6th HSSC Meeting
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Paper for Consideration by HSSC

Development of Web Enabled Spatial Database and Map Service to Support Management of S-11 Part B

Submitted by:	Republic of Korea (KHOA)
Executive Summary:	Introduce the progress on the development of web enabled spatial database and map service to support the management of S-11 Part B.
Related Documents:	S-11 Part B
Related Projects:	None

Introduction / Background

S-11 Part B - Catalogue of INT Charts is an MS Word document showing INT chart coverage in a diagram format and metadata in a table format. The publication is maintained by the IHB in liaison with all regional INT chart coordinators. Some of the shortcomings with the existing publication are as below:

- Metadata can only be made available in MS Word or PDF document format.
- Correlating information between the graphical maps (showing INT chart limits) and the metadata tables is not easy.
- Maintenance of the publication using the present production methods and document formats is time consuming.
- It is difficult to extract analytical information from the current publication.
- It is difficult to compare INT chart coverage limits with other types of spatial data such as ENC limits.

The IHB and ROK are working together for establishing a database and web system to support management of S-11 Part B and to service web enabled INT Chart Catalogue. This agenda item reports the progress on this initiative.

Analysis/Discussion

As shown in the diagram below, making a correlation between the tables and the graphics can be quite difficult and it is not possible to carry out any type of queries on the data. It is therefore proposed to transfer the contents of the MS Word tables into a spatially enabled database so that the limits (bounding boxes) of all INT charts can be loaded into a GIS system, or displayed as a Web Map Service. In order to achieve this, the metadata in the INT chart tables needs to be reorganised (modelled) so that the content is consistent with a normalised database structure.
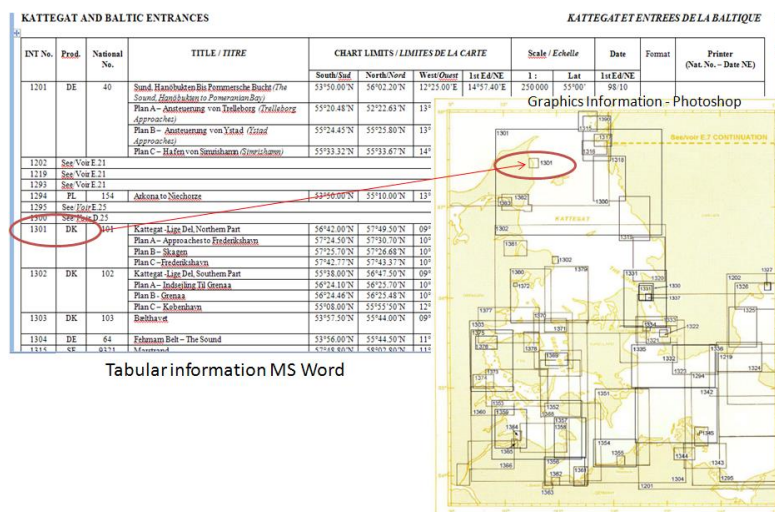

Fig. 1 Current Format of S-11 Part B

Many INT charts can have multiple chart plans and each of these plans will usually have a unique coverage area, and characteristics such as scale, title, limits, etc. This implies that a one-to-many relationship will be required between main INT chart metadata (e.g. number, producer nation, printer nation) and the chart plan metadata. This needs to be reflected in the database design. Those INT charts that do not have multiple plans will be considered as having a single plan.

