

Topic Three: NOAA Precision Navigation Dissemination System

NOAA Precision Navigation Workshop Day 2

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Background and Context

NOAA Precision Navigation Dissemination System

- NOS/OCS will create a high-reliability, centralized, cloud-based acquisition and dissemination system to provide a seamless coverage of interoperable hydrographic & bathymetric information along with meteorological & oceanographic observations & forecasts for U.S. coastal waters by 2022/2023
- The dissemination system will make the data & information available in standardized formats including the IHO S-100 framework & other standards (e.g. Web APIs such as OGC protocols)
- An accompanying NOAA web site, *marinenavigation.noaa.gov* will provide information about NOAA's Precision Navigation products and how to access them



Vision and Desired Outcome

NOAA Precision Navigation Dissemination System

- The dissemination system will make it easier for ECS and PPU manufacturers and under-keel-clearance software companies to ingest/process/display NOAA's marine navigation data and information to enable precision navigation at major U.S. seaports.

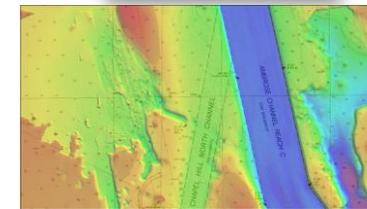
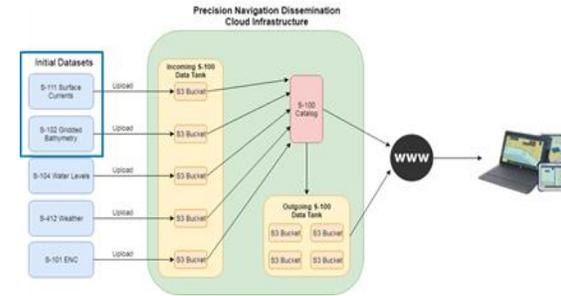


FY20 Milestones

- **Initial S-100 Product Suite by end FY20 Q2 (Mar. 2020) available on Prototype Precision Navigation Dissemination System:**

- S-111 Water Currents for several of the NOS operational oceanographic forecast modeling systems (OFS) and NWS/NCEP Global Real-Time Ocean Forecast System (GRTOFS)
- S-102 Gridded Bathymetry ('skin of the Earth', no features)
 - **New England Region**
- Prototype S-100 Exchange Catalog which includes metadata for S-111 dataset

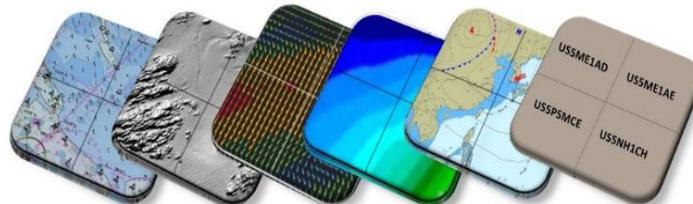
- **Marine Navigation Web Site (Ver. 0.5)**



FY21 Milestones

- **Disseminate additional S-100 Production Suite formats**
 - **S-412 Weather and Wave Hazards Overlay**

(From NWS/NCEP Ocean Prediction Center)



*Illustration of overlaying five S-100 Products:
S-101 ENC, S-102 Bathymetry, S-111 Water Currents,
S-412 Weather Overlays*

- **High-Definition Charts for Priority Ports**
- **Prototype cloud-hosted nowCOAST services***

