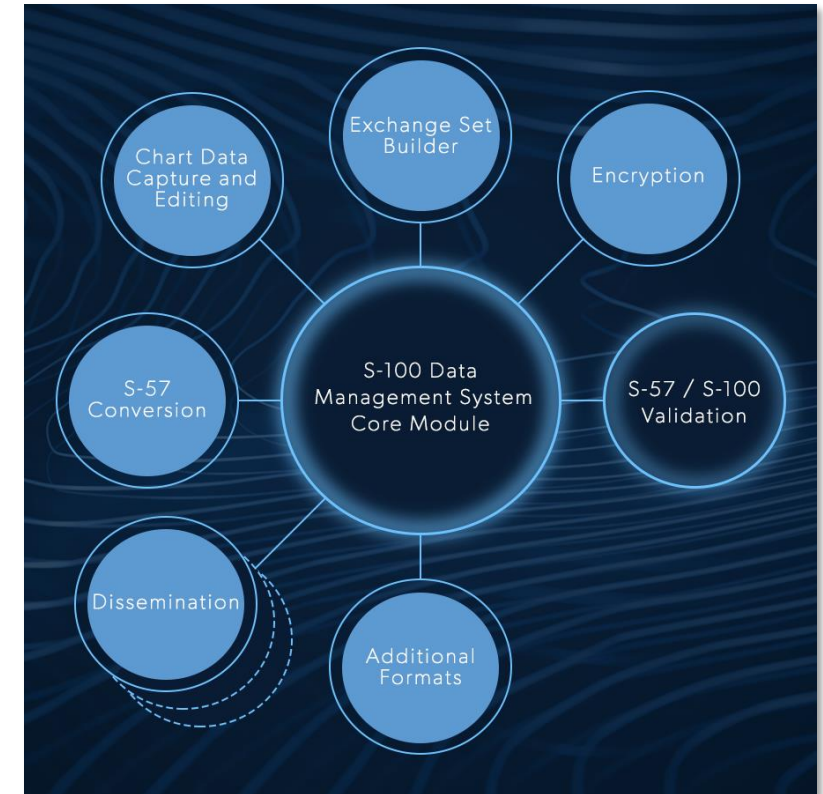
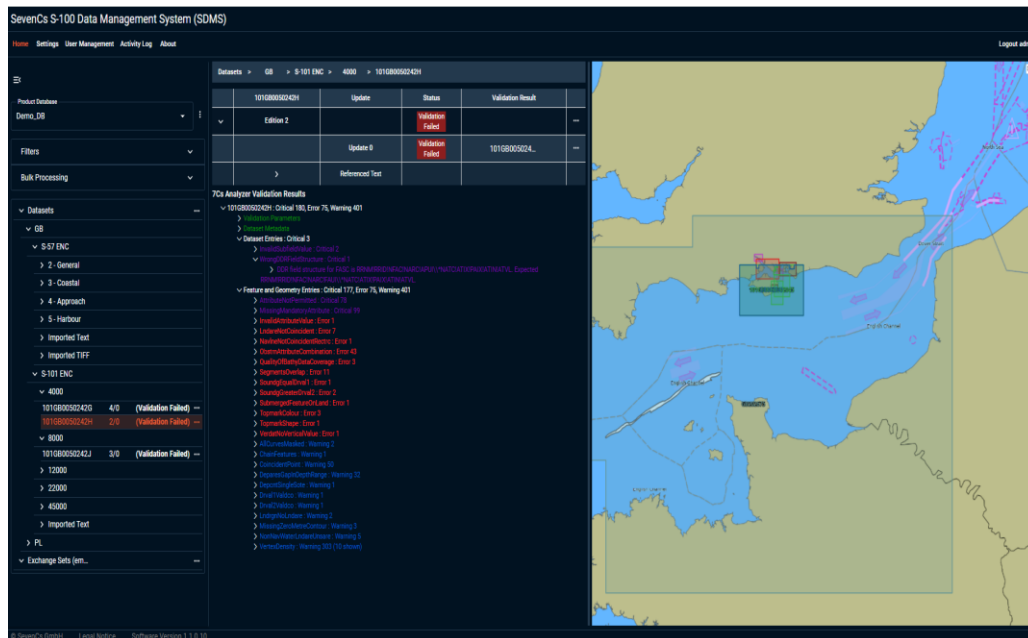


S-100 DATA MANAGEMENT

S-100 Data Management System

- The S-100 Data Management System (SDMS) is a modular, and scalable Management System for S-57 and S-100 Workflows



SDMS Concept

- SDMS serves as the central point of all S-57 and S-100 data assets of an organization
- detailed information (status, meta information, geographic coverage, processing results) about individual datasets can be retrieved by users
- users are guided through individual processing steps by means of defined workflows and dependencies

The screenshot shows the SDMS interface with a navigation menu on the left and a main content area. The main content area displays a breadcrumb trail: Datasets > US > S-57 ENC > 5 - Harbour > US5CA58M. Below the breadcrumb trail is a table with columns: US5CA58M, Update, and Status. The table shows Edition 13 with a 'New' status, and subsequent updates (Update 0, Update 1, Update 2, Update 3) with 'Validation Passed' status. A map on the right shows the geographic coverage of the dataset.