Data normalization

Information about Chart Insets
Inset title, inset number, scale …

Stettin Lagoon
Scale 1: 20 000
50 30' N

Plan B

Oslofjord
Scale 1: 20 000
52 30' N

Information about the Main INT Chart
INT Number, Main chart title, producer, edition date …
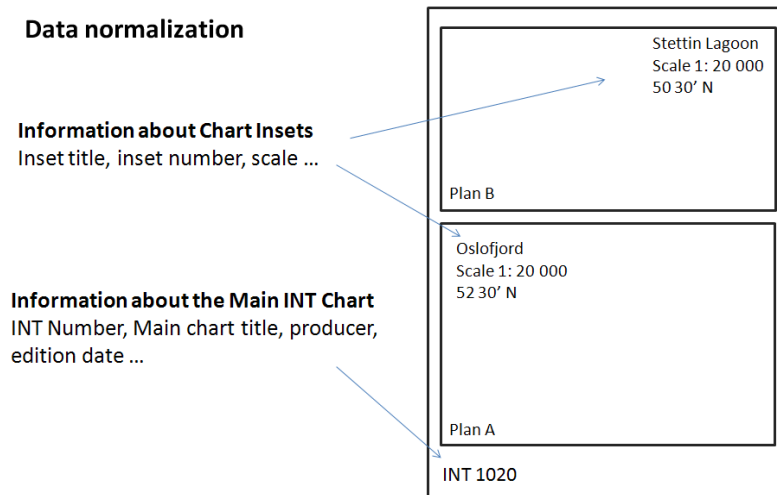
Plan A

INT 1020

Fig. 2 Normization of INT Chart Informaiton

Normalization of metadata contained in the tables was considered like Fig. 3 and Data model for exchange dataset between regional coordinator and IHB was drafted like Fig. 4.

<< Table >> ChartMain		<< Table >> ChartPanel
• INTChartID (PK)	(1..n)	• INTChartID (FK)
• ChartType		• PanelID
• INTChartNumber		• EngTitle
• NatChartNumber		• NatTitle1
• Status		• NatTitle2
• InclusionYear		• S_Limit
• PublicationYear		• N_Limit
• PublicationWeek		• W_Limit
• NewEditionWeek		• E_Limit
• NewEditionYear		• Projection
• FrameDimensions		• Scale
• INTArea		• ScaleLatitude
• Producing Status		• Scaleband
• RecordUpdateDate		
• Comment		

<< Table >> ProducerNation
• INTChartID (FK)
• Producers

(1..n)

