>.

Expected Result

A credential-entry screen should be displayed.

Step 1-2 from LVV-T849 Description

Enter a valid set of credentials for an LSST user with LSP access on the instance under test.

Expected Result

The Portal Aspect UI should be displayed following authentication.

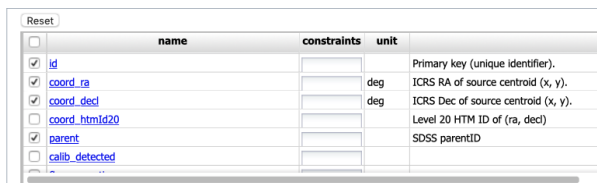
Step 2-1 from LVV-T851 Description

The default catalog (SDSS Stripe 82, 2013 LSST Processing) is fine for this.

Choose columns to return by:

- 1) unchecking the top box in the column selection box
- 2) checking columns for id, coord_ra, coord_dec, and parent.

The result should look like the following:



	name	constraints	unit	
<input type="checkbox"/>	id			Primary key (unique identifier).
<input checked="" type="checkbox"/>	coord_ra		deg	ICRS RA of source centroid (x, y).
<input checked="" type="checkbox"/>	coord_dec		deg	ICRS Dec of source centroid (x, y).
<input type="checkbox"/>	coord_htmlid20			Level 20 HTML ID of (ra, dec)
<input checked="" type="checkbox"/>	parent			SDSS parentID
<input type="checkbox"/>	calib_detected			

Expected Result

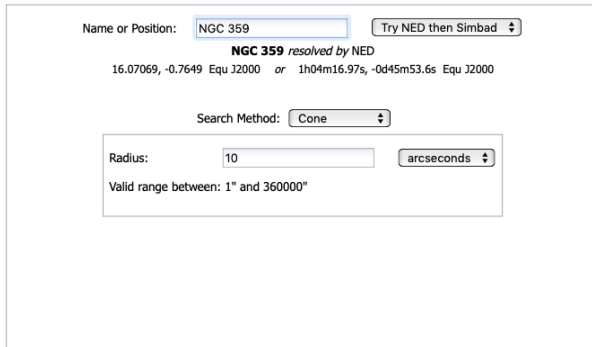
The column box should be configured to return a minimal useful set of columns.

Step 2-2 from LVV-T851 Description

Enter an object name for the portal to resolve. We will use NGC 359, a large elliptical galaxy in the Stripe 82 coverage.

To do this, enter the name “NGC 359” in the “Name or Position” text input box.

Leave the other defaults in place.



Expected Result

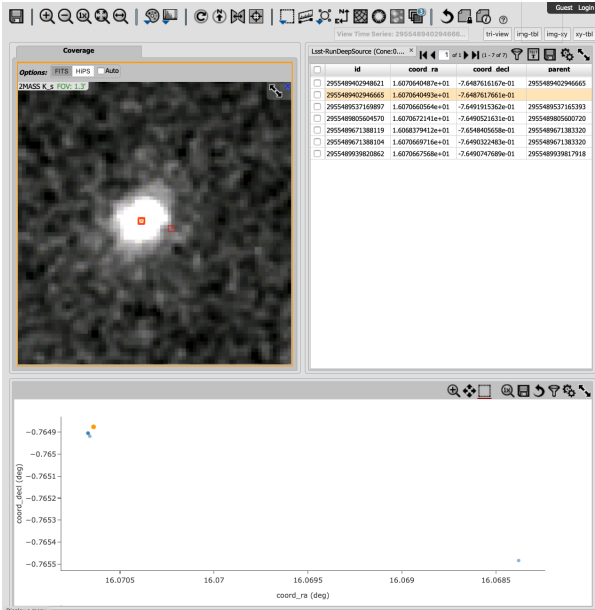
There should be a message like “NGC 359 resolved by NED”. The example coordinates should also changed to the coordinates of NGC 359.

Step 2-3 from LVV-T851 Description

Submit the query to the portal query engine by clicking the “Search” button in the lower left corner of the interface.

Expected Result

A firefly app with the summary image overlay and catalog widgets side by side. A plot of RA vs. Dec is displayed below the side by side widgets.

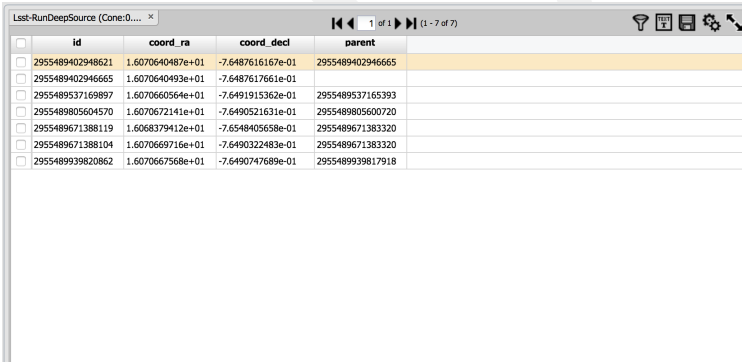


Step 3 Description

Click on the column header that reads “coord_ra”. This should re-sort the table so that objects are sorted in ascending order by RA. Click on the “coord_ra” header again, and the sorting should change to descending order by RA.

Expected Result

Default view (when you first search):

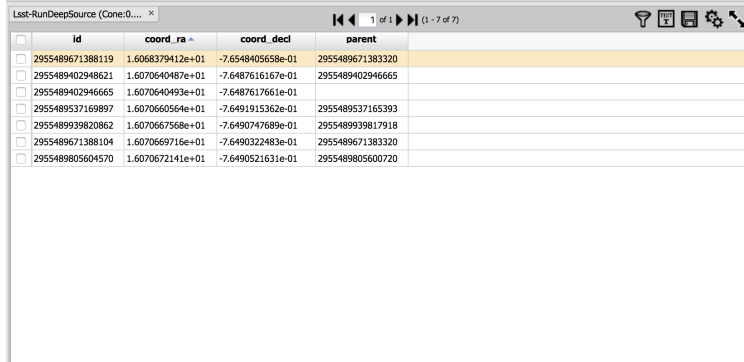


The screenshot shows the LSST Run/DeepSource interface with the table sorted by 'coord_ra' in ascending order. The table data is as follows:

id	coord_ra	coord_dec	parent
2955489402948621	1.6070640487e+01	-7.648716167e-01	2955489402946665
2955489402946665	1.6070640493e+01	-7.648716167e-01	
2955489537169897	1.6070660564e+01	-7.649151362e-01	2955489537165393
2955489805604570	1.6070672141e+01	-7.6490521631e-01	2955489805600720
2955489671388119	1.6068379412e+01	-7.6548405658e-01	2955489671383320
2955489671388104	1.6070669716e+01	-7.6490322483e-01	2955489671383320
2955489939820862	1.6070667568e+01	-7.6490747689e-01	2955489939817918

After clicking once on “coord_ra”, it sorts by RA in

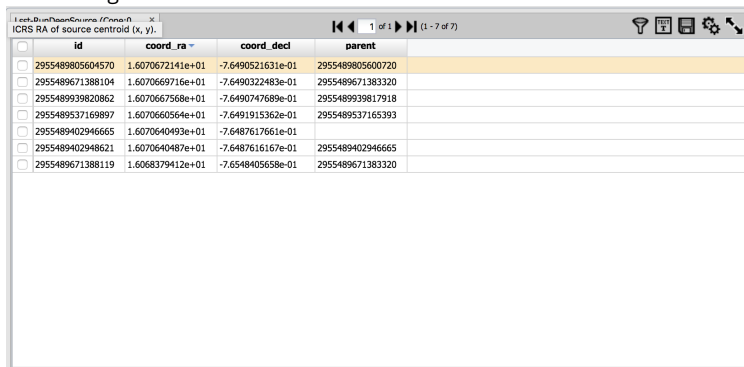
ascending order:



id	coord_ra	coord_decl	parent
2955489671388119	1.6068379412e+01	-7.6548405658e-01	2955489671383320
2955489402948621	1.6070640487e+01	-7.6487616167e-01	2955489402946665
2955489402946665	1.6070640493e+01	-7.6487617661e-01	
2955489537169897	1.6070660564e+01	-7.6491915362e-01	2955489537165393
2955489939820862	1.6070667568e+01	-7.6490747689e-01	2955489939817918
2955489671388104	1.6070669716e+01	-7.6490322483e-01	2955489671383320
2955489805604570	1.6070672141e+01	-7.6490521631e-01	2955489805600720

After clicking again on "coord_ra", it sorts by RA in

descending order:



id	coord_ra	coord_decl	parent
2955489805604570	1.6070672141e+01	-7.6490521631e-01	2955489805600720
2955489671388104	1.6070669716e+01	-7.6490322483e-01	2955489671383320
2955489939820862	1.6070667568e+01	-7.6490747689e-01	2955489939817918
2955489537169897	1.6070660564e+01	-7.6491915362e-01	2955489537165393
2955489402946665	1.6070640493e+01	-7.6487617661e-01	
2955489402948621	1.6070640487e+01	-7.6487616167e-01	2955489402946665
2955489671388119	1.6068379412e+01	-7.6548405658e-01	2955489671383320

Step 4 Description

Try sorting by another column (e.g., "id") by clicking on that column header, and confirm that the table updates.

Expected Result

Table now sorted by the column that was clicked.

Step 5-1 from LVV-T850 Description

Currently, there is no logout mechanism on the portal. This should be updated as the system matures.

Simply close the browser window.

Expected Result

Closed browser window. When navigating to the portal endpoint, expect to execute the steps in LVV-T849.

4.2.124 LVV-T724 - Verify simple filtering of tabular data

Version	Status	Priority	Verification Type	Owner
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1 Draft Normal Inspection Jeffrey Carlin

Open LVV-T724 in Jira

4.2.124.1 Verification Elements

- LVV-9933 - DMS-PRTL-REQ-0090-V-01: Simple Filtering of Tabular Data_1

4.2.124.2 Test Items

Verify that the Portal aspect provides the capability to filter tabular data by a single column, including but not limited to less than (<), less than or equal (<=), greater than (>), greater than or equal (=>), equal (=), not equal (!=) and not null (!=null).

4.2.124.3 Test Procedure

Step 1-1 from LVV-T849	Description
	Navigate to the Portal Aspect endpoint. The stable version should be used for this test and is currently located at: https://lsst-lsp-stable.ncsa.illinois.edu/portal/app/ .

Expected Result
A credential-entry screen should be displayed.

Step 1-2 from LVV-T849	Description
	Enter a valid set of credentials for an LSST user with LSP access on the instance under test.

Expected Result
The Portal Aspect UI should be displayed following authentication.

Step 2-1 from LVV-T851	Description
	The default catalog (SDSS Stripe 82, 2013 LSST Processing) is fine for this.

- Choose columns to return by:
- 1) unchecking the top box in the column selection box
 - 2) checking columns for id, coord_ra, coord_dec, and parent.

The result should look like the following:

<input type="checkbox"/>	name	constraints	unit
<input checked="" type="checkbox"/>	id		Primary key (unique identifier).
<input checked="" type="checkbox"/>	coord_ra		deg ICRS RA of source centroid (x, y).
<input checked="" type="checkbox"/>	coord_dec		deg ICRS Dec of source centroid (x, y).
<input type="checkbox"/>	coord_htmlid20		Level 20 HTM ID of (ra, dec)
<input checked="" type="checkbox"/>	parent		SDSS parentID
<input type="checkbox"/>	calib_detected		

Expected Result

The column box should be configured to return a minimal useful set of columns.

Step 2-2 from LVV-T851 Description

Enter an object name for the portal to resolve. We will use NGC 359, a large elliptical galaxy in the Stripe 82 coverage.

To do this, enter the name “NGC 359” in the “Name or Position” text input box.

Leave the other defaults in place.

Name or Position: Try NED then Simbad ▾

NGC 359 resolved by NED

16.07069, -0.7649 Equ J2000 or 1h04m16.97s, -0d45m53.6s Equ J2000

Search Method: Cone ▾

Radius: arcseconds ▾

Valid range between: 1" and 360000"

Expected Result

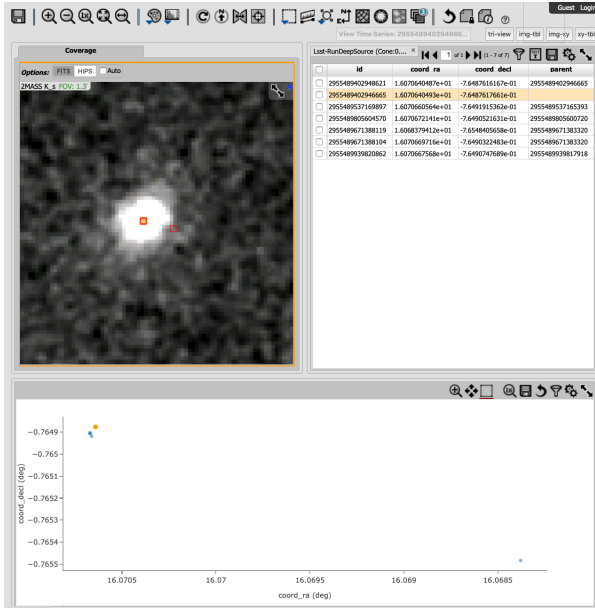
There should be a message like “NGC 359 resolved by NED”. The example coordinates should also changed to the coordinates of NGC 359.

Step 2-3 from LVV-T851 Description

Submit the query to the portal query engine by clicking the “Search” button in the lower left corner of the interface.

Expected Result

A firefly app with the summary image overlay and catalog widgets side by side. A plot of RA vs. Dec is displayed below the side by side widgets.



Step 3 Description

Verify the table can be filtered by:

1. choosing the “filter” icon:

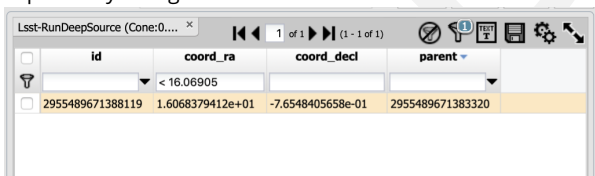


2. entering a filter criterion in the filter box: e.g. coadd_ra is less than 16.06905.

3. pressing return to execute the filtering

Expected Result

Expect only a single row to be selected:



Step 4-1 from LVV-T850 Description

Currently, there is no logout mechanism on the portal. This should be updated as the system matures.

Simply close the browser window.

Expected Result

Closed browser window. When navigating to the portal endpoint, expect to execute the steps in LVV-T849.

4.2.125 LVV-T725 - Verify calculated filtering of tabular data

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T725 in Jira

4.2.125.1 Verification Elements

- LVV-9929 - DMS-PRTL-REQ-0091-V-01: Calculated Filtering of Tabular Data_1

4.2.125.2 Test Items

Verify that the Portal aspect provides the capability to filter a table by single column where the filter has simple arithmetic calculations applied to the column values, including but not limited to sqrt, log, log10, exponentials and trigonometric functions.

4.2.125.3 Test Procedure

Step 1	Description
	Expected Result

4.2.126 LVV-T726 - Verify filtering data by multiple table columns

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T726 in Jira

4.2.126.1 Verification Elements

- LVV-9931 - DMS-PRTL-REQ-0092-V-01: Filtering of Tabular Data by Multiple Columns_1

4.2.126.2 Test Items

Verify that the Portal aspect provides the capability to filter tabular data by multiple columns within the table and redisplay the filtered table.

4.2.126.3 Test Procedure

Step 1	Description
	Expected Result

4.2.127 LVV-T727 - Verify calculated tabular data columns

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T727 in Jira

4.2.127.1 Verification Elements

- LVV-9930 - DMS-PRTL-REQ-0093-V-01: Calculated Quantities on Tabular Data_1

4.2.127.2 Test Items

Verify that the Portal enables the arithmetic calculation and display of new tabular data columns based on existing columns in a table.

4.2.127.3 Test Procedure

Step 1	Description
Expected Result	

4.2.128 LVV-T728 - Verify statistical measurements on tabular data

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T728 in Jira

4.2.128.1 Verification Elements

- LVV-9935 - DMS-PRTL-REQ-0094-V-01: Statistical Measurements on Tabular Data_1

4.2.128.2 Test Items

Verify that the Portal aspect enables the capability to perform a set of statistical measurements (e.g., mean, median, RMS, skew, kurtosis) on tabular data selected by the user.

4.2.128.3 Test Procedure

Step 1	Description
Expected Result	

4.2.129 LVV-T729 - Verify saving of displayed tabular data

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T729 in Jira

4.2.129.1 Verification Elements

- LVV-9932 - DMS-PRTL-REQ-0095-V-01: Saving Displayed Tabular Data_1

4.2.129.2 Test Items

Verify that the Portal aspect provides the capability to save and or download tabular data as it is displayed in the interface maintaining the content, filtering, and sorting.