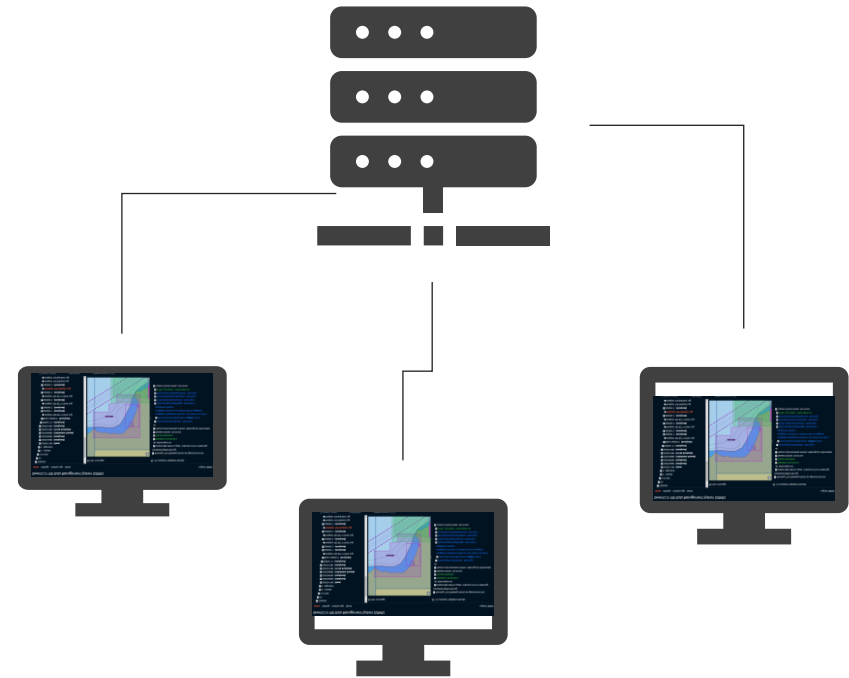
US5CA58M	Update	Status
Edition 13		New
	Update 0	Validation Passed
	Update 1	Validation Passed
	Update 2	Validation Passed
	Update 3	New
	Referenced	

The screenshot shows a detailed view of the dataset updates and validation results. The breadcrumb trail is: Datasets > US > S-57 ENC > 5 - Harbour > US5CA58M. The table has columns: US5CA58M, Update, Status, and Validation Result. The table shows Edition 13 with a 'New' status, and subsequent updates (Update 0, Update 1) with 'Validation Passed' status.

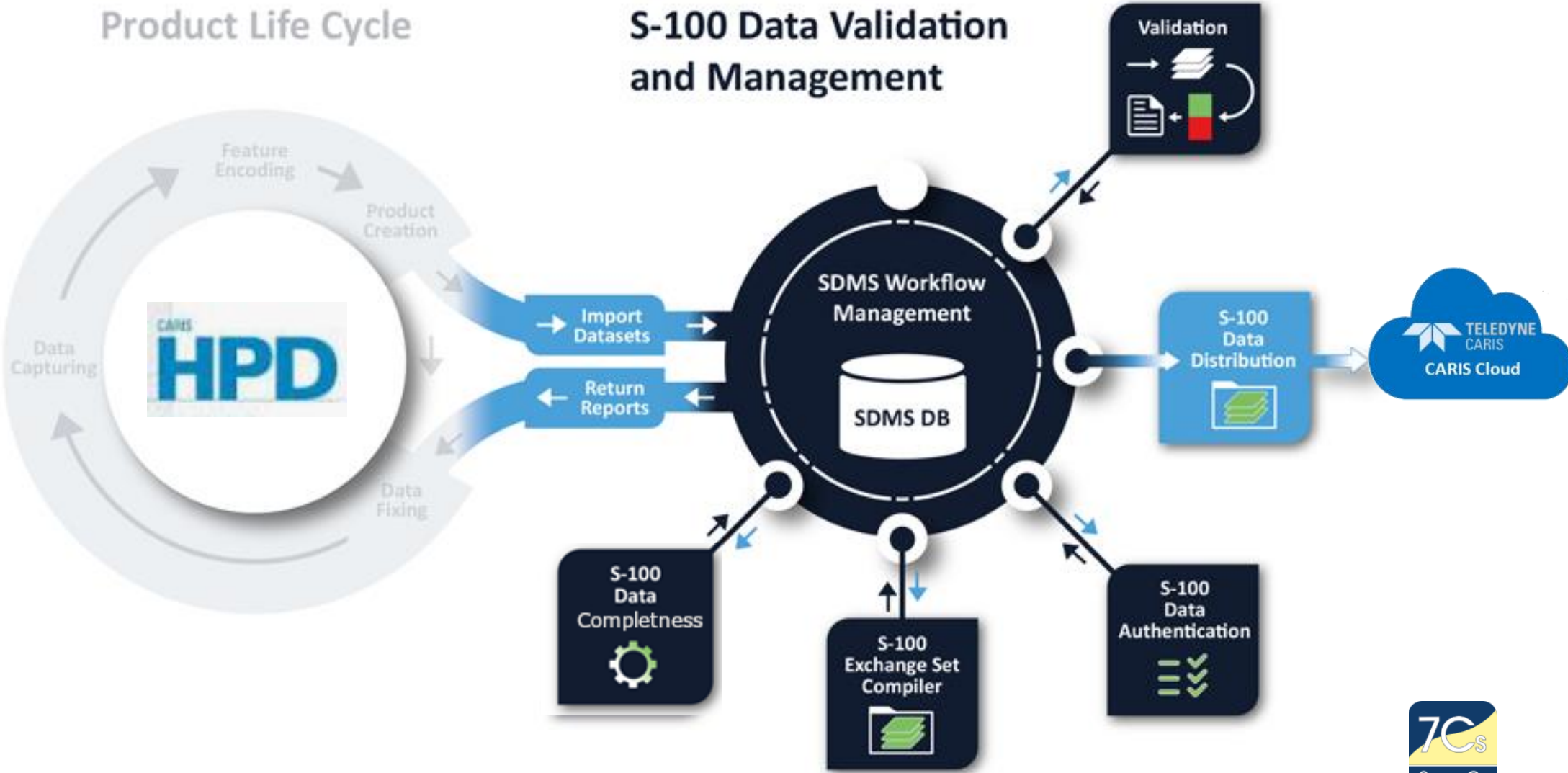
US5CA58M	Update	Status	Validation Result
Edition 13		New	
	Update 0	Validation Passed	US5CA58M_ed...
	Update 1	Validation Passed	US5CA58M_ed...