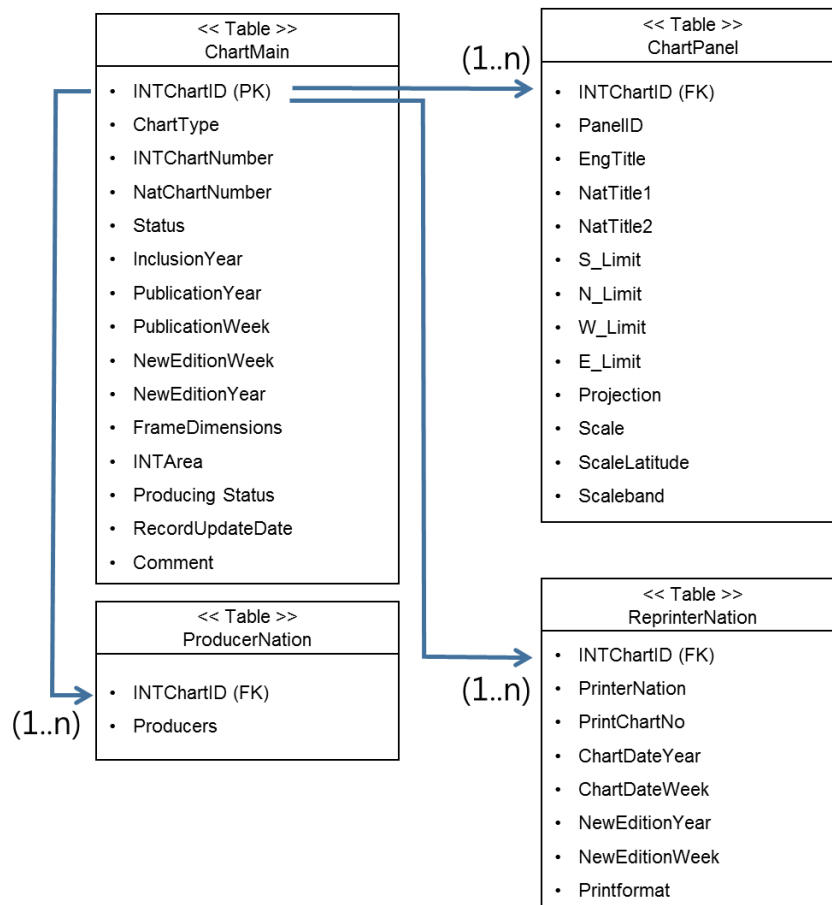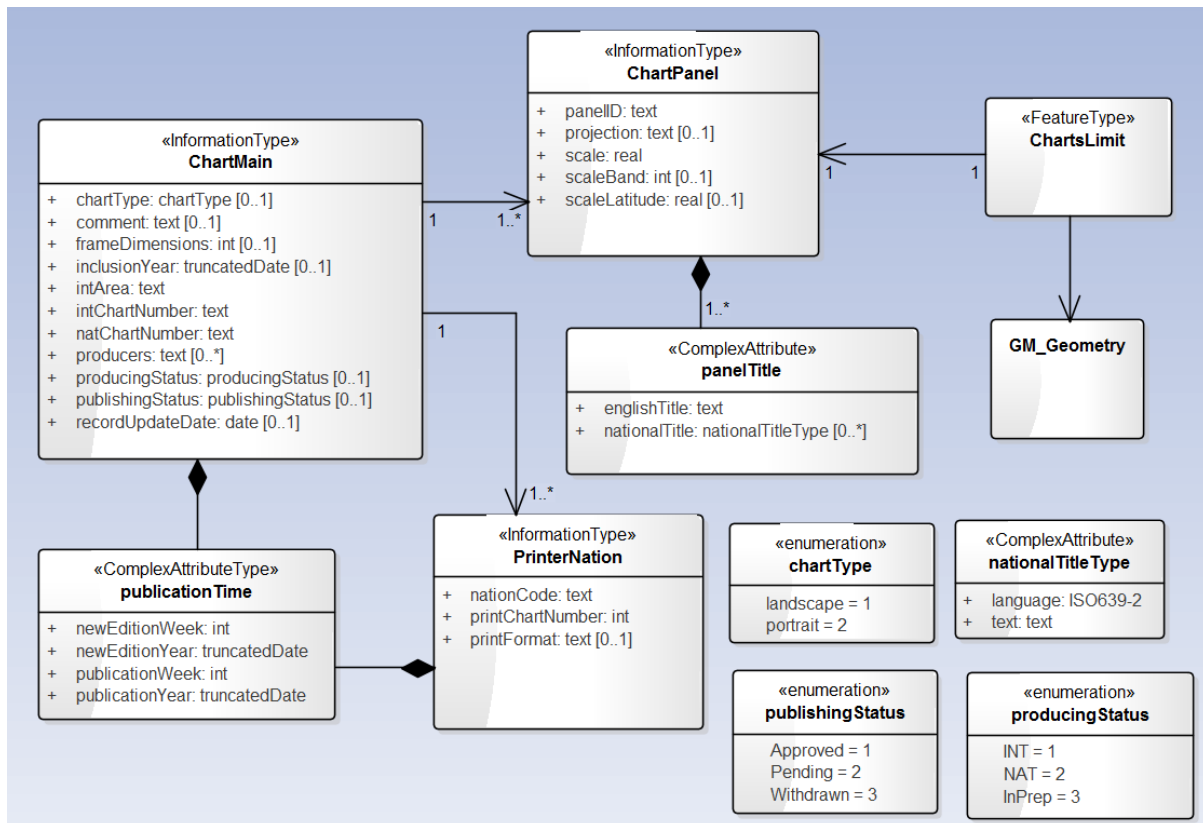| << Table >> ReprinterNation |
|---|
| • INTChartID (FK) |
| • PrinterNation |
| • PrintChartNo |
| • ChartDateYear |
| • ChartDateWeek |
| • NewEditionYear |
| • NewEditionWeek |
| • Printformat |

(1..n)

Fig. 3 Proposed INT Chart Model

Fig. 4 Data model for exchange dataset between regional coordinator and IHB

Regarding the INT chart model, there are some issues for consideration.
- What additional metadata fields should be included? – e.g. national title
- How should the data be organized? - grouped by INT Area or by scale band
- How should data be made available? – as datasets (e.g. GML), as web map services, or as a "database driven" web map server
- How will the data be maintained?
- What about polar coverage?