4.2.129.3 Test Procedure

Step 1	Description
	Expected Result

4.2.130 LVV-T730 - Verify creation and display of false-color images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T730 in Jira

4.2.130.1 Verification Elements

- LVV-9936 - DMS-PRTL-REQ-0096-V-01: False-color Images Creation and Display_1

4.2.130.2 Test Items

Verify that the Portal aspect has the capability to create and display false-color images com-

posed from any user-selectable set of filters from multiple filter views of the same region.

4.2.130.3 Test Procedure

Step 1	Description
Expected Result	

4.2.131 LVV-T731 - Verify statistical measurements on user-selected regions of images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T731 in Jira

4.2.131.1 Verification Elements

- LVV-9937 - DMS-PRTL-REQ-0097-V-01: Statistical Measurements on Image Data_1

4.2.131.2 Test Items

Verify that the Portal aspect enables the capability to perform a set of statistical measurements (e.g., mean, median, RMS, skew, kurtosis) on user-selected regions in images.

4.2.131.3 Test Procedure

Step 1	Description
Expected Result	

4.2.132 LVV-T732 - Verify overlay of catalog sources/objects on images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T732 in Jira

4.2.132.1 Verification Elements

- LVV-9942 - DMS-PRTL-REQ-0098-V-01: Overlay Catalog of Sources and Objects on Images_1

4.2.132.2 Test Items

Verify that the Portal aspect enables the overlay of positions of catalog sources and objects on a displayed image based upon astrophysically-based or observatory-based coordinates.

4.2.132.3 Test Procedure

Step 1	Description
	Expected Result

4.2.133 LVV-T733 - Verify overlay of LSST-derived orbits on images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T733 in Jira

4.2.133.1 Verification Elements

- LVV-9943 - DMS-PRTL-REQ-0099-V-01: Overlay LSST-Derived Orbits_1

4.2.133.2 Test Items

Verify that the Portal aspect has the capability to overlay predicted positions from the orbits of solar system objects in the LSST catalog on to images.

4.2.133.3 Test Procedure

Step 1	Description
	Expected Result

4.2.134 LVV-T734 - Verify overlay of user-supplied catalogs on images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T734 in Jira

4.2.134.1 Verification Elements

- LVV-9944 - DMS-PRTL-REQ-0100-V-01: Overlay User-provided Catalogs on Images_1

4.2.134.2 Test Items

Verify that the Portal enables users to overlay the positions of objects in user-supplied catalogs on top of images.

4.2.134.3 Test Procedure

Step 1	Description
	Expected Result

4.2.135 LVV-T735 - Verify overlay of user-supplied region files on images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T735 in Jira

4.2.135.1 Verification Elements

- LVV-9945 - DMS-PRTL-REQ-0101-V-01: Overlay User-provided Region Files on Images_1

4.2.135.2 Test Items

Verify that Portal users can upload a region file and overlay the region on a displayed image.

4.2.135.3 Test Procedure

Step 1	Description
	Expected Result

4.2.136 LVV-T736 - Verify overlay of camera artifacts on images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T736 in Jira

4.2.136.1 Verification Elements

- LVV-9940 - DMS-PRTL-REQ-0102-V-01: Display of Camera Artifacts as Overlays_1

4.2.136.2 Test Items

Verify that the Portal aspect has the capability to display as image overlays camera artifacts including but not limited to image crosstalk matrices, ghost image identifications, saturation, and column bleeding.

4.2.136.3 Test Procedure

Step 1	Description
	Expected Result

4.2.137 LVV-T737 - Verify single-object time-domain image view

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T737 in Jira

4.2.137.1 Verification Elements

- LVV-9948 - DMS-PRTL-REQ-0103-V-01: Single-Object Time-Domain Image View_1

4.2.137.2 Test Items

Verify that the Portal provides the capability to view an image time series that maintains the same physical scale, photometric scale, and image size display of a cutout area centered on an LSST object. If the object moves, then the images should stay centered on the object.

4.2.137.3 Test Procedure

Step 1	Description
	Expected Result

4.2.138 LVV-T738 - Verify position-based time-domain image view

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T738 in Jira

4.2.138.1 Verification Elements

- LVV-9946 - DMS-PRTL-REQ-0104-V-01: Position-based Time-Domain Image View_1

4.2.138.2 Test Items

Verify that the Portal provides the capability to view an image time series that maintains the same physical scale, photometric scale, and image size display of a specified region on the sky. If the object moves, then the images should stay centered on the sky and the object will appear to move.

4.2.138.3 Test Procedure

Step 1	Description
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Expected Result

4.2.139 LVV-T739 - Verify display of light curves

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T739 in Jira

4.2.139.1 Verification Elements

- LVV-9938 - DMS-PRTL-REQ-0105-V-01: Brightness Light Curves_1

4.2.139.2 Test Items

Verify that the Portal can display graphically the brightness/flux/magnitude of an LSST Object, Source, or ForcedSource as a function of time.

4.2.139.3 Test Procedure

Step 1	Description
Expected Result	

4.2.140 LVV-T740 - Verify linked tables, plots, and images

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T740 in Jira

4.2.140.1 Verification Elements

- LVV-9941 - DMS-PRTL-REQ-0106-V-01: Linked Tables, Plots, and Images_1

4.2.140.2 Test Items

Verify that the Portal aspect has the capability to have tabular data, plots, and images with overlays connected via brushing and linking, so that updates to the data in any one visualization tool (e.g., plot, image, table) creates an update in other visualization tools.

4.2.140.3 Test Procedure

Step 1	Description
	Expected Result

4.2.141 LVV-T741 - Verify capability to select data from a plot or image

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T741 in Jira

4.2.141.1 Verification Elements

- LVV-9939 - DMS-PRTL-REQ-0107-V-01: Data Selection from a Plot or Image_1

4.2.141.2 Test Items

Verify that the Portal aspect enables the selection of data contained inside or outside a closed 2-dimensional polygon on an xy-plot, 2-dimension data structure (e.g., density plot), and a 2-dimensional image.

4.2.141.3 Test Procedure

Step 1	Description
Expected Result	

4.2.142 LVV-T742 - Verify saving data selection from a plot or image

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T742 in Jira

4.2.142.1 Verification Elements

- LVV-9947 - DMS-PRTL-REQ-0108-V-01: Saving Data Selection from a Plot or Image_1

4.2.142.2 Test Items

Verify that the Portal aspect enables the saving of data selected via a polygon selection across the linked images, tables, and plots.

4.2.142.3 Test Procedure

Step 1	Description
Expected Result	

4.2.143 LVV-T743 - Verify access to user databases

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T743 in Jira

4.2.143.1 Verification Elements

- LVV-9949 - DMS-PRTL-REQ-0109-V-01: Access to User Databases_1

4.2.143.2 Test Items

Verify that the Portal aspect provides read/write access to user databases (Level 3 tabular data products) and has implemented any access restrictions placed on such data.

4.2.143.3 Test Procedure

Step 1	Description
	Expected Result

4.2.144 LVV-T744 - Verify tabular data download

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T744 in Jira

4.2.144.1 Verification Elements

- LVV-9954 - DMS-PRTL-REQ-01110-V-01: Tabular Data Download_1

4.2.144.2 Test Items

Verify that the Portal aspect includes a mechanism for a user to download to a remote site, Workspace, or to an existing or new user database the tabular results from a database query, including for catalog or image metadata.

4.2.144.3 Test Procedure

Step 1	Description
	Expected Result

4.2.145 LVV-T745 - Verify image data download

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T745 in Jira

4.2.145.1 Verification Elements

- LVV-9951 - DMS-PRTL-REQ-01111-V-01: Image Data Download_1

4.2.145.2 Test Items

Verify that the Portal aspect includes mechanisms for a user to download image data to a remote site or to the Workspace, from both screens displaying images and screens displaying lists of image metadata.

4.2.145.3 Test Procedure

Step 1	Description
Expected Result	

4.2.146 LVV-T746 - Verify selected image download

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T746 in Jira

4.2.146.1 Verification Elements

- LVV-9953 - DMS-PRTL-REQ-0112-V-01: Selected Image Download_1

4.2.146.2 Test Items

Verify that the Portal aspect supports user selection for download of a subset of the images in an image metadata table or image cutout table.

4.2.146.3 Test Procedure

Step 1	Description
Expected Result	

4.2.147 LVV-T747 - Verify estimation of data download volume

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T747 in Jira

4.2.147.1 Verification Elements

- LVV-9950 - DMS-PRTL-REQ-0113-V-01: Download Volume Estimation_1

4.2.147.2 Test Items

Verify that the Portal provides an estimate of the volume of a data download before the user confirms the download option.

4.2.147.3 Test Procedure

Step 1	Description
	Expected Result

4.2.148 LVV-T748 - Verify notification of long download completion

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T748 in Jira

4.2.148.1 Verification Elements

- LVV-9952 - DMS-PRTL-REQ-0114-V-01: Long Download Completion Notification_1

4.2.148.2 Test Items

Verify that the Portal aspect notifies the user with an estimate of how long a download is

expected to take. The user can continue to monitor the download; verify that an option has been provided to notify the user when the download has completed.

4.2.148.3 Test Procedure

Step 1	Description
	Expected Result

4.2.149 LVV-T749 - Verify API for visualization components

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T749 in Jira

4.2.149.1 Verification Elements

- LVV-9955 - DMS-PRTL-REQ-0115-V-01: APIs for Visualization Components_1

4.2.149.2 Test Items

Verify that the Portal aspect provides a documented application program interface that allows users and services at any location to access and manipulate the Portal's visualization services. This is intended to enable API control of the visualization components and tool-level visualization services to be called and controlled through an API. There will be a Web API as well as a Python wrapper for it.

4.2.149.3 Test Procedure

Step 1	Description
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Expected Result

4.2.150 LVV-T750 - Verify implementation of storage quotas status

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T750 in Jira

4.2.150.1 Verification Elements

- LVV-9958 - DMS-PRTL-REQ-0116-V-01: Storage Quotas User Interface_1

4.2.150.2 Test Items

Verify that the Portal aspect provides a summary of the current status of users' storage allocations.

4.2.150.3 Test Procedure

Step 1	Description
Expected Result	

4.2.151 LVV-T751 - Verify implementation of computational quotas status

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T751 in Jira

4.2.151.1 Verification Elements

- LVV-9956 - DMS-PRTL-REQ-0117-V-01: Computational Quotas User Interface_1

4.2.151.2 Test Items

Verify that the Portal aspect provides a summary of the current status of users' allocations of computational resources.

4.2.151.3 Test Procedure

Step 1	Description
	Expected Result

4.2.152 LVV-T752 - Verify saved Portal display preferences

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T752 in Jira

4.2.152.1 Verification Elements

- LVV-9957 - DMS-PRTL-REQ-0118-V-01: Portal Display Preferences_1

4.2.152.2 Test Items

Verify that the Portal aspect enables a user to establish and save viewing preferences, in-

cluding, but not limited to, which tabular data columns to view, how tables should be sorted by default, which calculated quantities appear within a table, what image stretch and color tables, what types of plots are generated, how data are overlaid on images.

4.2.152.3 Test Procedure

Step 1	Description
Expected Result	

4.2.153 LVV-T753 - Verify alert subscription service

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T753 in Jira

4.2.153.1 Verification Elements

- LVV-9960 - DMS-PRTL-REQ-0119-V-01: Alert Subscription Service_1

4.2.153.2 Test Items

Verify that the Portal aspect provides an interface to the alert subscription service that allows authenticated users with LSST data rights to subscribe to a stream of alert events.

4.2.153.3 Test Procedure

Step 1	Description
Expected Result	

4.2.154 LVV-T754 - Verify availability of pre-defined alert filters

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T754 in Jira

4.2.154.1 Verification Elements

- LVV-9961 - DMS-PRTL-REQ-0120-V-01: Pre-defined Alert Filters_1

4.2.154.2 Test Items

Verify that the Portal provides an interface to permit alert subscriptions to be configured with Project-provided alert filters.

4.2.154.3 Test Procedure

Step 1	Description
	Expected Result

4.2.155 LVV-T755 - Verify availability of user-defined alert filters

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T755 in Jira

4.2.155.1 Verification Elements

- LVV-9962 - DMS-PRTL-REQ-0121-V-01: User-defined Alert Filters_1

4.2.155.2 Test Items

Verify that the Portal provides an interface to permit alert subscriptions to be configured with user-provided alert filters.

4.2.155.3 Test Procedure

Step 1	Description
	Expected Result

4.2.156 LVV-T756 - Verify monitoring of alert subscription

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T756 in Jira

4.2.156.1 Verification Elements

- LVV-9959 - DMS-PRTL-REQ-0127-V-01: Alert Subscription Monitoring_1

4.2.156.2 Test Items

Verify that the Portal provides feedback about the status and performance of a user's filters in the alert subscription service.

4.2.156.3 Test Procedure

Step 1	Description
Expected Result	

4.2.157 LVV-T757 - Verify access to survey documentation

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T757 in Jira

4.2.157.1 Verification Elements

- LVV-9963 - DMS-PRTL-REQ-0122-V-01: Access to Observatory Documentation_1

4.2.157.2 Test Items

Verify that the Portal provides access to Project-provided documentation on the design, construction, and operation of the LSST.

4.2.157.3 Test Procedure

Step 1	Description
Expected Result	

4.2.158 LVV-T758 - Verify access to Portal documentation

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T758 in Jira

4.2.158.1 Verification Elements

- LVV-9965 - DMS-PRTL-REQ-0123-V-01: Portal User Documentation_1

4.2.158.2 Test Items

Verify that the Portal provides access to documentation on the use of the Portal (i.e., a user guide, or similar).

4.2.158.3 Test Procedure

Step 1	Description
	Expected Result

4.2.159 LVV-T759 - Verify access to Portal API documentation

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T759 in Jira

4.2.159.1 Verification Elements

- LVV-9964 - DMS-PRTL-REQ-0124-V-01: Portal API Documentation_1

4.2.159.2 Test Items

Verify that the Portal provides access to reference manual-style documentation of its public

network and programmatic APIs.

4.2.159.3 Test Procedure

Step 1	Description
	Expected Result

4.2.160 LVV-T760 - Verify tolerance of database changes

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T760 in Jira

4.2.160.1 Verification Elements

- LVV-9967 - DMS-PRTL-REQ-0125-V-01: Tolerance of Production Database Changes_1

4.2.160.2 Test Items

Verify that the Portal aspect facilitates accommodation of database expansion and changes and metadata extension and changes associated with the evolution of the Level 1 data, Level 2 data releases, and other planned data sources.

4.2.160.3 Test Procedure

Step 1	Description
	Expected Result

4.2.161 LVV-T761 - Verify implementation of system-busy notification

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T761 in Jira

4.2.161.1 Verification Elements

- LVV-9966 - DMS-PRTL-REQ-0126-V-01: System-Busy Indication_1

4.2.161.2 Test Items

Verify that the Portal provides a means to inform users when the elements of the system are unavailable due to maintenance or excessive load.

4.2.161.3 Test Procedure

Step 1	Description
	Expected Result

4.2.162 LVV-T762 - Verify availability of interactive Python environment

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Simon Krughoff

Open LVV-T762 in Jira

4.2.162.1 Verification Elements

- LVV-9971 - DMS-NB-REQ-0005-V-01: Interactive Python Environment_1

4.2.162.2 Test Items

Verify that the Notebook aspect provides an interactive Python environment through both a notebook interface and via a Python interactive interpreter.

4.2.162.3 Test Procedure

Step 1-1 from LVV-T837	Description
Authenticate to the notebook aspect of the LSST Science Platform (NB-LSP). This is currently at https://lsst-lsp-stable.ncsa.illinois.edu/nb .	
Expected Result	
Redirection to the spawner page of the NB-LSP allowing selection of the containerized stack version and machine flavor.	
Step 1-2 from LVV-T837	Description
Spawn a container by: 1) choosing an appropriate stack version: e.g. the latest weekly. 2) choosing an appropriate machine flavor: e.g. medium 3) click "Spawn"	
Expected Result	
Redirection to the JupyterLab environment served from the chosen container containing the correct stack version.	
Step 2-1 from LVV-T838	Description
Open a new launcher by navigating in the top menu bar "File" -> "New Launcher"	
Expected Result	
A launcher window with several sections, potentially with several kernel versions for each.	
Step 2-2 from LVV-T838	Description
Select the option under "Notebook" labeled "LSST" by clicking on the icon.	
Expected Result	
An empty notebook with a single empty cell. The kernel show up as "LSST" in the top right of the notebook.	

Step 3	Description
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Click in the empty cell to get a cursor.
Enter the example code.
Execute the example code by pressing shift+enter on the keyboard.

Example Code

```
import lsst.afw.image as afw_image
im = afw_image.ImageF(10, 10)
isinstance(im, afw_image.ImageF)
```

Expected Result

The expected result of this code is the value True without error or warning.