SDMS – main features

- focus on 'after-editing' processes and workflows
- works as client-server application
- single or multi-user operation
- physical or cloud-based environment
- self-deployed or hosted
- Web Browser operated GUI
- API Service



SDMS position in the ENC production



S-100 Data Management System -GUI

SevenCs S-100 Data Management System (SDMS)

Home Settings User Management Activity Log About

Logout admin

Product Database
Demo_DB

Filters

Bulk Processing

Datasets

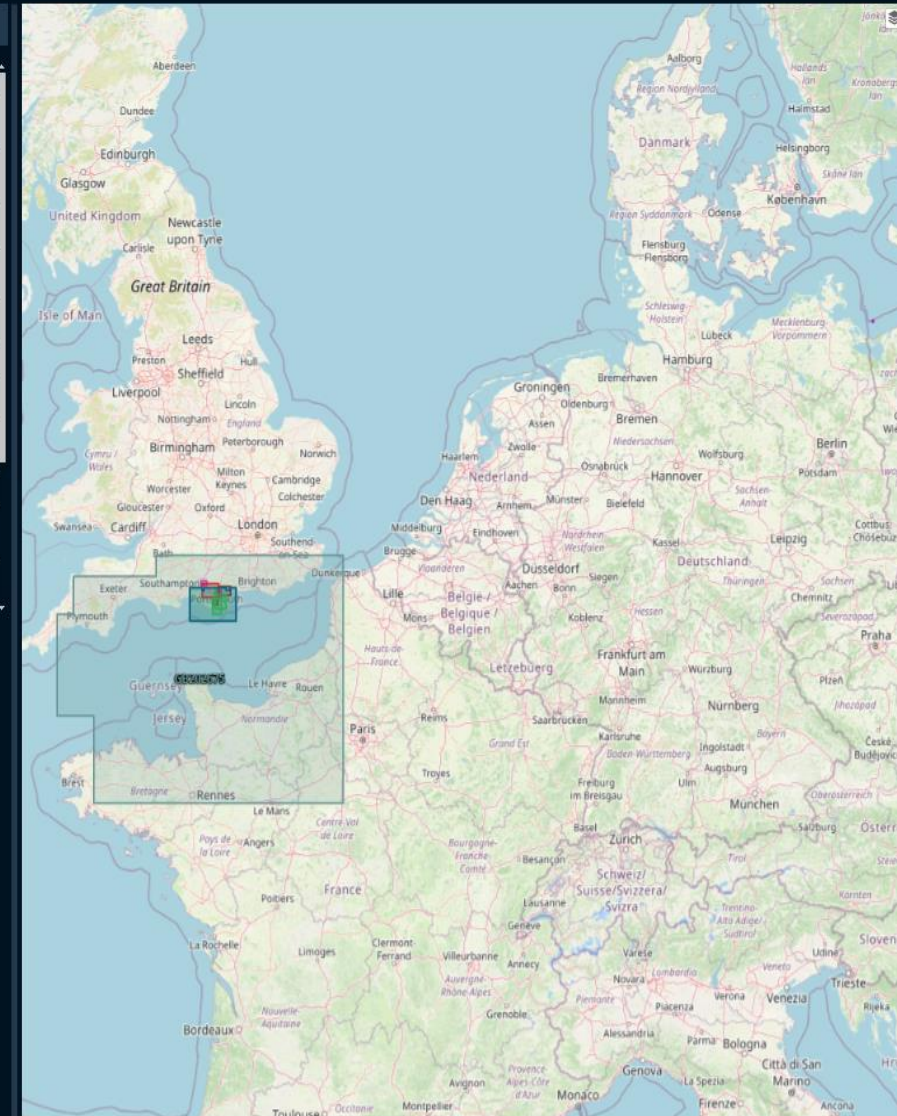
- GB
 - S-57 ENC
 - 2 - General
 - 3 - Coastal
 - 4 - Approach
 - 5 - Harbour
 - Imported Text
 - Imported TIFF
 - S-101 ENC
 - 4000
 - 101GB0050242G 4/0 (Validation Failed) ...
 - 101GB0050242H 2/0 (Validation Failed) ...
 - 8000
 - 101GB0050242J 3/0 (Validation Failed) ...
 - 12000
 - 22000
 - 45000
 - Imported Text
 - PL
 - Exchange Sets (em...