According to the proposed INT Chart Model, all of the INT chart information was compiled from S-11 Part B in a GIS format. The INT chart limits were produced by converting the coordinates from the document to geographicals and importing them into a GIS (.shp) format. There were many character encoding inconsistencies in S-11, which took a considerable amount of time. In the S-11 publication, there are some diagrams that show chart limits, for which there are no coordinates in the tables. Area C2 INT charts have very few INT chart limits and hence they are missing from the shape file. The missing information will need to be added later when the coordinates are available.

To establish web enabled spatial database and map service to support the management of S-11 Part B, some requirements have been identified:
- Virtual server running under Linux (CentOS or Ubuntu)
- Postgres with postgis extension for the spatial content as the database
- PHP, python or java as the building of forms
- Geoserver or Mapserver that the content can be generated from the postgres database as the web map service function

The GIS file on S-11 Part B was used to establish catalogue database and prototype of web map catalogue was developed like Fig. 5.
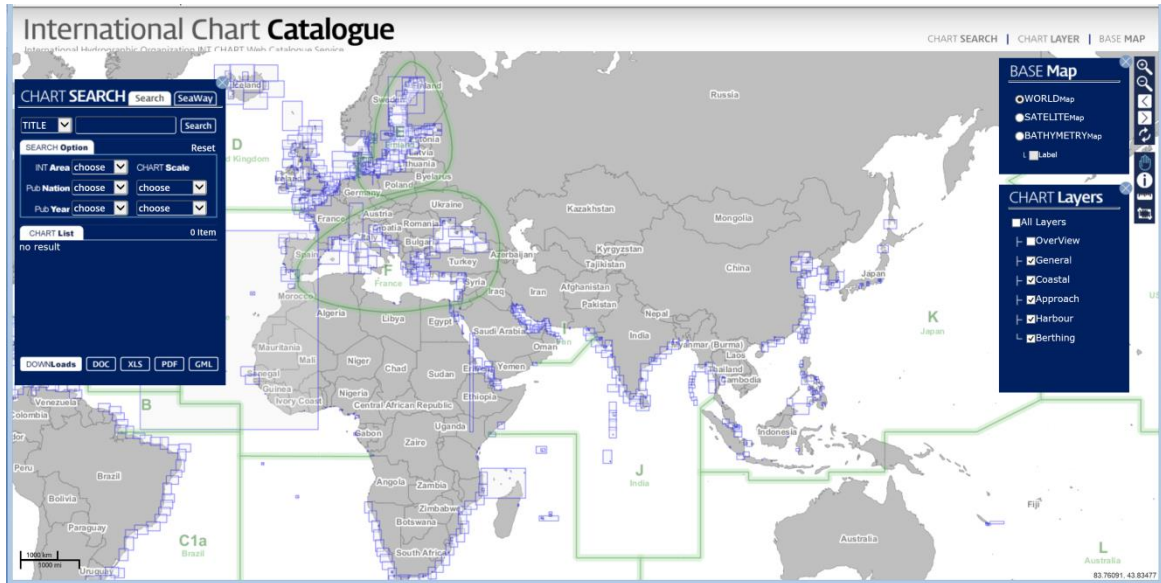
Fig. 5 Prototype of Web Map Catalogue on S-11 Part B

In this web map catalogue, it will be considered additionally to develop functions for adding the updated INT Chart information from the regional coordinator and downloading catalogue datasets on user selected area as exchange datasets. As the catalogue datasets for exchange can be designed based on the S-100 data model, a product specification on chart catalogue information could become a matter of discussion within the appropriate HSSC WGs in the future.

Action Required of HSSC

The HSSC is invited to:

a.   take note of this initiative; and

b.   provide recommendations on some issues for consideration regarding to the INT chart model.