Step 4	Description
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From the "File" menu, select "Save All, Exit, and Log Out" to exit the Notebook Aspect.

Expected Result

Notification of successful logout, OK to close browser window.

4.2.163 LVV-T763 - Verify availability of Unix shell access

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Simon Krughoff

Open LVV-T763 in Jira

4.2.163.1 Verification Elements

- LVV-9976 - DMS-NB-REQ-0006-V-01: Unix Shell Access_1

4.2.163.2 Test Items

Verify that the Notebook aspect provides command-line access to a Unix shell with the same environment as the interactive Python environment.

4.2.163.3 Test Procedure

Step 1-1 from LVV-T837 Description

Authenticate to the notebook aspect of the LSST Science Platform (NB-LSP). This is currently at <https://lsst-lsp-stable.ncsa.illinois.edu/nb>.

Expected Result

Redirection to the spawner page of the NB-LSP allowing selection of the containerized stack version and machine flavor.

Step 1-2 from LVV-T837 Description

Spawn a container by:

- 1) choosing an appropriate stack version: e.g. the latest weekly.
- 2) choosing an appropriate machine flavor: e.g. medium
- 3) click "Spawn"

Expected Result

Redirection to the JupyterLab environment served from the chosen container containing the correct stack version.

Step 2-1 from LVV-T839 Description

Open a new launcher by navigating in the top menu bar "File" -> "New Launcher".

Expected Result

A launcher window with several sections, potentially with several kernel versions for each.

Step 2-2 from LVV-T839 Description

Select the option under "Other" labeled "Terminal" by clicking on the icon.

Expected Result

A terminal window appears with command line access to the user's file system.

Step 3 Description

Verify that the STDOUT and STDERR output streams are attached to an interactive terminal using the example test code.

Example Code

```
case "$?" in
*) echo This shell is interactive ;;
*) echo This shell is not interactive ;;
esac
```

Expected Result

The shell should print "This shell is interactive" to the terminal window.

Step 4	Description
	From the "File" menu, select "Save All, Exit, and Log Out" to exit the Notebook Aspect.
Expected Result	
Notification of successful logout, OK to close browser window.	

4.2.164 LVV-T764 - Verify availability of containerized software releases

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Simon Krughoff

Open LVV-T764 in Jira

4.2.164.1 Verification Elements

- LVV-9974 - DMS-NB-REQ-0007-V-01: Pre-installed Containerized Software Releases_1

4.2.164.2 Test Items

Verify that users of the Notebook aspect are able to choose from a curated list of pre-built containers (including version of LSST stack) for their notebooks (and any other provided in-interactive environment) to execute in.

4.2.164.3 Test Procedure

Step 1-1 from LVV-T837	Description
	Authenticate to the notebook aspect of the LSST Science Platform (NB-LSP). This is currently at https://lsst-lsp-stable.ncsa.illinois.edu/nb .
Expected Result	
Redirection to the spawner page of the NB-LSP allowing selection of the containerized stack version and machine flavor.	
Step 1-2 from LVV-T837	Description
	Spawn a container by:

- 1) choosing an appropriate stack version: e.g. the latest weekly.
- 2) choosing an appropriate machine flavor: e.g. medium
- 3) click "Spawn"

Expected Result

Redirection to the JupyterLab environment served from the chosen container containing the correct stack version.

Step 2-1 from LVV-T838

Description

Open a new launcher by navigating in the top menu bar "File" -> "New Launcher"

Expected Result

A launcher window with several sections, potentially with several kernel versions for each.

Step 2-2 from LVV-T838

Description

Select the option under "Notebook" labeled "LSST" by clicking on the icon.

Expected Result

An empty notebook with a single empty cell. The kernel show up as "LSST" in the top right of the notebook.

Step 3

Description

Click in the empty cell to get a cursor.

Enter the example code.

Execute the example code by pressing shift+enter on the keyboard, and confirm that the version listed on the screen is the one you requested.

Example Code

```
lsst list -s | grep lsst_distrib
```

Expected Result

The expected result of this code is something similar to the following:

```
lsst_distrib      17.0+10      current_w_2019_11 setup
```

Step 4

Description

Enter the example code.

Execute the example code by pressing shift+enter on the keyboard.

Example Code

```
import lsst.afw.image as afw_image
```

```
im = afw_image.ImageF(10, 10)
isinstance(im, afw_image.ImageF)
```

Expected Result

The expected result of this code is the value True without error or warning.

Step 5 Description

From the "File" menu, select "Save All, Exit, and Log Out" to exit the Notebook Aspect.

Expected Result

Notification of successful logout, OK to close browser window.

Step 6 Description

After logging out, log back into the Notebook Aspect, and try a container with a different stack version.

Expected Result

Step 7-1 from LVV-T837 Description

Authenticate to the notebook aspect of the LSST Science Platform (NB-LSP). This is currently at <https://lsst-lsp-stable.ncsa.illinois.edu/nb>.

Expected Result

Redirection to the spawner page of the NB-LSP allowing selection of the containerized stack version and machine flavor.

Step 7-2 from LVV-T837 Description

Spawn a container by:

- 1) choosing an appropriate stack version: e.g. the latest weekly.
- 2) choosing an appropriate machine flavor: e.g. medium
- 3) click "Spawn"

Expected Result

Redirection to the JupyterLab environment served from the chosen container containing the correct stack version.

Step 8-1 from LVV-T838 Description

Open a new launcher by navigating in the top menu bar "File" -> "New Launcher"

Expected Result

A launcher window with several sections, potentially with several kernel versions for each.

Step 8-2 from LVV-T838 Description

Select the option under "Notebook" labeled "LSST" by clicking on the icon.

Expected Result

An empty notebook with a single empty cell. The kernel show up as "LSST" in the top right of the notebook.

Step 9 Description

Click in the empty cell to get a cursor.
 Enter the example code.
 Execute the example code by pressing shift+enter on the keyboard, and confirm that the version listed on the screen is the one you requested.

Example Code

```
leups list -s | grep lsst_distrib
```

Expected Result

The expected result of this code is something similar to the following:

```
lsst_distrib      17.0+10      current w_2019_11 setup
```

Step 10 Description

Click in the empty cell to get a cursor.
 Enter the example code.
 Execute the example code by pressing shift+enter on the keyboard.

Example Code

```
import lsst.afw.image as afw_image
im = afw_image.ImageF(10, 10)
isinstance(im, afw_image.ImageF)
```

Expected Result

The expected result of this code is the value True without error or warning.

Step 11 Description

From the "File" menu, select "Save All, Exit, and Log Out" to exit the Notebook Aspect.

Expected Result

Notification of successful logout, OK to close browser window.

4.2.165 LVV-T765 - Verify latency of release deployment

Version	Status	Priority	Verification Type	Owner
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1	Draft	Normal	Demonstration	Jeffrey Carlin
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Open LVV-T765 in Jira

4.2.165.1 Verification Elements

- LVV-9975 - DMS-NB-REQ-0008-V-01: Release Deployment Latency_1

4.2.165.2 Test Items

Verify that it is possible to add a new environment (with a new version of the LSST stack) to the curated list of available execution environments in less than four hours.

4.2.165.3 Test Procedure

Step 1	Description
	Expected Result

4.2.166 LVV-T766 - Verify availability of data access middleware

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T766 in Jira

4.2.166.1 Verification Elements

- LVV-9969 - DMS-NB-REQ-0009-V-01: Data Access Middleware Availability_1

4.2.166.2 Test Items

Verify that users of the Notebook Aspect are able to make use of the LSST Python I/O middle-ware layer to perform data discovery, data access and any other supported functions (e.g., provenance information). Notably, the Data Butler is available in the Notebook Python environment, with full access to all authorized data products available on that instance of the Science Platform.

4.2.166.3 Test Procedure

Step 1	Description
	Expected Result

4.2.167 LVV-T767 - Verify availability of standard astronomy software

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T767 in Jira

4.2.167.1 Verification Elements

- LVV-9968 - DMS-NB-REQ-0010-V-01: Common Astronomy Package Availability_1

4.2.167.2 Test Items

Verify that the Notebook Aspect provides select standard astronomy packages in the interactive environments. These may include, for example, Astropy and S-Extractor.

4.2.167.3 Test Procedure

Step 1	Description
	Expected Result

4.2.168 LVV-T768 - Verify availability of user package installation

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Simon Krughoff

Open LVV-T768 in Jira

4.2.168.1 Verification Elements

- LVV-9978 - DMS-NB-REQ-0011-V-01: User Package Installation_1

4.2.168.2 Test Items

Verify that the Notebook Aspect has a process that allows users to add new packages to their environment It is intended that operations like “pip install” will be usable.

4.2.168.3 Test Procedure

Step 1-1 from LVV-T837	Description
	Authenticate to the notebook aspect of the LSST Science Platform (NB-LSP). This is currently at https://lsst-lsp-stable.ncsa.illinois.edu/nb .
	Expected Result
	Redirection to the spawner page of the NB-LSP allowing selection of the containerized stack version and machine flavor.

Step 1-2 from LVV-T837	Description
	Spawn a container by: 1) choosing an appropriate stack version: e.g. the latest weekly. 2) choosing an appropriate machine flavor: e.g. medium 3) click “Spawn”

Expected Result

Redirection to the JupyterLab environment served from the chosen container containing the correct stack version.

Step 2-1 from LVV-T838 Description

Open a new launcher by navigating in the top menu bar "File" -> "New Launcher"

Expected Result

A launcher window with several sections, potentially with several kernel versions for each.

Step 2-2 from LVV-T838 Description

Select the option under "Notebook" labeled "LSST" by clicking on the icon.

Expected Result

An empty notebook with a single empty cell. The kernel show up as "LSST" in the top right of the notebook.

Step 3 Description

Verify the pip based module is not already installed by:
1) entering the example code in the empty cell
2) running the cell by pressing shift+enter on the keyboard.

Example Code

```
import pip_install_test
```

Expected Result

The expected result is a ModuleNotFoundError exception with a second empty cell under the first.

Step 4 Description

Verify the local file module is not already installed by:
1) entering the example code in the second empty cell
2) running the cell by pressing shift+enter on the keyboard.

Example Code

```
import local_file_test
```

Expected Result

The expected result is a ModuleNotFoundError exception with a third empty cell under the first two.

Step 5 Description

Open a new terminal window by navigating the top menu bar "File" -> "New" -> "Terminal".

Expected Result

A shell prompt (bash by default) with cursor focus.

Step 6 Description

Install the pip test package by entering the example code at the shell prompt.

Example Code

```
pip install --user pip-install-test
```

Expected Result

A message in the terminal indicating success installing the package.

Step 7 Description

Install a local python package on the PYTHONPATH in the notebook by executing the example code at the shell prompt.

Example Code

```
TMPDIR=$(mktemp -d)
echo 'print("Hello: this is a test of the user import system")' > ${TMPDIR}/local_file_test.py
if [ -e ${HOME}/notebooks/.user_setups ]; then
  mv ${HOME}/notebooks/.user_setups ${TMPDIR}
fi
echo 'export PYTHONPATH=${TMPDIR}:${PYTHONPATH}' > ${HOME}/notebooks/.user_setups
```

Expected Result

The example code should complete without error or warning.

Step 8 Description

Select the notebook created in Step 2 by clicking on the appropriate tab.

Expected Result

Step 9 Description

Clear all errors by navigating the top menu bar "Kernel" -> "Restart Kernel and Clear All Outputs..."

Expected Result

Three cells with code from Step 3 in the first cell, code from Step 4 in the second cell, and an empty third cell.

Step 10 Description

Check the pip install by:

- 1) selecting the first cell in the notebook
- 2) executing the cell by pressing shift+enter on the keyboard.

Expected Result

The cell should execute without error or warning. A message may be displayed indicating the success of import.

Step 11 Description

Check the local file install by:

- 1) selecting the second cell in the notebook
 - 2) executing the cell by pressing shift+enter on the keyboard
-

Expected Result

The cell should execute without error or warning. A message saying "Hello: this is a test of the user import system" will be displayed.

Step 12 Description

Navigate back to the terminal window by selecting the appropriate tab. Clean up the test installs by executing the example code in the terminal window.

Example Code

```
rm -r ${TMPDIR}
rm ${HOME}/notebooks/.user_setups
if [ -e ${TMPDIR}/.user_setups ]; then
  mv ${TMPDIR}/.user_setups ${HOME}/notebooks/
fi
pip uninstall -y pip-install-test
```

Expected Result

The example code should execute without error or warning.

Step 13 Description

Delete the notebook by:

- 1) right clicking the notebook in the file browser
 - 2) selecting delete from the dropdown.
-

Expected Result

The notebook should disappear from the file browser.

Step 14 Description

From the "File" menu, select "Save All, Exit, and Log Out" to exit the Notebook Aspect.

Expected Result

Notification of successful logout, OK to close browser window.

4.2.169 LVV-T769 - Verify availability of user development environment

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T769 in Jira

4.2.169.1 Verification Elements

- LVV-9977 - DMS-NB-REQ-0012-V-01: User Development Environment_1

4.2.169.2 Test Items

Verify that the Notebook Aspect environment permits a user to edit and build their own version of any LSST science pipeline package in their container. This implies the availability of both a C++ and a Python development environment.

4.2.169.3 Test Procedure

Step 1	Description
	Expected Result

4.2.170 LVV-T770 - Verify availability of persistent user home file space

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Simon Krughoff

Open LVV-T770 in Jira

4.2.170.1 Verification Elements

- LVV-9973 - DMS-NB-REQ-0013-V-01: Persistent User Home File Space_1

4.2.170.2 Test Items

Verify that the Notebook Aspect provides a persistent home space such that per user configuration survives shutdown and restart of the environment. This space appears as a home directory from Python and in the Unix shell environment. This includes things like .bashrc, .pythonrc, and user installed python libs.

4.2.170.3 Test Procedure

Step 1-1 from LVV-T837	Description
Authenticate to the notebook aspect of the LSST Science Platform (NB-LSP). This is currently at https://lsst-lsp-stable.ncsa.illinois.edu/nb .	
Expected Result	
Redirection to the spawner page of the NB-LSP allowing selection of the containerized stack version and machine flavor.	
Step 1-2 from LVV-T837	Description
Spawn a container by: <ol style="list-style-type: none"> 1) choosing an appropriate stack version: e.g. the latest weekly. 2) choosing an appropriate machine flavor: e.g. medium 3) click "Spawn" 	
Expected Result	
Redirection to the JupyterLab environment served from the chosen container containing the correct stack version.	
Step 2-1 from LVV-T839	Description
Open a new launcher by navigating in the top menu bar "File" -> "New Launcher".	
Expected Result	
A launcher window with several sections, potentially with several kernel versions for each.	
Step 2-2 from LVV-T839	Description
Select the option under "Other" labeled "Terminal" by clicking on the icon.	
Expected Result	
A terminal window appears with command line access to the user's file system.	

Step 3	Description
--------	-------------

Create a dummy ASCII text file in your home directory by typing the following at the command line. The second line confirms that the file was created with some text.

Example Code

```
$ echo '1 2 3 4 5' > tmp.txt  
$ cat tmp.txt
```

Expected Result

The file ('tmp.txt' in this example) is present in the home directory, and its contents print to the screen ('1 2 3 4 5' in this example).

Step 4	Description
--------	-------------

Check to see that a .bashrc file exists by typing "ls .bashrc" at the command line. If it does not exist, create one by typing "touch .bashrc".

Then make a change to the .bashrc file by opening it with your favorite text editor, and adding the example code below. Save the .bashrc file.

Confirm that the new line is in your .bashrc file by typing "cat .bashrc".

Example Code

```
echo "This is a test. This is only a test."
```

Expected Result

User's .bashrc file exists, and contains a line with the example code.

Step 5	Description
--------	-------------

From the "File" menu, select "Save All, Exit, and Log Out" to exit the Notebook Aspect.

Expected Result

Notification of successful logout, OK to close browser window.

Step 6-1 from LVV-T837	Description
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Authenticate to the notebook aspect of the LSST Science Platform (NB-LSP). This is currently at <https://lsst-lsp-stable.nsa.illinois.edu/nb>.

Expected Result

Redirection to the spawner page of the NB-LSP allowing selection of the containerized stack version and machine flavor.

Step 6-2 from LVV-T837	Description
------------------------	-------------

Spawn a container by:

- 1) choosing an appropriate stack version: e.g. the latest weekly.
- 2) choosing an appropriate machine flavor: e.g. medium
- 3) click "Spawn"

Expected Result

Redirection to the JupyterLab environment served from the chosen container containing the correct stack version.

Step 7 **Description**

After logging back in, check whether your changes have been retained.

Open a terminal, and confirm that the message entered into your .bashrc file prints to the screen.

Confirm that the temporary file you created is still present (e.g., by typing "cat tmp.txt" and observing that the contents print to the screen).