Datasets > GB > S-101 ENC > 4000 > 101GB0050242G

101GB0050242G	Update	Status	Validation Result
Edition 4		Validation Failed	
	Update 0	Validation Failed	101GB005024...
	Referenced Text		
	101GB001A000...		
	101GB001A0007...	Missing	
	101GB001A0015...	Missing	
	101GB00A16XX...	Missing	
	101GB00G10BX...		
	101GB00G1DXX...	Missing	
	101GB00N0049...		
	101GB00N0049...		

7Cs Analyzer Validation Results

- 101GB0050242G : Critical 37, Error 9, Warning 30
 - Validation Parameters
 - Dataset Metadata
 - Dataset Entries : Critical 3
 - InvalidSubfieldValue : Critical 2
 - WrongDORFieldStructure : Critical 1
 - DOR field structure for FASC is RRNMIRRIDINFACINARCIPUUV*NATCIATIXIPAIYATINATVL. Expected RRNMIRRIDINFACINARCIFALUV*NATCIATIXIPAIYATINATVL.
 - Feature and Geometry Entries : Critical 34, Error 9, Warning 30
 - AttributeNotPermitted : Critical 6
 - MissingMandatoryAttribute : Critical 28
 - NavlineNotCoincidentRectrc : Error 2
 - ObstnAttributeCombination : Error 7
 - AllCurvesMasked : Warning 2
 - CoincidentPoint : Warning 2
 - DeparedGapInDepthRange : Warning 4
 - 120/132 There is a gap in the depth ranges between two bordering DepthArea areas.
 - 120/541 There is a gap in the depth ranges between two bordering DepthArea areas.
 - 120/544 There is a gap in the depth ranges between two bordering DepthArea areas.
 - 120/693 There is a gap in the depth ranges between two bordering DepthArea areas.
 - VertexDensity : Warning 22



S-100 Authentication

S-100 authentication with SDMS

- Create private/public key pair (or import an existing private key)
- Fill-in form of Certificate Signing Request (according to S-98) and export it
- Send Certificate Signing Request to IHO
- Import returned IHO certificate into SDMS

S-100 Data Authentication

Key Pair

[GENERATE KEY PAIR](#) [IMPORT PRIVATE KEY](#) [EXPORT PRIVATE KEY](#)

Public Key
Public key is missing.

[GENERATE CERTIFICATE SIGNING REQUEST](#)

Certificate

[IMPORT CERTIFICATE](#)

DS Certificate
DS certificate is missing.

Information

Key pair is missing.
DS Certificate is missing.

Configuration of S-100 authentication

- SDMS can sign the imported S-100 datasets and
- create S-100 Exchange Sets
- on the condition that a valid set of configuration parameters has been specified

S-100 Data Authentication

Key Pair

GENERATE KEY PAIR IMPORT PRIVATE KEY EXPORT PRIVATE KEY

Public Key

```
MHYwEAYHKoZlZj0CAQYFK4EEACIDYgAEHd8uYXdkNNq+x3LgBhIPc
yVvbMv2o5A//ZSYAukZTlyvWeu8/ft.JbBKcizhWFwWUditVodKeXYfUt/
KmCwYyLNUVjc4YUlba5G3WdpQYLPRMep9Fgh3saaWf1N5/L/8P
```

GENERATE CERTIFICATE SIGNING REQUEST

Certificate

IMPORT CERTIFICATE

DS Certificate

```
-----BEGIN CERTIFICATE-----
MIIDnDCCAyGgAwIBAgIUga556MySE0bkvC1hAnZNqST+eGwwCgYI
KoZlZj0EAwMw
gdwxCzAJBgNVBAYTAk1DMR0wGwYDVQQIDBRtQ0hFTUVfQURNS
-----
```

Information

The authentication configuration is valid.