Expected Result

The message entered into the .bashrc file prints to the screen upon opening a terminal, and the dummy text placed in the .txt file displays when the "cat" command is executed.

Step 8 **Description**

Remove the file created above (using "rm test.txt" from the command line), and delete the added line from .bashrc.

Expected Result

Notification of successful logout, OK to close browser window.

Step 9 **Description**

From the "File" menu, select "Save All, Exit, and Log Out" to exit the Notebook Aspect.

Expected Result

Notification of successful logout, OK to close browser window.

4.2.171 LVV-T771 - Verify availability of Notebook aspect documentation

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LW-T771 in Jira

4.2.171.1 Verification Elements

- LVV-9970 - DMS-NB-REQ-0014-V-01: Documentation_1

4.2.171.2 Test Items

Verify that the Notebook Aspect provides documentation of each of the constituent features as well as tutorial notebooks demonstrating the use of the Aspect.

4.2.171.3 Test Procedure

Step 1	Description
	Expected Result

4.2.172 LVV-T772 - Verify new-user onboarding

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T772 in Jira

4.2.172.1 Verification Elements

- LVV-9972 - DMS-NB-REQ-0015-V-01: New-User Onboarding_1

4.2.172.2 Test Items

Verify that the Notebook Aspect provides clear documentation on how to obtain credentials

for accessing the Notebook Aspect.

4.2.172.3 Test Procedure

Step 1	Description
	Expected Result

4.2.173 LVV-T773 - Verify availability of shared file space

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T773 in Jira

4.2.173.1 Verification Elements

- LVV-9983 - DMS-NB-REQ-0016-V-01: Shared File Space_1

4.2.173.2 Test Items

Verify that the Notebook Aspect provides access to a shared read/write filesystem visible to all users of an instance of the Science Platform.

4.2.173.3 Test Procedure

Step 1	Description
	Expected Result

4.2.174 LVV-T774 - Verify API and Portal aspects accessible from Notebook

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T774 in Jira

4.2.174.1 Verification Elements

- LVV-9980 - DMS-NB-REQ-0017-V-01: Access to the API and Portal Aspects_1

4.2.174.2 Test Items

Verify that the Notebook Aspect is able to utilise the data access services provided by other Aspects. In particular, a Notebook user can use standard VO services to access LSST Data Releases.

4.2.174.3 Test Procedure

Step 1	Description
	Expected Result

4.2.175 LVV-T775 - Verify access to User File Workspace

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T775 in Jira

4.2.175.1 Verification Elements

- LVV-9985 - DMS-NB-REQ-0018-V-01: User File Workspace Access_1

4.2.175.2 Test Items

Verify that users of the Notebook Aspect are able to access the User File Workspace available as a POSIX filesystem from within the Python kernels and shell-prompt sessions it supports.

4.2.175.3 Test Procedure

Step 1	Description
	Expected Result

4.2.176 LVV-T776 - Verify access to VOSpace services from Notebook aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T776 in Jira

4.2.176.1 Verification Elements

- LVV-9986 - DMS-NB-REQ-0019-V-01: VOSpace Access_1

4.2.176.2 Test Items

Verify that users of the Notebook Aspect are able to interact with VOSpace services available through project or external services. Users will be able to directly use VOSpace APIs within a Notebook.

4.2.176.3 Test Procedure

Step 1	Description
	Expected Result

4.2.177 LVV-T777 - Verify user database workspace access from Notebook aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T777 in Jira

4.2.177.1 Verification Elements

- LVV-9984 - DMS-NB-REQ-0020-V-01: User Database Workspace Access_1

4.2.177.2 Test Items

Verify that users are able to interact with their User Database through the Notebook Aspect to insert, delete, and control access to their tables. This will be possible via TAP, at least, and possibly through lower-level access.

4.2.177.3 Test Procedure

Step 1	Description
	Expected Result

4.2.178 LVV-T778 - Verify access to batch system

Version	Status	Priority	Verification Type	Owner
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1	Draft	Normal	Inspection	Jeffrey Carlin
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Open LVV-T778 in Jira

4.2.178.1 Verification Elements

- LVV-9981 - DMS-NB-REQ-0021-V-01: Batch System Access_1

4.2.178.2 Test Items

Verify that the Notebook aspect provides access to a batch processing system via shell access.

4.2.178.3 Test Procedure

Step 1	Description
	Expected Result

4.2.179 LVV-T779 - Verify implementation of quotas in Notebook aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T779 in Jira

4.2.179.1 Verification Elements

- LVV-9982 - DMS-NB-REQ-0022-V-01: Compute and Storage Quotas_1

4.2.179.2 Test Items

Verify that the Notebook Aspect has a quota system for compute and storage authorized access via an authentication system.

4.2.179.3 Test Procedure

Step 1	Description
	Expected Result

4.2.180 LVV-T780 - Verify access to all data products from Notebook aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T780 in Jira

4.2.180.1 Verification Elements

- LVV-9979 - DMS-NB-REQ-0023-V-01: Access to All Data Products_1

4.2.180.2 Test Items

Verify that an authorized user of the Notebook Aspect is able to access the reformatted Engineering and Facilities Database (EFD) and all other LSST released data products.

4.2.180.3 Test Procedure

Step 1	Description

Expected Result

4.2.181 LVV-T781 - Verify ease of Notebook aspect deployment

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T781 in Jira

4.2.181.1 Verification Elements

- LVV-9988 - DMS-NB-REQ-0024-V-01: Ease of Deployment_1

4.2.181.2 Test Items

Verify that the Notebook Aspect is deployable to multiple instances and contexts, both private and public.

4.2.181.3 Test Procedure

Step 1	Description
	Expected Result

4.2.182 LVV-T782 - Verify workload for deployment in Kubernetes

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Demonstration	Jeffrey Carlin

Open LVV-T782 in Jira

4.2.182.1 Verification Elements

- LVV-9987 - DMS-NB-REQ-0025-V-01: Deployment Workload in Kubernetes_1

4.2.182.2 Test Items

Given a Kubernetes cluster with a configuration meeting a documented standard set of specifications, verify that it takes an engineer with admin rights no more than 2 days to deploy the Notebook Aspect in that context. The specification is expected to constrain factors such as software versions for Kubernetes and related packages, available storage, a shared file system, and an authentication system.

4.2.182.3 Test Procedure

Step 1	Description
	Expected Result

4.2.183 LVV-T783 - Verify monitoring of Notebook system health

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T783 in Jira

4.2.183.1 Verification Elements

- LVV-9989 - DMS-NB-REQ-0026-V-01: System Health Monitoring_1

4.2.183.2 Test Items

Verify that the Notebook Aspect provides a service health microservice and a dynamic web page hostable on separate resources that provides a view of the health status.

4.2.183.3 Test Procedure

Step 1	Description
	Expected Result

4.2.184 LVV-T784 - Verify visualization of images in Notebook aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T784 in Jira

4.2.184.1 Verification Elements

- LVV-9990 - DMS-NB-REQ-0032-V-01: Image Visualization_1

4.2.184.2 Test Items

Verify that the Notebook aspect provides tools for visualization of images produced by the LSST stack tools.

4.2.184.3 Test Procedure

Step 1	Description

Expected Result

4.2.185 LVV-T785 - Verify availability of scientific plotting tools in Notebook aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T785 in Jira

4.2.185.1 Verification Elements

- LVV-9991 - DMS-NB-REQ-0033-V-01: Scientific Plotting_1

4.2.185.2 Test Items

Verify that the Notebook Aspect provides common plotting methods including scatter plots, raster images, histograms, 2D histograms, contours, line traces, polygons, compositions of these (contours on scatter plots), density images.

4.2.185.3 Test Procedure

Step 1	Description
	Expected Result

4.2.186 LVV-T786 - Verify linkage of visualization tools in Notebook aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T786 in Jira

4.2.186.1 Verification Elements

- LVV-9993 - DMS-NB-REQ-0034-V-01: Visualization Linkage_1

4.2.186.2 Test Items

Verify that the Notebook Aspect provides “drill down” functionality in plots, including brushing and linking between plots, interactive discovery of metadata about particular points, drill down to imaging from measurements.

4.2.186.3 Test Procedure

Step 1	Description
	Expected Result

4.2.187 LVV-T787 - Verify interactivity of visualizations in Notebook aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T787 in Jira

4.2.187.1 Verification Elements

- LVV-9992 - DMS-NB-REQ-0035-V-01: Visualization Interactivity_1

4.2.187.2 Test Items

Verify that the Notebook Aspect provides interactive plots for certain visualizations, including linked axes on multiple plots, zoom, pan, and data point selection.

4.2.187.3 Test Procedure

Step 1	Description
	Expected Result

4.2.188 LVV-T788 - Verify interactive scaling of visualizations in Notebook aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T788 in Jira

4.2.188.1 Verification Elements

- LVV-9994 - DMS-NB-REQ-0036-V-01: Visualization Scaling_1

4.2.188.2 Test Items

Verify that the Notebook Aspect provides interactive plots that scale to include at least 1E6 datapoints. This may be done through an adaptive refinement scheme like datashader.

4.2.188.3 Test Procedure

Step 1	Description
	Expected Result

4.2.189 LVV-T789 - Verify access to Portal queries from Notebook aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T789 in Jira

4.2.189.1 Verification Elements

- LVV-9996 - DMS-NB-REQ-0029-V-01: Access to Portal-Initiated Queries_1

4.2.189.2 Test Items

Verify that a user of the Notebook Aspect can access search queries they performed in the Portal Aspect.

4.2.189.3 Test Procedure

Step 1	Description
	Expected Result

4.2.190 LVV-T790 - Verify access to Portal visualization API from Notebook aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T790 in Jira

4.2.190.1 Verification Elements

- LVV-9995 - DMS-NB-REQ-0030-V-01: Access to Portal Visualization API_1

4.2.190.2 Test Items

Verify that the Notebook Aspect provides a mechanism for “pushing” specific types of data to the Portal API. For instance, this allows a user to plot a catalog of coordinates over an image display using the Portal’s Firefly components. This is supported by DMS-PRTL-REQ-0115 on the Portal side.

4.2.190.3 Test Procedure

Step 1	Description
	Expected Result

4.2.191 LVV-T791 - Verify ability to launch a notebook with access to Portal query results

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T791 in Jira

4.2.191.1 Verification Elements

- LVV-9997 - DMS-NB-REQ-0031-V-01: Notebook-Launching Interface_1

4.2.191.2 Test Items

Verify that the Notebook Aspect provides a means to trigger the opening of a notebook with access to the results of a query performed in the Portal. This is intended to permit a Portal

user to perform a query and then quickly obtain a Notebook session with that data available for further analysis.

4.2.191.3 Test Procedure

Step 1	Description
	Expected Result

4.2.192 LVV-T792 - Verify implementation of secure protocol for Notebook aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T792 in Jira

4.2.192.1 Verification Elements

- LVV-10000 - DMS-NB-REQ-0001-V-01: Secure Protocol_1

4.2.192.2 Test Items

Verify that the Notebook Aspect is accessible through an HTTPS endpoint.

4.2.192.3 Test Procedure

Step 1	Description
	Expected Result

4.2.193 LVV-T793 - Verify implementation of authentication and authorization service in Notebook aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T793 in Jira

4.2.193.1 Verification Elements

- LVV-9998 - DMS-NB-REQ-0002-V-01: Authentication and Authorization_1

4.2.193.2 Test Items

Verify that the Notebook Aspect provides a means to authenticate users for the purpose of establishing authorized use and only permit access to authenticated users using the LSST Data Facility authentication and authorization service.

4.2.193.3 Test Procedure

Step 1	Description
	Expected Result

4.2.194 LVV-T794 - Verify secure implementation of Notebook aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T794 in Jira

4.2.194.1 Verification Elements

- LVV-9999 - DMS-NB-REQ-0003-V-01: Secure Implementation_1

4.2.194.2 Test Items

Verify that the Notebook aspect does not allow users to circumvent authorizing controls.

4.2.194.3 Test Procedure

Step 1	Description
	Expected Result

4.2.195 LVV-T795 - Verify access to Notebook aspect via IPv6

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T795 in Jira

4.2.195.1 Verification Elements

- LVV-10001 - DMS-NB-REQ-0004-V-01: IPV6 Access_1

4.2.195.2 Test Items

Verify that the Notebook Aspect supports access using IPv6 protocols.

4.2.195.3 Test Procedure

Step 1	Description
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Expected Result

4.2.196 LVV-T796 - Verify web APIs use CAOM2

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T796 in Jira

4.2.196.1 Verification Elements

- LVV-10011 - DMS-API-REQ-0021-V-01: Use of CAOM2_1

4.2.196.2 Test Items

Verify that the API Aspect Web APIs present image and visit metadata organized in accordance with the CAOM2 data model.

4.2.196.3 Test Procedure

Step 1	Description
Expected Result	

4.2.197 LVV-T797 - Verify API access to image and visit metadata

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T797 in Jira

4.2.197.1 Verification Elements

- LVV-10003 - DMS-API-REQ-0022-V-01: Access to Image and Visit Metadata_1

4.2.197.2 Test Items

Verify that the API Aspect provides for retrieval of image and visit metadata via TAP ADQL queries.

4.2.197.3 Test Procedure

Step 1	Description
	Expected Result

4.2.198 LVV-T798 - Verify API access to catalog data products

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Colin Slater

Open LVV-T798 in Jira

4.2.198.1 Verification Elements

- LVV-10002 - DMS-API-REQ-0023-V-01: Access to Catalog Data Products_1

4.2.198.2 Test Items

Verify that the API Aspect provides for retrieval of all Prompt and Data Release catalog data

via TAP ADQL queries.

4.2.198.3 Test Procedure

Step 1	Description
	Create a Jupyter Notebook session in the LSP.
	Expected Result
Step 2	Description
	Instantiate a connection to the TAP service with the pyVO library.
	Example Code
	<pre>import pyvo service = pyvo.dal.TAPService('https://lsst-lsp-stable.ncsa.illinois.edu/api/tap') service.describe()</pre>
	Expected Result
	A description of the TAP service should be printed, with no errors.
Step 3	Description
	List the available tables.
	Example Code
	<pre>service.tables.describe()</pre>
	Expected Result
	A list of available tables should be printed, including both DRP and Prompt Processing data products.
Step 4	Description
	Execute an example query on one of the DRP tables, such as the Object table (inserting the correct table name from Step 3):

Example Code

```
results = service.search("SELECT * from DRP_schema.example_DRP_table LIMIT 5")
results.to_table().show_in_notebook()
```

Expected Result

Rows from the DRP data products should be displayed properly.

Step 5 Description

Repeat Step 4 but with an example Prompt Products table (such as DIAObject) from Step 3.

Expected Result

Rows from the Prompt Products table should be displayed properly.

4.2.199 LVV-T799 - Verify API access to observatory metadata

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T799 in Jira

4.2.199.1 Verification Elements

- LVV-10005 - DMS-API-REQ-0024-V-01: Access to Observatory Metadata_1

4.2.199.2 Test Items

Verify that the API Aspect provides for retrieval of observatory metadata (including the Transformed EFD) via TAP ADQL queries.

4.2.199.3 Test Procedure

Step 1	Description
Expected Result	

4.2.200 LVV-T800 - Verify API enforcement of information classification

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T800 in Jira

4.2.200.1 Verification Elements

- LVV-10009 - DMS-API-REQ-0025-V-01: Enforcement of Information Classification_1

4.2.200.2 Test Items

Verify that the API Aspect does NOT allow access to Sensitive or Highly Sensitive (per LPM-122) observatory metadata.

4.2.200.3 Test Procedure

Step 1	Description
Expected Result	

4.2.201 LVV-T801 - Verify API access to reference catalogs

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T801 in Jira

4.2.201.1 Verification Elements

- LVV-10006 - DMS-API-REQ-0026-V-01: Access to Reference Catalogs_1

4.2.201.2 Test Items

Verify that the API Aspect provides for retrieval of all reference catalog data via TAP ADQL queries. For the purposes of this requirement a “reference catalog” is an externally sourced catalog used during data production activities.

4.2.201.3 Test Procedure

Step 1	Description
	Expected Result

4.2.202 LVV-T802 - Verify API access to virtual data products

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T802 in Jira

4.2.202.1 Verification Elements

- LVV-10007 - DMS-API-REQ-0027-V-01: Access to Virtual Data Products_1

4.2.202.2 Test Items

Verify that the API Aspect provides services to initiate regeneration of, and facilitate retrieval of, virtual data products on demand.

4.2.202.3 Test Procedure

Step 1	Description
	Expected Result

4.2.203 LVV-T803 - Verify API access to FITS image data

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T803 in Jira

4.2.203.1 Verification Elements

- LVV-10004 - DMS-API-REQ-0028-V-01: Access to Image Data in FITS Format_1

4.2.203.2 Test Items

Verify that the API Aspect delivers image data in FITS format.