SDMS – Data Authentication (Signing)

SevenCs S-100 Data Management System (SDMS)

Home Settings User Management Activity Log About

Filter Type Operator Name
Name Contains GB

Bulk Processing
Bulk Action
Pass Validation

Datasets > GB > S-101 ENC > 22000 > 101GB0040242B

	101GB0040242B	Update	Status	Validation Result	
▼	Edition 2		Validation Passed		...
		Base 0 ✓	Validation Passed	101GB004024...	...
	>	Referenced Text			

Data Set File Information

Base Update 0 of data set 101GB0040242B

File name: 101GB0040242B.000

Status: Validation Passed

Description:

Update date: 2022-02-04

Imported at: 05/26/2024 08:00:41

Data Authentication: SIGNED at 05/26/2024 08:00:42

101GB0040242B 2/0 (Validation Passed) ...

> 45000

> Imported Text



SDMS S-100 Exchange Set Creation

S-100 Data Distribution

- Some of the metadata is stored in the Exchange Set Catalog File
- This additional information must be stored in a database
- The data must be shared only in Exchange Sets format and not as single datasets
- The data signatures and certificates must be verified by the organization that receives that Exchange Set.

SDMS – Exchange Sets Creation for S-100 Datasets

SevenCs S-100 Data Management System (SDMS)

Home Settings User Management Activity Log About Logout admin

Exchange Set Properties

Name: ENC_ROOT_2024-05-26T08:23:49

Exchange Catalogue Description: CHC2024 Demo

Exchange Catalogue Comment: CHC2024 Demo

SAVE

ADD SELECTED

Filters (active)

Filter Type	Operator	Name
<input checked="" type="checkbox"/> Name	Contains	GB

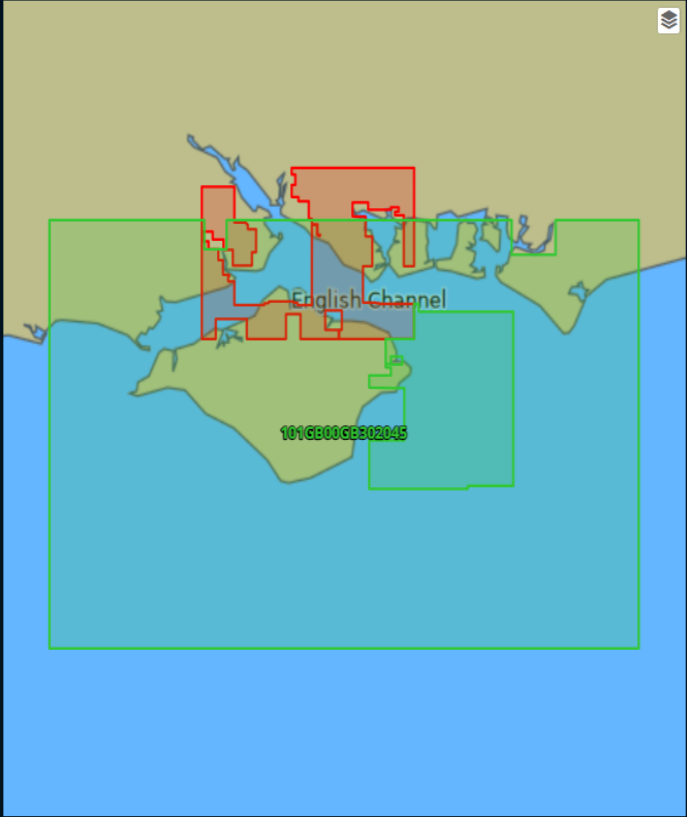
+

Bulk Processing

Bulk Action: Pass Validation **▶**

Datasets and Support Files

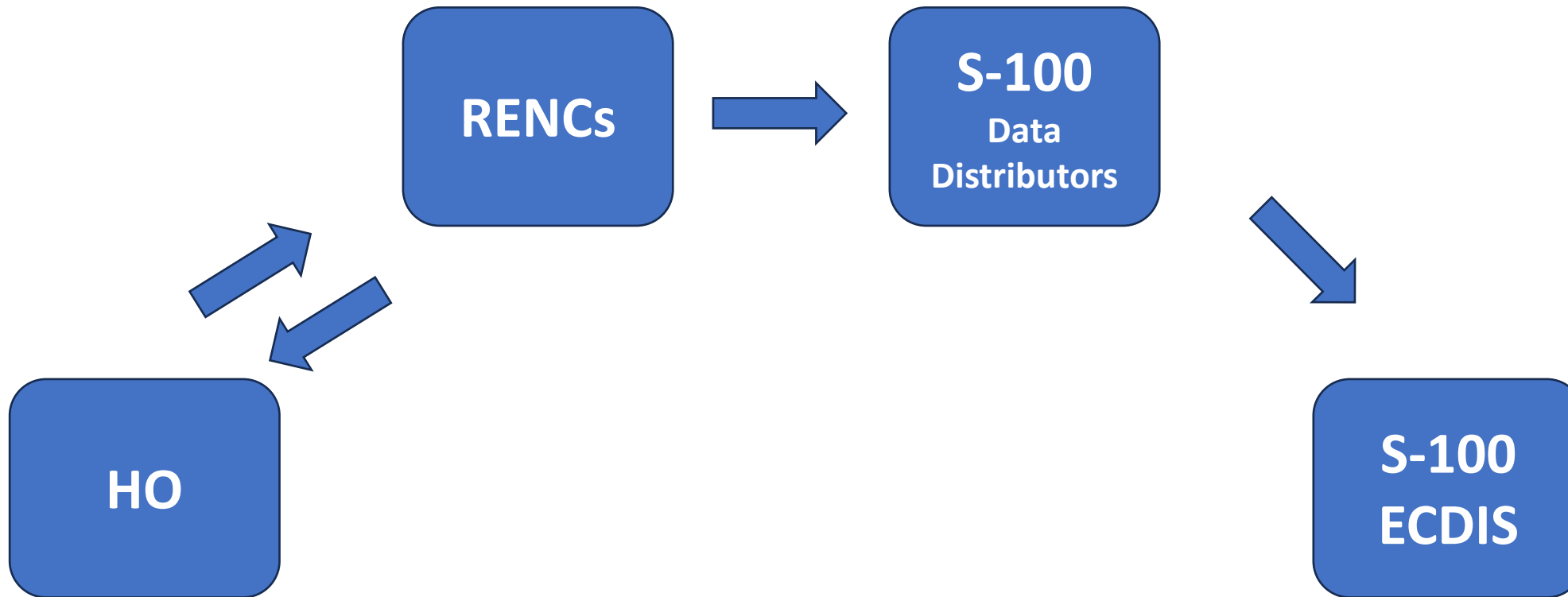
Category	Item	Action
Data Sets	45000	×
	101GB00GB302045	×
	101GB0040242C	×
22000	101GB0040242B	×
	Support Files	
	101GB00A25XXX.TXT	×
	101GR00G1AXXX.TXT	×



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Expected S-100 Data Distribution Workflow



The S-100 data is expected to be signed and verified on each location



7Cs S-57vsS-101 Consistency Service

Conversion Quality Assurance

- How to make sure that the S-57 to S-101 conversion went well and no data was lost during the process?
- The goal is to increase the conversion completeness confidence level
- Independent service for Conversion Completeness Quality Assurance (as part of SDMS)



S-57vs101 Consistency Services - Background

- IHO will publish S-101 Edition 2.0.0 (operational version) in 2025
- According to the Dual Fuel concept S-100 ECDIS must support S-57 and S-100
- Legacy ECDIS does not support S-100, transition will not happen overnight
- Conversion will be required in both directions S-57 <-> S-101
- Conversion process too complex to be executed on-the-fly (configuration requires constant fine-tuning)
- This is why we chose FME as basis and developed necessary S-101 extensions (S-101 Reader, S-101 Writer)
- FME gives us the flexibility we require

Components S-57 vs. S-101 Consistency Service

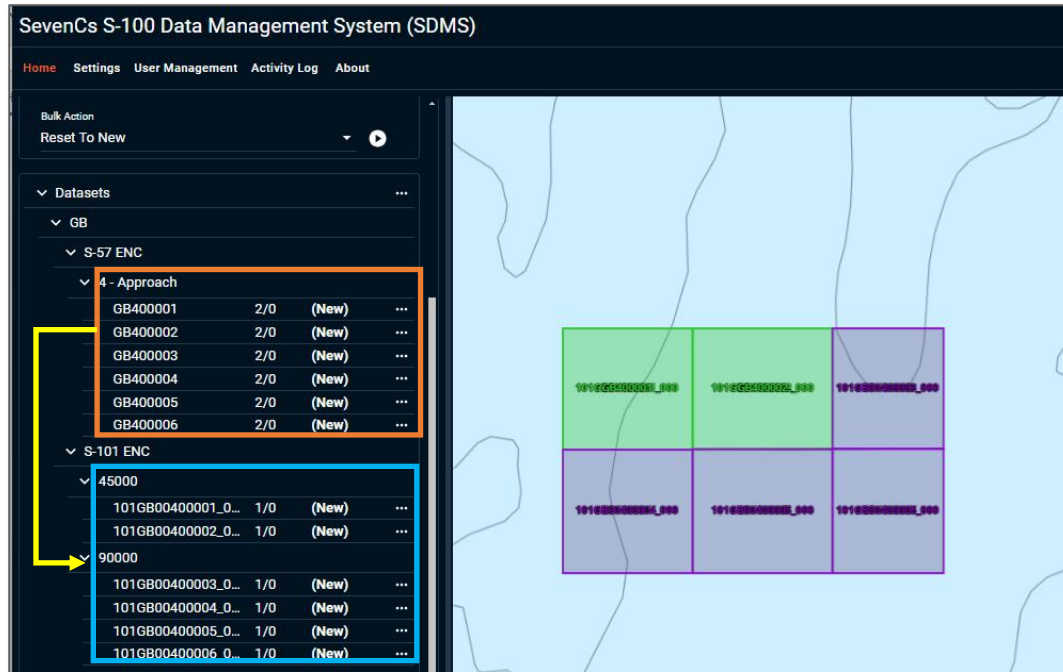
- Software Components and their roles
 - FME main application, used to configure and execute the logic of the consistency checks (comparison of features and attributes, detection of discrepancies, log file generation)
 - FME native S-57 reader, import of S-57 data set(s) and feature parsing
 - 7Cs S-101 Reader Plug-in, import of S-101 data set(s) and feature parsing
 - S-57 Writer, S-101 Writer, optional components useful for further analysis
- Additional services
 - user specific technical training workshop
 - software support