4.2.203.3 Test Procedure

Step 1	Description
	Expected Result

4.2.204 LVV-T804 - Verify API access to multiple data releases

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T804 in Jira

4.2.204.1 Verification Elements

- LVV-10010 - DMS-API-REQ-0029-V-01: Multiple Data Releases_1

4.2.204.2 Test Items

Verify that the API Aspect Web APIs provide unambiguous access to data products and meta-data from more than one Data Release simultaneously.

4.2.204.3 Test Procedure

Step 1	Description
	Expected Result

4.2.205 LVV-T805 - Verify API provides catalog metadata

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T805 in Jira

4.2.205.1 Verification Elements

- LVV-10008 - DMS-API-REQ-0030-V-01: Catalog Metadata Service_1

4.2.205.2 Test Items

Verify that the API Aspect provides complete metadata for all tables within each data release, including a per-column description, IVOA UCD when appropriate, units when appropriate, and any relationship with other columns.

4.2.205.3 Test Procedure

Step 1	Description
	Expected Result

4.2.206 LVV-T806 - Verify availability of TAP service

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T806 in Jira

4.2.206.1 Verification Elements

- LVV-10015 - DMS-API-REQ-0006-V-01: TAP Service for Tabular Queries_1

4.2.206.2 Test Items

Verify that the API Aspect Web APIs include an endpoint conforming to IVOA TAP 1.1 for the purpose of accessing tabularly structured data.

4.2.206.3 Test Procedure

Step 1	Description
	Expected Result

4.2.207 LVV-T808 - Verify asynchronous TAP queries

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T808 in Jira

4.2.207.1 Verification Elements

- LVV-10013 - DMS-API-REQ-0008-V-01: Asynchronous TAP Support_1

4.2.207.2 Test Items

Verify that the API Aspect TAP endpoint supports asynchronous queries as described by the IVOA TAP 1.1 specification.

4.2.207.3 Test Procedure

Step 1	Description
	Expected Result

4.2.208 LVV-T809 - Verify availability of ADQL for queries

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Colin Slater

Open LVV-T809 in Jira

4.2.208.1 Verification Elements

- LVV-10012 - DMS-API-REQ-0009-V-01: ADQL Support_1

4.2.208.2 Test Items

Verify that the API Aspect TAP endpoint supports IVOA ADQL 2.1 as a query language.

4.2.208.3 Test Procedure

Step 1	Description
	Create a Jupyter Notebook session in the LSP.
Expected Result	
Step 2	Description
	Instantiate a connection to the TAP service with the pyVO library by running:
	<pre>import pyvo</pre>
	<pre>service = pyvo.dal.TAPService('http://lsst-lsp-stable.ncsa.illinois.edu/api/tap')</pre>
	<pre>service.describe()</pre>
Expected Result	
	A description of the TAP service should be printed, with no errors.
Step 3	Description
	Execute:
	<pre>service.tables.describe()</pre>

Expected Result

A list of available tables should be printed.

Step 4 Description

Execute an example query on one of the available tables (inserting the correct table name from Step 3):

```
results = service.search("SELECT * from schema.example_table LIMIT 5")
results.to_table().show_in_notebook()
```

Expected Result

Rows from the test table should be correctly displayed.

Step 5 Description

Execute an example cone search to verify the correct parsing of ADQL. The example table must have ra and decl columns, and the target center of 1.0 and -1.0 in the example query should be replaced with coordinates inside the data footprint. Execute:

```
results = service.search("SELECT ra, decl FROM schema.example_table WHERE CONTAINS(POINT('ICRS', ra, decl), CIRCLE('ICRS', 1.0, -1.0, 0.5))")
results.to_table().show_in_notebook()
```

Expected Result

Rows should be returned from the example table, and all of them should be within 0.5 degrees of the specified center coordinate.

4.2.209 LVV-T810 - Verify SIA service for image availability

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T810 in Jira

4.2.209.1 Verification Elements

- LVV-10016 - DMS-API-REQ-0016-V-01: SIA Service for Image Availability_1

4.2.209.2 Test Items

Verify that the API Aspect Web APIs include an endpoint conforming to IVOA SIA V2 for the purpose of locating available images.

4.2.209.3 Test Procedure

Step 1	Description
	Expected Result

4.2.210 LVV-T811 - Verify availability of SODA service for image data

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T811 in Jira

4.2.210.1 Verification Elements

- LVV-10018 - DMS-API-REQ-0017-V-01: SODA Service for Image Data_1

4.2.210.2 Test Items

Verify that the API Aspect Web APIs include an endpoint conforming to IVOA SODA 1.0 for the purpose of retrieving image data.

4.2.210.3 Test Procedure

Step 1	Description
	Expected Result

4.2.211 LVV-T812 - Verify API SODA cutout image support

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Colin Slater

Open LVV-T812 in Jira

4.2.211.1 Verification Elements

- LVV-10017 - DMS-API-REQ-0018-V-01: Cutout Service_1

4.2.211.2 Test Items

Verify that the API Aspect SODA endpoint supports performing cutouts on all released image data types.

4.2.211.3 Test Procedure

Step 1	Description
	Expected Result

4.2.212 LVV-T813 - Verify query history retrieval

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T813 in Jira

4.2.212.1 Verification Elements

- LVV-10020 - DMS-API-REQ-0038-V-01: Query History Retrieval_1

4.2.212.2 Test Items

Verify that the API aspect provides interfaces for retrieving the history of queries for a user.

4.2.212.3 Test Procedure

Step 1	Description
	Expected Result

4.2.213 LVV-T814 - Verify availability of cached query result retrieval

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T814 in Jira

4.2.213.1 Verification Elements

- LVV-10019 - DMS-API-REQ-0039-V-01: Cached Query Result Retrieval_1

4.2.213.2 Test Items

Verify that the API Aspect provides for the caching of results of queries for a limited time, and

their retrieval based on information from the query history or on query identifiers previously returned from asynchronous query services.

4.2.213.3 Test Procedure

Step 1	Description
	Expected Result

4.2.214 LVV-T815 - Verify retrieval of query specifications

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T815 in Jira

4.2.214.1 Verification Elements

- LVV-10021 - DMS-API-REQ-0040-V-01: Query Specification Retrieval_1

4.2.214.2 Test Items

Verify that the API Aspect provides interfaces that return an artifact containing a complete specification for a query, and that permit that artifact to be used at a later time to re-execute the same query.

4.2.214.3 Test Procedure

Step 1	Description
	Expected Result

4.2.215 LVV-T816 - Verify Butler interface to data products

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T816 in Jira

4.2.215.1 Verification Elements

- LVV-10022 - DMS-API-REQ-0034-V-01: Butler Interface to Data Products_1

4.2.215.2 Test Items

Verify that the API Aspect provides a connection between the Data Butler (Generation 3) instances within notebooks hosted in a LDF instance and backend file system, database, and object data stores within that same LDF instance, for the purpose of allowing notebook aspect users to access data release data products and user generated data products as Python objects.

4.2.215.3 Test Procedure

Step 1	Description
	Expected Result

4.2.216 LVV-T817 - Verify availability of VOSpace service

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T817 in Jira

4.2.216.1 Verification Elements

- LVV-10023 - DMS-API-REQ-0019-V-01: VOSpace Service_1

4.2.216.2 Test Items

Verify that the API Aspect Web APIs include an endpoint conforming to IVOA VOSpace 2.0 for the purpose of persistence and retrieval of user-generated file-oriented data products in the User Workspace defined in DMS-LSP-REQ-0011.

4.2.216.3 Test Procedure

Step 1	Description
	Expected Result

4.2.217 LVV-T818 - Verify availability of WebDAV service

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T818 in Jira

4.2.217.1 Verification Elements

- LVV-10024 - DMS-API-REQ-0020-V-01: WebDAV Service_1

4.2.217.2 Test Items

Verify that the API Aspect Web APIs include an endpoint conforming to WebDAV for the purpose of persistence and retrieval of user-generated file-oriented data products in the User Workspace defined in DMS-LSP-REQ-0011.

4.2.217.3 Test Procedure

Step 1	Description
	Expected Result

4.2.218 LVV-T819 - Verify VOTable 1.3 support

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Colin Slater

Open LVV-T819 in Jira

4.2.218.1 Verification Elements

- LVV-10029 - DMS-API-REQ-0010-V-01: VOTable Output for TAP_1

4.2.218.2 Test Items

Verify that the API Aspect TAP endpoint supports IVOA VOTable 1.3 as an available output format.

4.2.218.3 Test Procedure

Step 1	Description
	Open a Terminal window on the Science Platform.
	Expected Result

Step 2	Description
--------	-------------

Retrieve the TAP capabilities description by executing:

```
curl https://lsst-lsp-stable.ncsa.illinois.edu/api/tap/capabilities
```

Expected Result

Step 3	Description
--------	-------------

Inspect the capabilities file. Under the TAP capability, one of the outputFormat elements should correspond to VOTable.

Expected Result

The expected XML looks like:

```
<outputFormat ivo-id="ivo://ivoa.net/std/TAPRegExt#output-votable-td">  
  <mime>application/x-votable+xml</mime>  
  <alias>votable</alias>  
</outputFormat>
```

Step 4	Description
--------	-------------

Create a Notebook instance in the Science Platform.

Expected Result

Step 5	Description
--------	-------------

Make a request to the TAP service and print the raw output returned by executing:

```
import pyvo  
service = pyvo.dal.TAPService('https://lsst-lsp-stable.ncsa.illinois.edu/api/tap')  
query = service.create_query("SELECT * FROM TAP_SCHEMA.tables", )  
output = q.execute_raw()  
print(output)
```

Expected Result

The result should be a VOTable file; which is indicated by these initial elements in the XML:

```
<?xml version="1.0" encoding="UTF-8"?>
```


<VOTABLE xmlns="http://www.ivoa.net/xml/VOTable/v1.3" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" version="1.3">

4.2.219 LVV-T820 - Verify support for VOTable TABLEDATA payload

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T820 in Jira

4.2.219.1 Verification Elements

- LVV-10030 - DMS-API-REQ-0011-V-01: VOTable TABLEDATA Payload_1

4.2.219.2 Test Items

Verify that API Aspect services that support returning results in VOTable format support the return of a VOTable data payload in the XML-based TABLEDATA serialization.

4.2.219.3 Test Procedure

Step 1	Description
	Expected Result

4.2.220 LVV-T821 - Verify support for VOTable BINARY2 payload

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T821 in Jira

4.2.220.1 Verification Elements

- LVV-10028 - DMS-API-REQ-0012-V-01: VOTable BINARY2 Payload_1

4.2.220.2 Test Items

Verify that the API Aspect services that support returning results in VOTable format support the return of a VOTable data payload in the BINARY2 serialization.

4.2.220.3 Test Procedure

Step 1	Description
	Expected Result

4.2.221 LVV-T822 - Verify JSON support for TAP outputs

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T822 in Jira

4.2.221.1 Verification Elements

- LVV-10026 - DMS-API-REQ-0013-V-01: JSON Output for TAP_1

4.2.221.2 Test Items

Verify that the API Aspect TAP endpoint supports JSON as an alternative available output

format.

4.2.221.3 Test Procedure

Step 1	Description
Expected Result	

4.2.222 LVV-T823 - Verify CSV support for TAP outputs

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T823 in Jira

4.2.222.1 Verification Elements

- LVV-10025 - DMS-API-REQ-0014-V-01: CSV Output for TAP_1

4.2.222.2 Test Items

Verify that the API Aspect TAP endpoint supports CSV as an alternative available output format. This output format is not required to meet requirements otherwise in force on the return of table and column metadata.

4.2.222.3 Test Procedure

Step 1	Description
Expected Result	

4.2.223 LVV-T824 - Verify SQLite support for TAP outputs

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T824 in Jira

4.2.223.1 Verification Elements

- LVV-10027 - DMS-API-REQ-0015-V-01: SQLite Output for TAP_1

4.2.223.2 Test Items

Verify that the API Aspect TAP endpoint supports SQLite as an alternative available output format.

4.2.223.3 Test Procedure

Step 1	Description
	Expected Result

4.2.224 LVV-T825 - Verify support for tabular result download to Workspace

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T825 in Jira

4.2.224.1 Verification Elements

- LVV-10032 - DMS-API-REQ-0031-V-01: Tabular Result Download to Workspace_1

4.2.224.2 Test Items

Verify that the API Aspect provides a capability for users to save their query results as VOTables in their allocated VOspace, subject to limitations of a resource quota system.

4.2.224.3 Test Procedure

Step 1	Description
	Expected Result

4.2.225 LVV-T826 - Verify support for tabular upload to Workspace

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T826 in Jira

4.2.225.1 Verification Elements

- LVV-10033 - DMS-API-REQ-0032-V-01: Tabular Upload to Workspace_1

4.2.225.2 Test Items

Verify that the API Aspect provides a capability for users to upload catalog data products (formatted as VOTables) residing within their allocated VOspace, such that the catalog products after upload may be joined in queries against data release catalog products, subject to limitations of a resource quota system.

4.2.225.3 Test Procedure

Step 1	Description
Expected Result	

4.2.226 LVV-T827 - Verify ability to drop catalogs from Workspace

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T827 in Jira

4.2.226.1 Verification Elements

- LVV-10031 - DMS-API-REQ-0033-V-01: Deletion from Workspace_1

4.2.226.2 Test Items

Verify that the API Aspect provides a capability for users to drop previously uploaded user catalog data products.

4.2.226.3 Test Procedure

Step 1	Description
Expected Result	

4.2.227 LVV-T828 - Verify API uses secure protocols

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T828 in Jira

4.2.227.1 Verification Elements

- LVV-10037 - DMS-API-REQ-0001-V-01: Secure Protocols_1

4.2.227.2 Test Items

Verify that the API Aspect Web APIs are accessible through HTTPS endpoints.

4.2.227.3 Test Procedure

Step 1	Description
	Expected Result

4.2.228 LVV-T829 - Verify API authentication

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T829 in Jira

4.2.228.1 Verification Elements

- LVV-10034 - DMS-API-REQ-0003-V-01: Authentication_1

4.2.228.2 Test Items

Verify that the API Aspect Web APIs accept authenticated requests for the purpose of establishing user identity.

4.2.228.3 Test Procedure

Step 1	Description
	Expected Result

4.2.229 LVV-T830 - Verify API uses project authorization infrastructure

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T830 in Jira

4.2.229.1 Verification Elements

- LVV-10035 - DMS-API-REQ-0004-V-01: Authorization_1

4.2.229.2 Test Items

Verify that the API Aspect Web APIs interact with project authorization infrastructure for the purpose of establishing authorized use.

4.2.229.3 Test Procedure

Step 1	Description
	Expected Result

4.2.230 LVV-T831 - Verify secure implementation of APIs

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T831 in Jira

4.2.230.1 Verification Elements

- LVV-10036 - DMS-API-REQ-0005-V-01: Secure Implementation_1

4.2.230.2 Test Items

Verify that the API Aspect Web APIs prevent users from circumventing authorization controls.

4.2.230.3 Test Procedure

Step 1	Description
	Expected Result

4.2.231 LVV-T832 - Verify containerized deployment of API services

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T832 in Jira

4.2.231.1 Verification Elements

- LVV-10038 - DMS-API-REQ-0035-V-01: Containerized Deployment_1

4.2.231.2 Test Items

Verify that the API Aspect services are delivered as containerized applications.

4.2.231.3 Test Procedure

Step 1	Description
Expected Result	

4.2.232 LVV-T833 - Verify support for compression of API results

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T833 in Jira

4.2.232.1 Verification Elements

- LVV-10040 - DMS-API-REQ-0002-V-01: Result Compression_1

4.2.232.2 Test Items

Verify that the API Aspect Web APIs support gzip HTTP content-encoding for the purpose of returning compressed data.

4.2.232.3 Test Procedure

Step 1	Description
Expected Result	

4.2.233 LVV-T834 - Verify API upgradeability

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T834 in Jira

4.2.233.1 Verification Elements

- LVV-10041 - DMS-API-REQ-0036-V-01: Upgradability_1

4.2.233.2 Test Items

Verify that the API Aspect service software are upgradable in place with minimal user down-time.

4.2.233.3 Test Procedure

Step 1	Description
	Expected Result

4.2.234 LVV-T835 - Verify API logging and monitoring

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Inspection	Jeffrey Carlin

Open LVV-T835 in Jira

4.2.234.1 Verification Elements

- LVV-10039 - DMS-API-REQ-0037-V-01: Logging and Monitoring_1

4.2.234.2 Test Items

Verify that the API Aspect services provide logging and monitoring capabilities for the purpose

of supporting service operators.

4.2.234.3 Test Procedure

Step 1	Description
	Expected Result

4.2.235 LVV-T1824 - Portal Aspect access to processed HSC data in the LSP

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Gregory Dubois-Felsmann

Open LVV-T1824 in Jira

4.2.235.1 Verification Elements

None.

4.2.235.2 Test Items

Verify the availability through the Portal Aspect of a dataset of Rubin/LSST-processed HSC public release data, including DRP-style products such as an Object-like catalog, coadded images, and calibrated single-epoch images, with image metadata. Access will be based on TAP service of catalogs and image metadata (ObsTAP-style) and through that to images.

If additional data products are available, such as DIA* outputs or Source/ForcedSource, testing those should be represented by an additional stretch-goal test case.

4.2.235.3 Environment Needs

4.2.235.3.1 Software

Testing will largely be performed using a web browser to access the Portal Aspect.

4.2.235.4 Test Procedure

Step 1	Description
	Expected Result

4.2.236 LVV-T1825 - Notebook Aspect access to processed HSC data in the LSP

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Gregory Dubois-Felsmann

Open LVV-T1825 in Jira

4.2.236.1 Verification Elements

None.

4.2.236.2 Test Items

Verify the availability through the Notebook Aspect of a dataset of Rubin/LSST-processed HSC public release data, including DRP-style products such as an Object-like catalog, coadded images, and calibrated single-epoch images, with image metadata.

If additional data products are available, such as DIA* outputs or Source/ForcedSource, testing those should be represented by an additional stretch-goal test case.

4.2.236.3 Environment Needs

4.2.236.3.1 Software

Testing will largely be performed using a web browser to access the Notebook Aspect.

4.2.236.4 Test Procedure

Step 1	Description
	Expected Result

Draft

5 Reusable Test Cases

Test cases in this section are made up of commonly encountered steps that have been factored out into modular, reusable scripts. These test cases are meant solely for the building of actual tests used for verification, to be inserted in test scripts via the “Call to Test” functionality in Jira/ATM. They streamline the process of writing test scripts by providing pre-designed steps, while also ensuring homogeneity throughout the test suite. These reusable modules are not themselves verifying requirements. Also, these test cases shall not call other reusable test cases in their script.

5.1 LVV-T837 - Authenticate to Notebook Aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T837 in Jira

5.1.0.1 Test Items

Not specifically a test – modular script to be used in multiple other Test Scripts.

5.1.0.2 Input Specification

Must have a user account on the LSP.

5.1.0.3 Test Procedure

Step 1	Description
	Authenticate to the notebook aspect of the LSST Science Platform (NB-LSP). This is currently at https://lsst-lsp-stable.nsa.illinois.edu/nb .
Expected Result	
	Redirection to the spawner page of the NB-LSP allowing selection of the containerized stack version and machine flavor.
Step 2	Description
	Spawn a container by: 1) choosing an appropriate stack version: e.g. the latest weekly. 2) choosing an appropriate machine flavor: e.g. medium 3) click “Spawn”

Expected Result

Redirection to the JupyterLab environment served from the chosen container containing the correct stack version.

5.2 LVV-T838 - Access an empty notebook in the Notebook Aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Simon Krughoff

Open LVV-T838 in Jira

5.2.0.1 Test Items

The steps here cover just those necessary to gain access to an empty notebook after authentication is complete.

5.2.0.2 Input Specification

Authentication to the Notebook aspect.

5.2.0.3 Test Procedure

Step 1	Description
	Open a new launcher by navigating in the top menu bar "File" -> "New Launcher"

Expected Result
A launcher window with several sections, potentially with several kernel versions for each.

Step 2	Description
	Select the option under "Notebook" labeled "LSST" by clicking on the icon.

Expected Result
An empty notebook with a single empty cell. The kernel show up as "LSST" in the top right of the notebook.

5.3 LVV-T839 - Access a terminal in the Notebook Aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Jeffrey Carlin

Open LVV-T839 in Jira

5.3.0.1 Test Items

The steps here cover just those necessary to gain access to a terminal after authentication is complete.

5.3.0.2 Input Specification

Authentication to the Notebook aspect.

5.3.0.3 Test Procedure

Step 1	Description
	Open a new launcher by navigating in the top menu bar "File" -> "New Launcher".
Expected Result	
A launcher window with several sections, potentially with several kernel versions for each.	
Step 2	Description
	Select the option under "Other" labeled "Terminal" by clicking on the icon.
Expected Result	
A terminal window appears with command line access to the user's file system.	

5.4 LVV-T849 - Authenticate to the portal aspect of the LSP

Version	Status	Priority	Verification Type	Owner
2	Draft	Normal	Test	Simon Krughoff

Open LVV-T849 in Jira

5.4.0.1 Test Items

Obtain an authenticated session in the portal aspect of the LSST Science Platform

5.4.0.2 Test Procedure

Step 1	Description
	Navigate to the Portal Aspect endpoint. The stable version should be used for this test and is currently located at: https://lsst-lsp-stable.ncsa.illinois.edu/portal/app/ .

Expected Result

A credential-entry screen should be displayed.

Step 2

Description

Enter a valid set of credentials for an LSST user with LSP access on the instance under test.

Expected Result

The Portal Aspect UI should be displayed following authentication.

5.5 LVV-T850 - Log out of the portal aspect of the LSP

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Test	Simon Krughoff

Open LVV-T850 in Jira

5.5.0.1 Test Items

Leave the portal aspect of the LSST Science Platform in a clean state

5.5.0.2 Test Procedure

Step 1

Description

Currently, there is no logout mechanism on the portal.
This should be updated as the system matures.

Simply close the browser window.

Expected Result

Closed browser window. When navigating to the portal endpoint, expect to execute the steps in LVV-T849.

5.6 LVV-T851 - Query Stripe 82 (LSST stack processing) for NGC 359 via Portal aspect

Version	Status	Priority	Verification Type	Owner
1	Draft	Normal	Demonstration	Jeffrey Carlin

Open LVV-T851 in Jira

5.6.0.1 Test Items

Execute a Portal query by astronomical source name for elliptical galaxy NGC 359, returning LSST stack-processed Stripe 82 data for this object.

5.6.0.2 Input Specification

LVV-T849 - authenticate to Portal aspect

5.6.0.3 Test Procedure

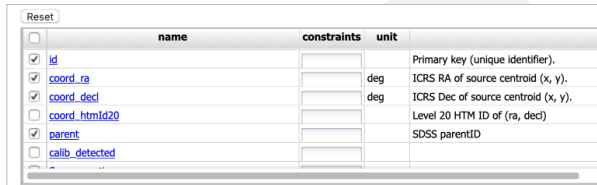
Step 1	Description
---------------	--------------------

The default catalog (SDSS Stripe 82, 2013 LSST Processing) is fine for this.

Choose columns to return by:

- 1) unchecking the top box in the column selection box
- 2) checking columns for id, coord_ra, coord_dec, and parent.

The result should look like the following:



Expected Result

The column box should be configured to return a minimal useful set of columns.

Step 2	Description
---------------	--------------------

Enter an object name for the portal to resolve. We will use NGC 359, a large elliptical galaxy in the Stripe 82 coverage.

To do this, enter the name "NGC 359" in the "Name or Position" text input box.

Leave the other defaults in place.

Name or Position:

NGC 359 resolved by NED
 16.07069, -0.7649 Equ J2000 or 1h04m16.97s, -0d45m53.6s Equ J2000

Search Method:

Radius:

Valid range between: 1" and 360000"

Expected Result

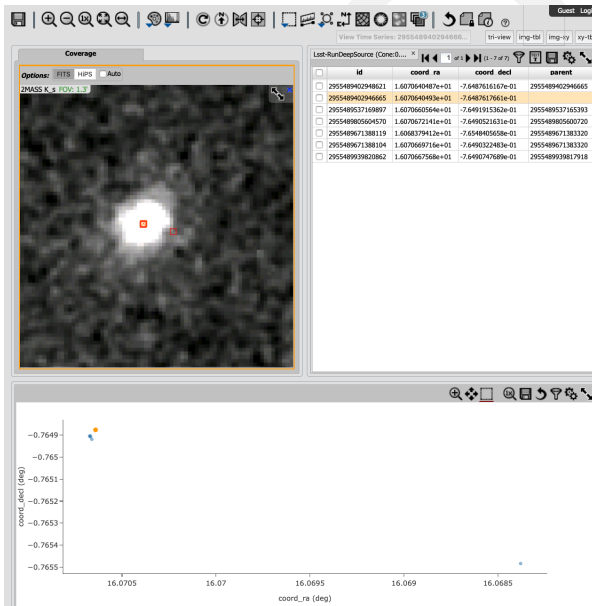
There should be a message like "NGC 359 resolved by NED". The example coordinates should also changed to the coordinates of NGC 359.

Step 3 Description

Submit the query to the portal query engine by clicking the "Search" button in the lower left corner of the interface.

Expected Result

A firefly app with the summary image overlay and catalog widgets side by side. A plot of RA vs. Dec is displayed below the side by side widgets.



5.7 LVV-T1591 - Obtain an access token for the TAP service in an LSP instance

Version	Status	Priority	Verification Type	Owner
1	Approved	Normal	Test	Gregory Dubois-Felsmann

Open LVV-T1591 in Jira

5.7.0.1 Test Items

Obtain an access token for the TAP service in an LSP instance, enabling subsequent test steps to connect to the TAP service as an authorized user.

5.7.0.2 Environment Needs

5.7.0.2.1 Software

An up-to-date Web browser

5.7.0.3 Input Specification

The tester must have credentials for LSP access. Either NCSA or federated non-project credentials may be used.

5.7.0.4 Test Procedure

Step 1	Description
	Using a Web browser, navigate to the "/auth/tokens" endpoint of the LSP instance under test.
	Expected Result
	A credential-entry screen should be displayed, unless the test user is already logged in in another window or tab of the browser.
Step 2	Description
	If necessary, enter a valid set of credentials. They may be NCSA or non-NCSA credentials.
	Expected Result
	The token-request UI is displayed.

Step 3	Description
--------	-------------

Request a token for the “read:tap” capability.

Expected Result

A screen confirming the creation of the token.

Step 4	Description
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Leave the resulting page’s browser tab/window open for use in subsequent test steps.

In many cases you may be asked in a subsequent step to use the “copy token to clipboard” UI element on this page in order to transfer your token to a prompt in another window.

Expected Result

6 Deprecated Test Cases

This section includes all test cases that have been marked as deprecated. These test cases will never be executed again, but have been in the past. For this reason it is important to keep them in the baseline as a reference.

6.1 LVV-T2 - LSP-00-00: Verification of the presence of the expected WISE data

Version	Status	Priority	Verification Type	Owner
1	Deprecated	Normal	Test	Gregory Dubois-Felsmann

Open LVV-T2 in Jira

6.1.0.1 Verification Elements

- LVV-9807 - DMS-LSP-REQ-0001-V-01: Access to All Released or Authorized Data Products_1
- LVV-9809 - DMS-LSP-REQ-0005-V-01: Linkage of Aspects_1

6.1.0.2 Test Items

This test will check:

- That the expected tables are present in the database and accessible via the API Aspect and the Portal Aspect;
- That the tables are present with the expected schema as documented in the IPAC- provided WISE documentation;
- That the row counts in the tables are as expected;
- That the tables cover essentially the entire sky, as expected from the characteristics of the WISE mission.

Requirements (to be removed when Reqs are synchronized from magic draw)

- DMS-LSP-REQ-0001
- DMS-LSP-REQ-0005

6.2 LVV-T3 - LSP-00-05: Demonstration of low-volume and/or indexed queries against the WISE data via API

Version	Status	Priority	Verification Type	Owner
1	Deprecated	Normal	Test	Gregory Dubois-Felsmann

Open LVV-T3 in Jira

6.2.0.1 Verification Elements

- LVV-9808 - DMS-LSP-REQ-0004-V-01: API (Data Access) Aspect_1

6.2.0.2 Test Items

This test will check that the following low-volume queries can be performed against the WISE catalogs via the API Aspect.

- Small cone searches against the Object-like, ForcedSource-like, and Source-like tables; and
- Searches by exact ID matching against the Object-like, ForcedSource-like, and Source-like tables

The tests will record their performance for comparison against similar queries in the production WISE archive at IRSA, and the returned data will be compared to that for similar queries against the API services provided by IRSA.

Requirement (to remove once requirements are synchronized from magic draw)

DMS-LSP-REQ-004

6.3 LVV-T4 - LSP-00-10: Demonstration of table-scan queries against the WISE data via API

Version	Status	Priority	Verification Type	Owner
1	Deprecated	Normal	Test	Gregory Dubois-Felsmann

Open LVV-T4 in Jira

6.3.0.1 Verification Elements

- LVV-9824 - DMS-LSP-REQ-0028-V-01: Peak Volume for Moderate-Sized Queries_1
- LVV-9825 - DMS-LSP-REQ-0029-V-01: Peak Volume for Queries on all Objects_1

6.3.0.2 Test Items

This test exercises a range of table-scan-type queries against the WISE data. Queries shall be performed against the Object-like table, the Forced-Source-like table, and against at least one of the Source-like tables. A range of query result sizes should be exercised, and shall include at least:

- Queries returning a very small amount of data, fewer than 100 rows, and a small subset of columns;
- Queries matching a scaled version of the “low volume” query definition from the Data Access White Paper; and
- Queries matching a scaled version of the “high volume” query definition from the Data Access White Paper.

The scaling of the “low volume” query definition (“50 simultaneous queries against 10 million objects in the catalog, response 10 sec, result data set: 0.1 GB”) is based on a assumption that the “against 10 million objects” is applied against the O(20 billion) rows anticipated in the Object table, and that it contemplates reducing the scope of any non-indexed portion of the WHERE clause of the query to that fraction of one in ~ 2000 of the rows in the table. Scaled to the ~ 750 million rows in the WISE Object-like (AllWISE “Source Catalog”) table, this would

be ~ 375,000 rows. Similarly scaling the result set size suggests a result set of ~ 3.7 MB. Successful completion will be evaluated based on the system's ability to perform the query at all and to return a result with characteristics corresponding to plausible estimates or extrapolations from scaled-down queries against the IRSA WISE archive. Exact verification may not be realistic because of the lack of a system capable of performing the equivalent queries in the production WISE archive.

At a later date it may be possible to attempt equivalent queries using a non-database system and verify the exact correspondence of results, but the non-database system does not presently exist¹.

Requirements (to be removed when Reqs are synchronized from magic draw)

- DMS-LSP-REQ-0028
- DMS-LSP-REQ-0029

6.4 LVV-T5 - LSP-00-15: Execution of basic catalog queries in the Portal

Version	Status	Priority	Verification Type	Owner
1	Deprecated	Normal	Test	Gregory Dubois-Felsmann

Open LVV-T5 in Jira

6.4.0.1 Verification Elements

- LVV-9811 - DMS-LSP-REQ-0002-V-01: Portal Aspect_1
- LVV-9819 - DMS-LSP-REQ-0014-V-01: Download Data_1
- LVV-9862 - DMS-PRTL-REQ-0022-V-01: Positional Query: Astrophysical Coordinate Systems_1
- LVV-9865 - DMS-PRTL-REQ-0021-V-01: Positional Query: Multiple Positions/Objects_1

- LVV-9869 - DMS-PRTL-REQ-0026-V-01: Positional Query by Region: Cone-Search_1
- LVV-9868 - DMS-PRTL-REQ-0027-V-01: Positional Query by Region: Box-Search_1
- LVV-9859 - DMS-PRTL-REQ-0028-V-01: Query by Identifier_1
- LVV-9856 - DMS-PRTL-REQ-0016-V-01: Generic Query - Form-based_1

6.4.0.2 Test Items

This test will test the functional requirements to be able to perform a range of basic queries through the Portal Aspect of the LSP:

- Cone searches on the Object-like, ForcedSource-like, and Source-like WISE tables;
- Multi-target cone searches;
- Form-based searches for exact equality, e.g., for row IDs; and
- Form-based searches for sets of object attributes.

In addition, it tests the ability to download tabular query results from the Portal Aspect.

6.5 LVV-T6 - LSP-00-20: Operation of the UI for interaction with tabular data results

Version	Status	Priority	Verification Type	Owner
1	Deprecated	Normal	Test	Gregory Dubois-Felsmann

[Open LVV-T6 in Jira](#)

6.5.0.1 Verification Elements

- LVV-9895 - DMS-PRTL-REQ-0056-V-01: Histograms_1
- LVV-9901 - DMS-PRTL-REQ-0055-V-01: XY Scatter Plots_1
- LVV-9893 - DMS-PRTL-REQ-0054-V-01: Paging of Tabular Data_1

- LVV-9889 - DMS-PRTL-REQ-0050-V-01: Column Selection of Tabular Data_1
- LVV-9894 - DMS-PRTL-REQ-0053-V-01: Row Selection of Tabular Data_1
- LVV-9891 - DMS-PRTL-REQ-0049-V-01: Display of Tabular Data_1
- LVV-9819 - DMS-LSP-REQ-0014-V-01: Download Data_1
- LVV-9821 - DMS-LSP-REQ-0017-V-01: Tabular Data Download File Formats_1

6.5.0.2 Test Items

This test will test the functional requirements to be able to perform certain basic exploratory data analysis functions on tabular data results in the Portal Aspect UI:

- Sort tabular results;
- Filter tabular results based on the contents of columns;
- Perform per-row selections from a table;
- Display 1D histograms of selected attributes;
- Display 2D scatter plots of selected attributes;
- Perform graphical selections of rows from plots; and
- Download tabular query results reflecting sorting and selection.