S-57 vs S-101 Consistency Checks



- used to verify that all the relevant content of an S-57 dataset is content-consistent with its S-101 equivalent
- currently one-to-one comparison, can be extended to do one-to-many

SDMS integration

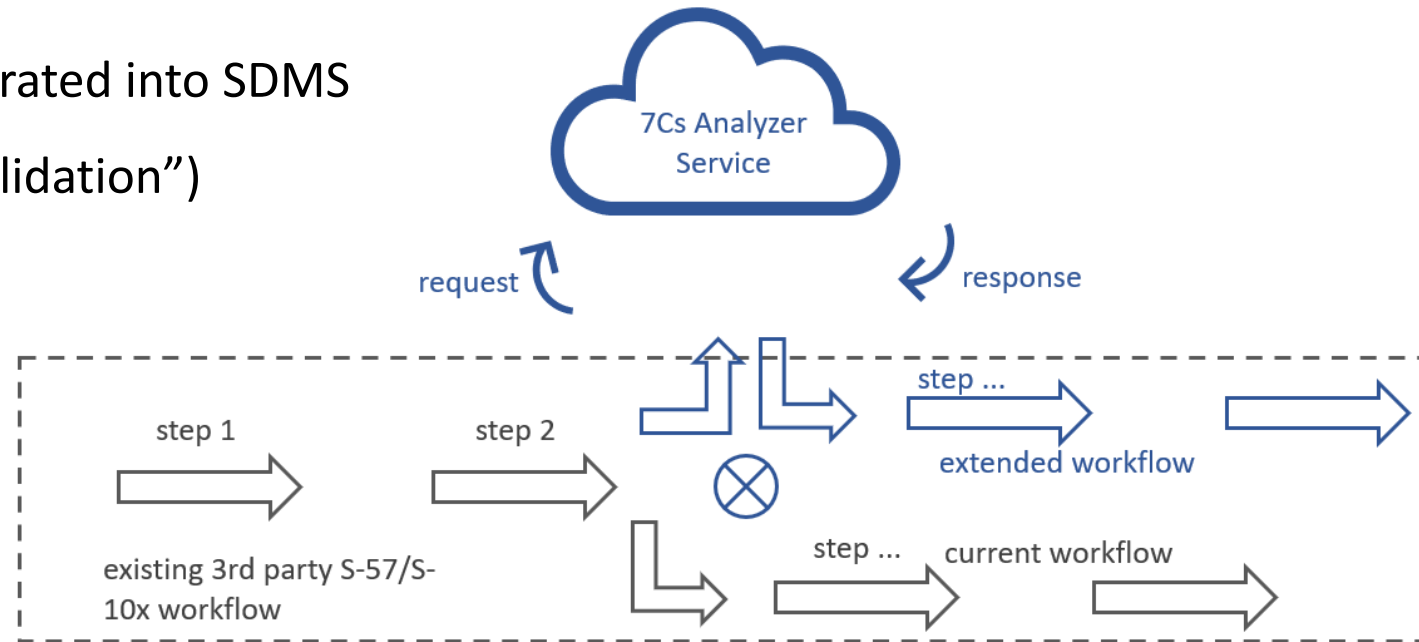
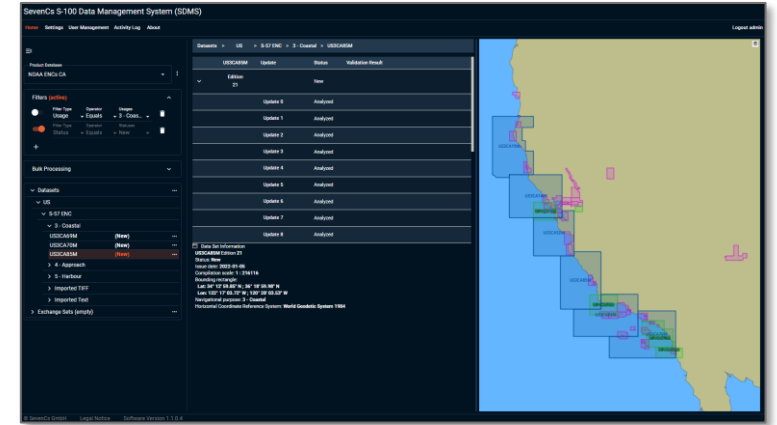