This test does not address the limits of scaling of these capabilities to large query results. That will be addressed in future test specifications. The test report should include notes on the sizes of results that were used.

6.6 LVV-T7 - LSP-00-25: Image metadata, image, and image cutout queries

Version	Status	Priority	Verification Type	Owner
1	Deprecated	Normal	Test	Gregory Dubois-Felsmann

[Open LVV-T7 in Jira](#)

6.6.0.1 Verification Elements

- LVV-9819 - DMS-LSP-REQ-0014-V-01: Download Data_1
- LVV-9820 - DMS-LSP-REQ-0018-V-01: Image Data Download File Format_1
- LVV-9881 - DMS-PRTL-REQ-0040-V-01: Query for Single Epoch Image Cutouts_1
- LVV-9880 - DMS-PRTL-REQ-0041-V-01: Query for Coadded Image Cutouts_1

6.6.0.2 Test Items

This test will check basic functionality related to image search and retrieval, via both the API Aspect and the Portal Aspect of the LSST Science Platform:

- Searching for images containing a specified point;
- Displaying selected images;
- Obtaining and displaying image cutouts at a specified point; and
- Downloading selected images and image cutouts.

Because of limited staff resources, these tests will be based on the original PDAC dataset, the LSST Summer 2013 processing of the SDSS Stripe 82 data. The image data for the WISE and NEOWISE missions have not been loaded into PDAC.

6.7 LVV-T8 - LSP-00-30: Linkage of catalog query results with associated images

Version	Status	Priority	Verification Type	Owner
1	Deprecated	Normal	Test	Gregory Dubois-Felsmann

[Open LVV-T8 in Jira](#)

6.7.0.1 Verification Elements

- LVV-9848 - DMS-PRTL-REQ-0004-V-01: Semantic Linkage: Portal Workflows_1

- LVV-9814 - DMS-LSP-REQ-0008-V-01: Semantic Linkage_1

6.7.0.2 Test Items

This test will check for the ability, in the Portal Aspect of the LSST Science Platform, to match catalog data with the image data on which the measurements were performed, specifically:

- Navigating from a catalog query result to the associated images; and
- Overlaying catalog query results on associated images.

Because of limited staff resources, these tests will be based on the original PDAC dataset, the LSST Summer 2013 processing of the SDSS Stripe 82 data. The image data for the WISE and NEOWISE missions have not been loaded into PDAC.

6.8 LVV-T9 - LSP-00-35: Linkage of catalog query results to related catalog data

Version	Status	Priority	Verification Type	Owner
1	Deprecated	Normal	Test	Gregory Dubois-Felsmann

Open LVV-T9 in Jira

6.8.0.1 Verification Elements

- LVV-9814 - DMS-LSP-REQ-0008-V-01: Semantic Linkage_1

6.8.0.2 Test Items

This test will check for the ability, in the Portal Aspect of the LSST Science Platform, to match catalog data with related catalog data. Specifically, the test verifies the ability to navigate from a coadded source catalog entry to the associated forced photometry.

Requirements (to be removed when Reqs are synchronized from magic draw)

- DMS-LSP-REQ-0008

Draft

A Traceability

Verification Elements	High Level Requirements	Test Cases
LVV-9807 - DMS-LSP-REQ-0001-V-01: Access to All Released or Authorized Data Products_1		LVV-T2 LVV-T598
LVV-9809 - DMS-LSP-REQ-0005-V-01: Linkage of Aspects_1		LVV-T2 LVV-T603 LVV-T1334 LVV-T1436 LVV-T1437
LVV-9808 - DMS-LSP-REQ-0004-V-01: API (Data Access) Aspect_1		LVV-T3 LVV-T602 LVV-T1437
LVV-9824 - DMS-LSP-REQ-0028-V-01: Peak Volume for Moderate-Sized Queries_1		LVV-T4 LVV-T617
LVV-9825 - DMS-LSP-REQ-0029-V-01: Peak Volume for Queries on all Objects_1		LVV-T4 LVV-T618
LVV-9811 - DMS-LSP-REQ-0002-V-01: Portal Aspect_1		LVV-T5 LVV-T600 LVV-T1334
LVV-9819 - DMS-LSP-REQ-0014-V-01: Download Data_1		LVV-T5 LVV-T6 LVV-T7 LVV-T612
LVV-9862 - DMS-PRTL-REQ-0022-V-01: Positional Query: Astrophysical Coordinate Systems_1		LVV-T5 LVV-T657
LVV-9865 - DMS-PRTL-REQ-0021-V-01: Positional Query: Multiple Positions/Objects_1		LVV-T5 LVV-T656
LVV-9869 - DMS-PRTL-REQ-0026-V-01: Positional Query by Region: Cone-Search_1		LVV-T5 LVV-T661 LVV-T1334
LVV-9868 - DMS-PRTL-REQ-0027-V-01: Positional Query by Region: Box-Search_1		LVV-T5 LVV-T662
LVV-9859 - DMS-PRTL-REQ-0028-V-01: Query by Identifier_1		LVV-T5 LVV-T652
LVV-9856 - DMS-PRTL-REQ-0016-V-01: Generic Query - Form-based_1		LVV-T5 LVV-T649 LVV-T1334
LVV-9895 - DMS-PRTL-REQ-0056-V-01: Histograms_1		LVV-T6 LVV-T691
LVV-9901 - DMS-PRTL-REQ-0055-V-01: XY Scatter Plots_1		LVV-T6 LVV-T690
LVV-9893 - DMS-PRTL-REQ-0054-V-01: Paging of Tabular Data_1		LVV-T6 LVV-T689
LVV-9889 - DMS-PRTL-REQ-0050-V-01: Column Selection of Tabular Data_1		LVV-T6 LVV-T685

Verification Elements	High Level Requirements	Test Cases
LVV-9894 - DMS-PRTL-REQ-0053-V-01: Row Selection of Tabular Data_1		LWV-T6 LWV-T688
LVV-9891 - DMS-PRTL-REQ-0049-V-01: Display of Tabular Data_1		LWV-T6 LWV-T684 LWV-T1334
LVV-9821 - DMS-LSP-REQ-0017-V-01: Tabular Data Download File Formats_1		LWV-T6 LWV-T615
LVV-9820 - DMS-LSP-REQ-0018-V-01: Image Data Download File Format_1		LWV-T7 LWV-T616
LVV-9881 - DMS-PRTL-REQ-0040-V-01: Query for Single Epoch Image Cutouts_1		LWV-T7 LWV-T675
LVV-9880 - DMS-PRTL-REQ-0041-V-01: Query for Coadded Image Cutouts_1		LWV-T7 LWV-T674
LVV-9848 - DMS-PRTL-REQ-0004-V-01: Semantic Linkage: Portal Workflows_1		LWV-T8 LWV-T637
LVV-9814 - DMS-LSP-REQ-0008-V-01: Semantic Linkage_1		LWV-T8 LWV-T9 LWV-T606
LVV-9810 - DMS-LSP-REQ-0003-V-01: Notebook Aspect_1		LWV-T601 LWV-T1436
LVV-9812 - DMS-LSP-REQ-0006-V-01: Use of VO Standards_1		LWV-T604 LWV-T1334 LWV-T1436 LWV-T1437
LVV-9806 - DMS-LSP-REQ-0007-V-01: Abide by the Data Access Policies_1		LWV-T605
LVV-9813 - DMS-LSP-REQ-0009-V-01: Semantic Linkage: Uncertainties_1		LWV-T607
LVV-9815 - DMS-LSP-REQ-0010-V-01: Transfer of Portal Data References to Notebook_1		LWV-T608
LVV-9817 - DMS-LSP-REQ-0011-V-01: User File Workspace_1		LWV-T609
LVV-9816 - DMS-LSP-REQ-0012-V-01: User Database Workspace_1		LWV-T610
LVV-9818 - DMS-LSP-REQ-0013-V-01: User Workspace Access Controls_1		LWV-T611
LVV-9823 - DMS-LSP-REQ-0015-V-01: Upload Data_1		LWV-T613
LVV-9822 - DMS-LSP-REQ-0016-V-01: Transfer Data to Workspace_1		LWV-T614
LVV-9826 - DMS-LSP-REQ-0030-V-01: Peak Volume of In-process Queries_1		LWV-T619
LVV-9827 - DMS-LSP-REQ-0031-V-01: Query Result Download Bandwidth_1		LWV-T620
LVV-9828 - DMS-LSP-REQ-0019-V-01: Documentation_1		LWV-T621 LWV-T622
LVV-9830 - DMS-LSP-REQ-0020-V-01: Authenticated User Access_1		LWV-T1334 LWV-T1436 LWV-T1437
LVV-9832 - DMS-LSP-REQ-0021-V-01: New-user Support_1		LWV-T623 LWV-T624
LVV-9831 - DMS-LSP-REQ-0022-V-01: Common Identity_1		LWV-T1334 LWV-T1436 LWV-T1437

Verification Elements	High Level Requirements	Test Cases
		LVV-T625
LVV-9834 - DMS-LSP-REQ-0023-V-01: Use of External Identity Providers_1		LVV-T1334 LVV-T1436 LVV-T1437
LVV-9835 - DMS-LSP-REQ-0024-V-01: Use of Multiple Sets of Credentials_1		LVV-T626 LVV-T1334 LVV-T1436 LVV-T1437
LVV-9829 - DMS-LSP-REQ-0025-V-01: Acceptable Use Policy_1		LVV-T627
LVV-9836 - DMS-LSP-REQ-0026-V-01: Using secure protocols_1		LVV-T628 LVV-T1436
LVV-9833 - DMS-LSP-REQ-0027-V-01: Privacy of User Activities_1		LVV-T629
LVV-9839 - DMS-LSP-REQ-0032-V-01: Multiple installations_1		LVV-T630
LVV-9837 - DMS-LSP-REQ-0033-V-01: Internet-Accessible (IPv4)_1		LVV-T631
LVV-9838 - DMS-LSP-REQ-0034-V-01: Internet-Accessible (IPv6)_1		LVV-T632
LVV-9840 - DMS-LSP-REQ-0035-V-01: System-Availability Indication_1		LVV-T633
LVV-9841 - DMS-PRTL-REQ-0001-V-01: Portal is a Web Application_1		LVV-T634 LVV-T1334
LVV-9847 - DMS-PRTL-REQ-0002-V-01: Portal Discovery of all Data Products_1		LVV-T635
LVV-9846 - DMS-PRTL-REQ-0003-V-01: Portal Access to Workspace_1		LVV-T636 LVV-T1818
LVV-9842 - DMS-PRTL-REQ-0005-V-01: Access to Calibration Products_1		LVV-T638
LVV-9845 - DMS-PRTL-REQ-0006-V-01: Coadded Image to Single-Epoch Image Associations_1		LVV-T639
LVV-9843 - DMS-PRTL-REQ-0007-V-01: Access to External Archives_1		LVV-T640
LVV-9844 - DMS-PRTL-REQ-0008-V-01: API for Access to Portal Session State_1		LVV-T641
LVV-9854 - DMS-PRTL-REQ-0009-V-01: Support Synchronous and Asynchronous Queries_1		LVV-T642
LVV-9849 - DMS-PRTL-REQ-0010-V-01: Long Query Backgrounding_1		LVV-T643
LVV-9853 - DMS-PRTL-REQ-0011-V-01: Query Status and Termination Notification_1		LVV-T644
LVV-9851 - DMS-PRTL-REQ-0012-V-01: Query Results Size Limitation_1		LVV-T645
LVV-9850 - DMS-PRTL-REQ-0013-V-01: Query History Inspection_1		LVV-T646
LVV-9852 - DMS-PRTL-REQ-0014-V-01: Query Saving - Portal_1		LVV-T647
LVV-9857 - DMS-PRTL-REQ-0015-V-01: Generic Query_1		LVV-T648 LVV-T1334
LVV-9855 - DMS-PRTL-REQ-0017-V-01: Generic Query - ADQL-based_1		LVV-T650 LVV-T1334
LVV-9858 - DMS-PRTL-REQ-0018-V-01: Query Result Size_1		LVV-T651
LVV-9860 - DMS-PRTL-REQ-0029-V-01: Query by LSST Object and Source Identifiers: Specific Match to Identifier_1		LVV-T653
LVV-9861 - DMS-PRTL-REQ-0030-V-01: Query by Solar System Objects: Specific Match to Identifier_1		LVV-T654
LVV-9866 - DMS-PRTL-REQ-0020-V-01: Positional Query: Position on the Sky_1		LVV-T655 LVV-T1334

Verification Elements	High Level Requirements	Test Cases
LVV-9863 - DMS-PRTL-REQ-0023-V-01: Positional Query: Astrophysical Source Name Lookup_1		LVV-T658
LVV-9864 - DMS-PRTL-REQ-0024-V-01: Positional Query: LSST Object and Source Identifiers_1		LVV-T659
LVV-9867 - DMS-PRTL-REQ-0025-V-01: Positional Query: Solar System Object Names_1		LVV-T660
LVV-9870 - DMS-PRTL-REQ-0019-V-01: Query by Date and Time: Time Range of Observation_1		LVV-T663
LVV-9874 - DMS-PRTL-REQ-0031-V-01: Tabular Data Query Specifications_1		LVV-T664
LVV-9873 - DMS-PRTL-REQ-0032-V-01: Query Tabular Data based upon Image MetaData_1		LVV-T666
LVV-9872 - DMS-PRTL-REQ-0033-V-01: Queries on the Alerts Database_1		LVV-T667
LVV-9871 - DMS-PRTL-REQ-0034-V-01: Access to Original Alert State_1		LVV-T668
LVV-9878 - DMS-PRTL-REQ-0035-V-01: Query for Single Epoch Visit Images_1		LVV-T669
LVV-9877 - DMS-PRTL-REQ-0036-V-01: Query for Single Epoch Raft Images_1		LVV-T670
LVV-9876 - DMS-PRTL-REQ-0037-V-01: Query for Single Epoch CCD Image_1		LVV-T671
LVV-9879 - DMS-PRTL-REQ-0038-V-01: Single-Epoch Image Query Specifications_1		LVV-T672
LVV-9875 - DMS-PRTL-REQ-0039-V-01: Coadded Image Query Specifications_1		LVV-T673
LVV-9905 - DMS-PRTL-REQ-0062-V-01: Display Native Single-Visit Image Data Products_1		LVV-T676
LVV-9884 - DMS-PRTL-REQ-0042-V-01: Visualization of Tabular and Image Data_1		LVV-T677
LVV-9883 - DMS-PRTL-REQ-0043-V-01: Visualization of Ancillary Information_1		LVV-T678
LVV-9882 - DMS-PRTL-REQ-0044-V-01: Linking Visualization of Image Data to Tabular Data_1		LVV-T679
LVV-9885 - DMS-PRTL-REQ-0045-V-01: Visualization of Uploaded Tabular and Image Data_1		LVV-T680
LVV-9886 - DMS-PRTL-REQ-0046-V-01: Visualization of Workspace Data_1		LVV-T681 LVV-T1818
LVV-9888 - DMS-PRTL-REQ-0047-V-01: Table Row Property Sheet_1		LVV-T682
LVV-9887 - DMS-PRTL-REQ-0048-V-01: Alert Visualization_1		LVV-T683
LVV-9892 - DMS-PRTL-REQ-0051-V-01: Display Order of Columns of Tabular Data_1		LVV-T686
LVV-9890 - DMS-PRTL-REQ-0052-V-01: Copying of Tabular Data_1		LVV-T687
LVV-9900 - DMS-PRTL-REQ-0057-V-01: Symbol Size, Shape, and Color Coding in XY(Z) Scatter Plots_1		LVV-T692
LVV-9898 - DMS-PRTL-REQ-0058-V-01: Plot Quantitative Uncertainties_1		LVV-T693
LVV-9897 - DMS-PRTL-REQ-0059-V-01: Plot Asymmetric Quantitative Uncertainties_1		LVV-T694
LVV-9899 - DMS-PRTL-REQ-0060-V-01: Plot Upper and Lower Quantitative Limits_1		LVV-T695
LVV-9896 - DMS-PRTL-REQ-0061-V-01: Multiple XY-Plots on the Same Display_1		LVV-T696
LVV-9906 - DMS-PRTL-REQ-0063-V-01: Display Raft- and Focal-Plane-Level Single-Visit Image Data_1		LVV-T697

Verification Elements	High Level Requirements	Test Cases
LVV-9907 - DMS-PRTL-REQ-0064-V-01: Display Single Visit Image Cut-Out_1		LVV-T698
LVV-9904 - DMS-PRTL-REQ-0065-V-01: Display Native Coadded Image Data Products_1		LVV-T699
LVV-9903 - DMS-PRTL-REQ-0066-V-01: Display Coadded Image Cutouts / Mosaics_1		LVV-T700
LVV-9902 - DMS-PRTL-REQ-0067-V-01: Display Calibration Image Data Products_1		LVV-T701
LVV-9908 - DMS-PRTL-REQ-0068-V-01: Display User-provided Images_1		LVV-T702
LVV-9909 - DMS-PRTL-REQ-0069-V-01: Image Property Sheet_1		LVV-T703
LVV-9914 - DMS-PRTL-REQ-0070-V-01: Provide Coordinate Display Tools for Images_1		LVV-T704
LVV-9911 - DMS-PRTL-REQ-0071-V-01: Image Pixel Content Display_1		LVV-T705
LVV-9912 - DMS-PRTL-REQ-0072-V-01: Image Spatial Manipulation_1		LVV-T706
LVV-9913 - DMS-PRTL-REQ-0073-V-01: Multi-Image Scaling and Aligning_1		LVV-T707
LVV-9910 - DMS-PRTL-REQ-0074-V-01: Image Appearance Manipulation_1		LVV-T708
LVV-9915 - DMS-PRTL-REQ-0075-V-01: Image Mask and Variance Overlays_1		LVV-T709
LVV-9917 - DMS-PRTL-REQ-0076-V-01: Image Plot Overlays_1		LVV-T710
LVV-9916 - DMS-PRTL-REQ-0077-V-01: Image Overlays: Adjustment of Colors and Positions_1		LVV-T711
LVV-9918 - DMS-PRTL-REQ-0078-V-01: Display All-Sky HEALPix Image_1		LVV-T712
LVV-9922 - DMS-PRTL-REQ-0079-V-01: Zoom In and Out on a HEALPix Image_1		LVV-T713
LVV-9920 - DMS-PRTL-REQ-0080-V-01: Pan Around on a HEALPix Image_1		LVV-T714
LVV-9919 - DMS-PRTL-REQ-0081-V-01: HEALPix Pixel Selection_1		LVV-T715
LVV-9921 - DMS-PRTL-REQ-0082-V-01: Retrieve HEALPix-Associated Data_1		LVV-T716
LVV-9924 - DMS-PRTL-REQ-0083-V-01: Coordinate Display Applicability_1		LVV-T717
LVV-9928 - DMS-PRTL-REQ-0084-V-01: Point Coordinate Display_1		LVV-T718
LVV-9926 - DMS-PRTL-REQ-0085-V-01: Distance Measurement Tool_1		LVV-T719
LVV-9925 - DMS-PRTL-REQ-0086-V-01: Coordinate Grid Overlays_1		LVV-T720
LVV-9923 - DMS-PRTL-REQ-0087-V-01: Astrophysical Compass Overlay_1		LVV-T721
LVV-9927 - DMS-PRTL-REQ-0088-V-01: Geometric Figure Overlays_1		LVV-T722
LVV-9934 - DMS-PRTL-REQ-0089-V-01: Sorting of Tabular Data by Column_1		LVV-T723
LVV-9933 - DMS-PRTL-REQ-0090-V-01: Simple Filtering of Tabular Data_1		LVV-T724
LVV-9929 - DMS-PRTL-REQ-0091-V-01: Calculated Filtering of Tabular Data_1		LVV-T725
LVV-9931 - DMS-PRTL-REQ-0092-V-01: Filtering of Tabular Data by Multiple Columns_1		LVV-T726
LVV-9930 - DMS-PRTL-REQ-0093-V-01: Calculated Quantities on Tabular Data_1		LVV-T727
LVV-9935 - DMS-PRTL-REQ-0094-V-01: Statistical Measurements on Tabular Data_1		LVV-T728
LVV-9932 - DMS-PRTL-REQ-0095-V-01: Saving Displayed Tabular Data_1		LVV-T729 LVV-T1334
LVV-9936 - DMS-PRTL-REQ-0096-V-01: False-color Images Creation and Display_1		LVV-T1818 LVV-T730
LVV-9937 - DMS-PRTL-REQ-0097-V-01: Statistical Measurements on Image Data_1		LVV-T731

Verification Elements	High Level Requirements	Test Cases
LVV-9942 - DMS-PRTL-REQ-0098-V-01: Overlay Catalog of Sources and Objects on Images_1		LVV-T732
LVV-9943 - DMS-PRTL-REQ-0099-V-01: Overlay LSST-Derived Orbits_1		LVV-T733
LVV-9944 - DMS-PRTL-REQ-0100-V-01: Overlay User-provided Catalogs on Images_1		LVV-T734
LVV-9945 - DMS-PRTL-REQ-0101-V-01: Overlay User-provided Region Files on Images_1		LVV-T735
LVV-9940 - DMS-PRTL-REQ-0102-V-01: Display of Camera Artifacts as Overlays_1		LVV-T736
LVV-9948 - DMS-PRTL-REQ-0103-V-01: Single-Object Time-Domain Image View_1		LVV-T737
LVV-9946 - DMS-PRTL-REQ-0104-V-01: Position-based Time-Domain Image View_1		LVV-T738
LVV-9938 - DMS-PRTL-REQ-0105-V-01: Brightness Light Curves_1		LVV-T739
LVV-9941 - DMS-PRTL-REQ-0106-V-01: Linked Tables, Plots, and Images_1		LVV-T740
LVV-9939 - DMS-PRTL-REQ-0107-V-01: Data Selection from a Plot or Image_1		LVV-T741
LVV-9947 - DMS-PRTL-REQ-0108-V-01: Saving Data Selection from a Plot or Image_1		LVV-T742
LVV-9949 - DMS-PRTL-REQ-0109-V-01: Access to User Databases_1		LVV-T743
LVV-9954 - DMS-PRTL-REQ-0110-V-01: Tabular Data Download_1		LVV-T744
LVV-9951 - DMS-PRTL-REQ-0111-V-01: Image Data Download_1		LVV-T745
LVV-9953 - DMS-PRTL-REQ-0112-V-01: Selected Image Download_1		LVV-T746
LVV-9950 - DMS-PRTL-REQ-0113-V-01: Download Volume Estimation_1		LVV-T747
LVV-9952 - DMS-PRTL-REQ-0114-V-01: Long Download Completion Notification_1		LVV-T748
LVV-9955 - DMS-PRTL-REQ-0115-V-01: APIs for Visualization Components_1		LVV-T749
LVV-9958 - DMS-PRTL-REQ-0116-V-01: Storage Quotas User Interface_1		LVV-T750
LVV-9956 - DMS-PRTL-REQ-0117-V-01: Computational Quotas User Interface_1		LVV-T751
LVV-9957 - DMS-PRTL-REQ-0118-V-01: Portal Display Preferences_1		LVV-T752
LVV-9960 - DMS-PRTL-REQ-0119-V-01: Alert Subscription Service_1		LVV-T753
LVV-9961 - DMS-PRTL-REQ-0120-V-01: Pre-defined Alert Filters_1		LVV-T754
LVV-9962 - DMS-PRTL-REQ-0121-V-01: User-defined Alert Filters_1		LVV-T755
LVV-9959 - DMS-PRTL-REQ-0127-V-01: Alert Subscription Monitoring_1		LVV-T756
LVV-9963 - DMS-PRTL-REQ-0122-V-01: Access to Observatory Documentation_1		LVV-T757
LVV-9965 - DMS-PRTL-REQ-0123-V-01: Portal User Documentation_1		LVV-T758
LVV-9964 - DMS-PRTL-REQ-0124-V-01: Portal API Documentation_1		LVV-T759
LVV-9967 - DMS-PRTL-REQ-0125-V-01: Tolerance of Production Database Changes_1		LVV-T760
LVV-9966 - DMS-PRTL-REQ-0126-V-01: System-Busy Indication_1		LVV-T761
LVV-9971 - DMS-NB-REQ-0005-V-01: Interactive Python Environment_1		LVV-T762
LVV-9976 - DMS-NB-REQ-0006-V-01: Unix Shell Access_1		LVV-T763
		LVV-T1436

Verification Elements	High Level Requirements	Test Cases
LVV-9974 - DMS-NB-REQ-0007-V-01: Pre-installed Containerized Software Releases_1		LVV-T764
LVV-9975 - DMS-NB-REQ-0008-V-01: Release Deployment Latency_1		LVV-T765
LVV-9969 - DMS-NB-REQ-0009-V-01: Data Access Middleware Availability_1		LVV-T766
LVV-9968 - DMS-NB-REQ-0010-V-01: Common Astronomy Package Availability_1		LVV-T767
LVV-9978 - DMS-NB-REQ-0011-V-01: User Package Installation_1		LVV-T768
LVV-9977 - DMS-NB-REQ-0012-V-01: User Development Environment_1		LVV-T769
LVV-9973 - DMS-NB-REQ-0013-V-01: Persistent User Home File Space_1		LVV-T770
LVV-9970 - DMS-NB-REQ-0014-V-01: Documentation_1		LVV-T1436
LVV-9972 - DMS-NB-REQ-0015-V-01: New-User Onboarding_1		LVV-T771
LVV-9972 - DMS-NB-REQ-0015-V-01: New-User Onboarding_1		LVV-T772
LVV-9983 - DMS-NB-REQ-0016-V-01: Shared File Space_1		LVV-T773
LVV-9980 - DMS-NB-REQ-0017-V-01: Access to the API and Portal Aspects_1		LVV-T774
LVV-9985 - DMS-NB-REQ-0018-V-01: User File Workspace Access_1		LVV-T1436
LVV-9985 - DMS-NB-REQ-0018-V-01: User File Workspace Access_1		LVV-T775
LVV-9986 - DMS-NB-REQ-0019-V-01: VOSpace Access_1		LVV-T776
LVV-9984 - DMS-NB-REQ-0020-V-01: User Database Workspace Access_1		LVV-T777
LVV-9981 - DMS-NB-REQ-0021-V-01: Batch System Access_1		LVV-T778
LVV-9982 - DMS-NB-REQ-0022-V-01: Compute and Storage Quotas_1		LVV-T779
LVV-9979 - DMS-NB-REQ-0023-V-01: Access to All Data Products_1		LVV-T780
LVV-9988 - DMS-NB-REQ-0024-V-01: Ease of Deployment_1		LVV-T781
LVV-9987 - DMS-NB-REQ-0025-V-01: Deployment Workload in Kubernetes_1		LVV-T782
LVV-9989 - DMS-NB-REQ-0026-V-01: System Health Monitoring_1		LVV-T783
LVV-9990 - DMS-NB-REQ-0032-V-01: Image Visualization_1		LVV-T784
LVV-9991 - DMS-NB-REQ-0033-V-01: Scientific Plotting_1		LVV-T785
LVV-9993 - DMS-NB-REQ-0034-V-01: Visualization Linkage_1		LVV-T786
LVV-9992 - DMS-NB-REQ-0035-V-01: Visualization Interactivity_1		LVV-T787
LVV-9994 - DMS-NB-REQ-0036-V-01: Visualization Scaling_1		LVV-T788
LVV-9996 - DMS-NB-REQ-0029-V-01: Access to Portal-Initiated Queries_1		LVV-T789
LVV-9995 - DMS-NB-REQ-0030-V-01: Access to Portal Visualization API_1		LVV-T1436
LVV-9995 - DMS-NB-REQ-0030-V-01: Access to Portal Visualization API_1		LVV-T790
LVV-9997 - DMS-NB-REQ-0031-V-01: Notebook-Launching Interface_1		LVV-T791
LVV-10000 - DMS-NB-REQ-0001-V-01: Secure Protocol_1		LVV-T792
LVV-9998 - DMS-NB-REQ-0002-V-01: Authentication and Authorization_1		LVV-T1436
LVV-9998 - DMS-NB-REQ-0002-V-01: Authentication and Authorization_1		LVV-T793
LVV-9999 - DMS-NB-REQ-0003-V-01: Secure Implementation_1		LVV-T1436
LVV-9999 - DMS-NB-REQ-0003-V-01: Secure Implementation_1		LVV-T794
LVV-10001 - DMS-NB-REQ-0004-V-01: IPV6 Access_1		LVV-T795
LVV-10011 - DMS-API-REQ-0021-V-01: Use of CAOM2_1		LVV-T796
LVV-10003 - DMS-API-REQ-0022-V-01: Access to Image and Visit Metadata_1		LVV-T797
LVV-10002 - DMS-API-REQ-0023-V-01: Access to Catalog Data Products_1		LVV-T798
LVV-10002 - DMS-API-REQ-0023-V-01: Access to Catalog Data Products_1		LVV-T1437
LVV-10005 - DMS-API-REQ-0024-V-01: Access to Observatory Metadata_1		LVV-T799
LVV-10009 - DMS-API-REQ-0025-V-01: Enforcement of Information Classification_1		LVV-T800
LVV-10006 - DMS-API-REQ-0026-V-01: Access to Reference Catalogs_1		LVV-T801

Verification Elements	High Level Requirements	Test Cases
LVV-10007 - DMS-API-REQ-0027-V-01: Access to Virtual Data Products_1		LVV-T802
LVV-10004 - DMS-API-REQ-0028-V-01: Access to Image Data in FITS Format_1		LVV-T803
LVV-10010 - DMS-API-REQ-0029-V-01: Multiple Data Releases_1		LVV-T804
LVV-10008 - DMS-API-REQ-0030-V-01: Catalog Metadata Service_1		LVV-T805
LVV-10015 - DMS-API-REQ-0006-V-01: TAP Service for Tabular Queries_1		LVV-T806
LVV-10014 - DMS-API-REQ-0007-V-01: Synchronous TAP Support_1		LVV-T807
LVV-10013 - DMS-API-REQ-0008-V-01: Asynchronous TAP Support_1		LVV-T808
LVV-10012 - DMS-API-REQ-0009-V-01: ADQL Support_1		LVV-T809
LVV-10016 - DMS-API-REQ-0016-V-01: SIA Service for Image Availability_1		LVV-T810
LVV-10018 - DMS-API-REQ-0017-V-01: SODA Service for Image Data_1		LVV-T811
LVV-10017 - DMS-API-REQ-0018-V-01: Cutout Service_1		LVV-T812
LVV-10020 - DMS-API-REQ-0038-V-01: Query History Retrieval_1		LVV-T813
LVV-10019 - DMS-API-REQ-0039-V-01: Cached Query Result Retrieval_1		LVV-T814
LVV-10021 - DMS-API-REQ-0040-V-01: Query Specification Retrieval_1		LVV-T815
LVV-10022 - DMS-API-REQ-0034-V-01: Butler Interface to Data Products_1		LVV-T816
LVV-10023 - DMS-API-REQ-0019-V-01: VOspace Service_1		LW-T817
LVV-10024 - DMS-API-REQ-0020-V-01: WebDAV Service_1		LW-T818
LVV-10029 - DMS-API-REQ-0010-V-01: VOtable Output for TAP_1		LW-T819
LVV-10030 - DMS-API-REQ-0011-V-01: VOtable TABLEDATA Payload_1		LW-T820
LVV-10028 - DMS-API-REQ-0012-V-01: VOtable BINARY2 Payload_1		LW-T821
LVV-10026 - DMS-API-REQ-0013-V-01: JSON Output for TAP_1		LW-T822
LVV-10025 - DMS-API-REQ-0014-V-01: CSV Output for TAP_1		LW-T823
LVV-10027 - DMS-API-REQ-0015-V-01: SQLite Output for TAP_1		LW-T824
LVV-10032 - DMS-API-REQ-0031-V-01: Tabular Result Download to Workspace_1		LW-T825
LVV-10033 - DMS-API-REQ-0032-V-01: Tabular Upload to Workspace_1		LW-T826
LVV-10031 - DMS-API-REQ-0033-V-01: Deletion from Workspace_1		LW-T827
LVV-10037 - DMS-API-REQ-0001-V-01: Secure Protocols_1		LW-T828
LVV-10034 - DMS-API-REQ-0003-V-01: Authentication_1		LW-T829
LVV-10035 - DMS-API-REQ-0004-V-01: Authorization_1		LW-T830
LVV-10036 - DMS-API-REQ-0005-V-01: Secure Implementation_1		LW-T831
LVV-10038 - DMS-API-REQ-0035-V-01: Containerized Deployment_1		LW-T832
LVV-10040 - DMS-API-REQ-0002-V-01: Result Compression_1		LW-T833
LVV-10041 - DMS-API-REQ-0036-V-01: Upgradability_1		LW-T834
LVV-10039 - DMS-API-REQ-0037-V-01: Logging and Monitoring_1		LW-T835