- This will allow users to drive the FME process from SDMS without directly interacting with the FME user interface

Datasets Validation

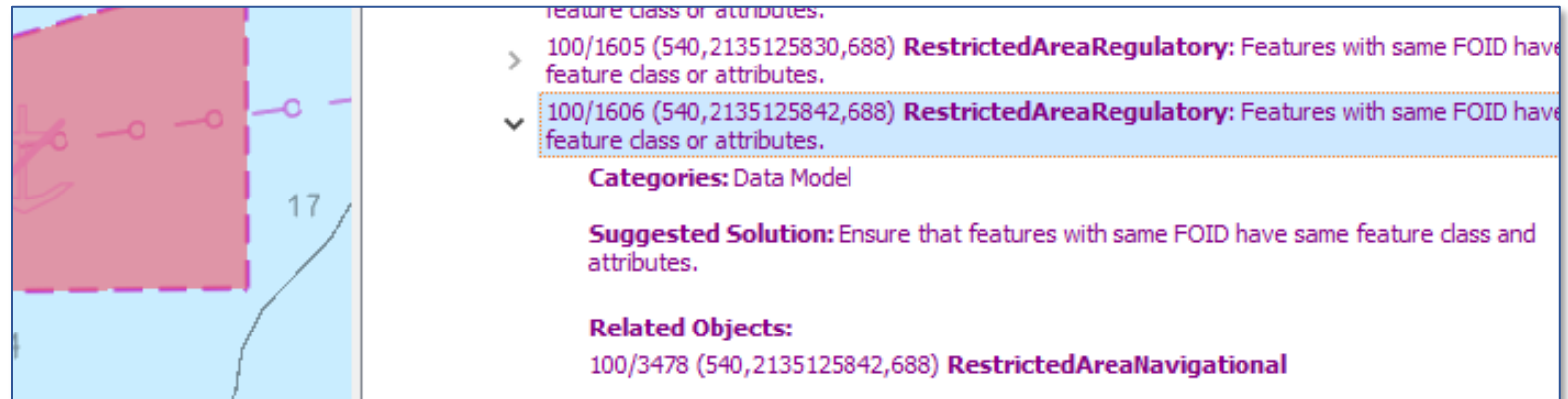
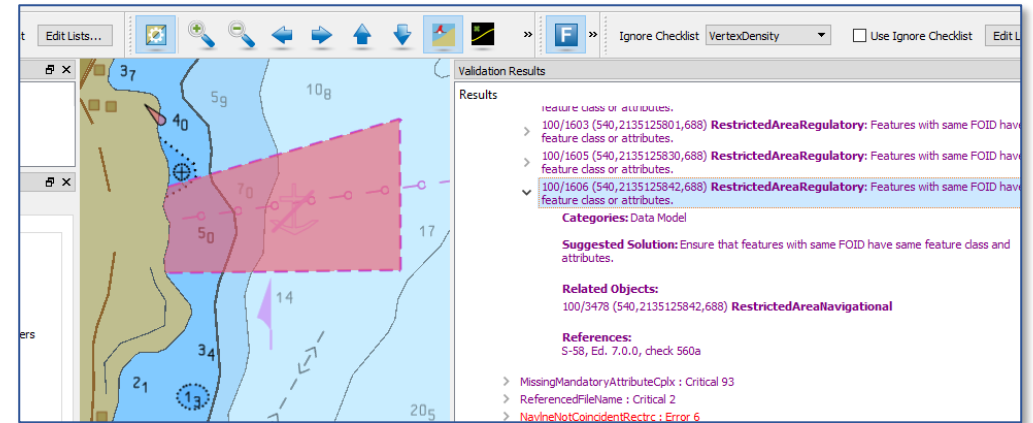
7Cs Analyzer Service API

- Release version has been completed
- Several trials have been set up to test the automation of the validation process
- Currently being integrated into SDMS (to support “silent validation”)



S-101 validation

- S-101 validation rules in progress (S-158)
- 7Cs Analyzer uses S-101 checks as far as they have been defined already
- very useful to assess status of conversion results
- and a huge amount of derived S-58 checks
 - iso checks
 - geometry
 - valid feature types
 - valid attributes, values



Thank You