* *Dependent on building out the PN/NC Dissemination Team*

FY22/23 Milestones*

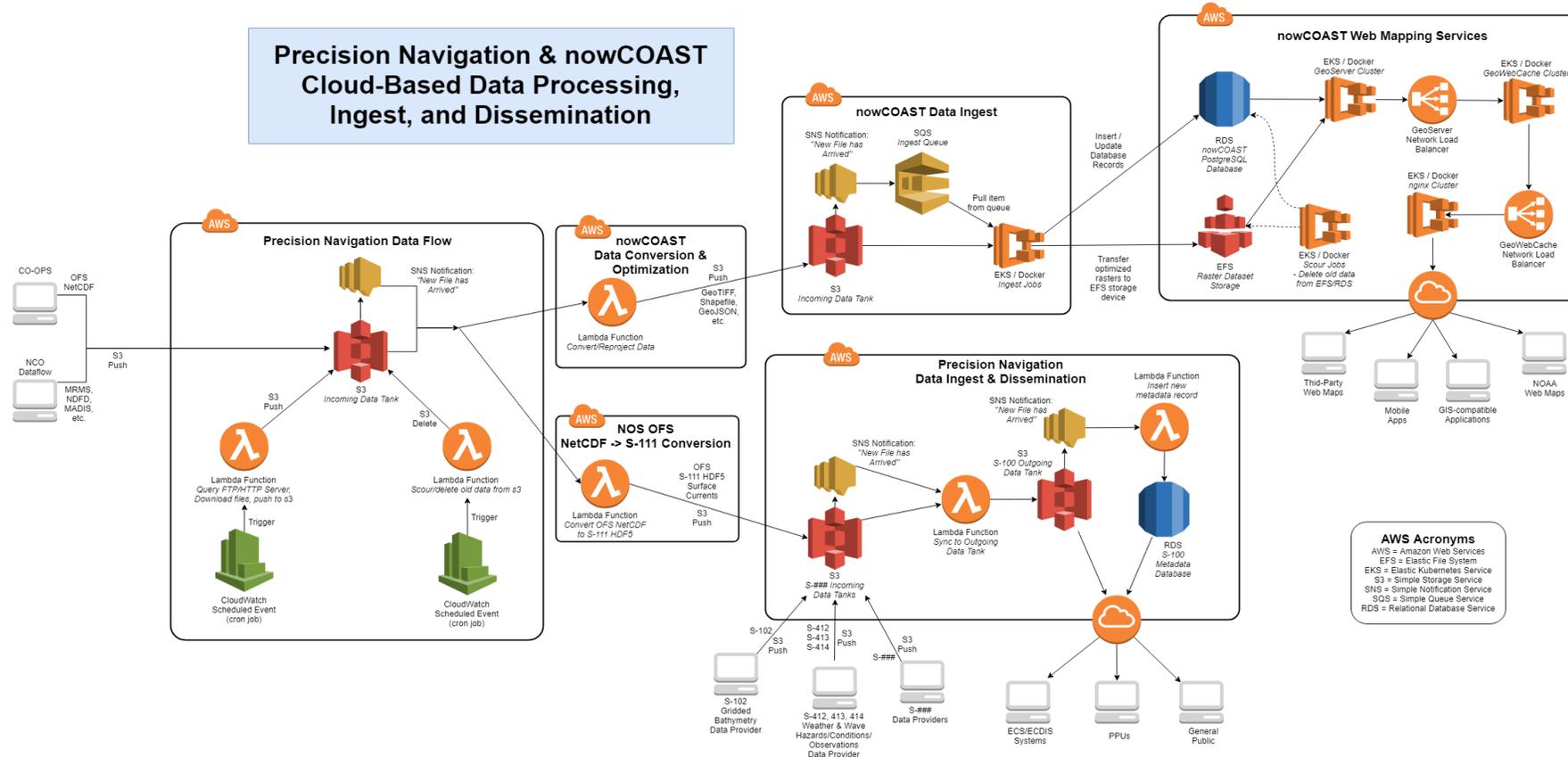
- **Precision Navigation Dissemination System becomes operationally-supported 24 x 7 *+**

... However, initial NOAA datasets, S-111 OFS forecast guidance and S-102 gridded bathymetry, will be available from prototype system after March 2020 for your testing

* *Dependent on building out the PN/NC Dissemination Team*
+ *Meets NOAA IT Security Requirements*



NOAA Precision Navigation Dissemination System

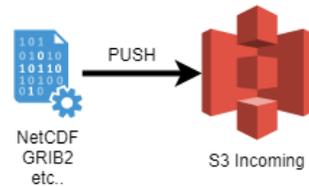


Acquisition → Processing → Ingest → Dissemination

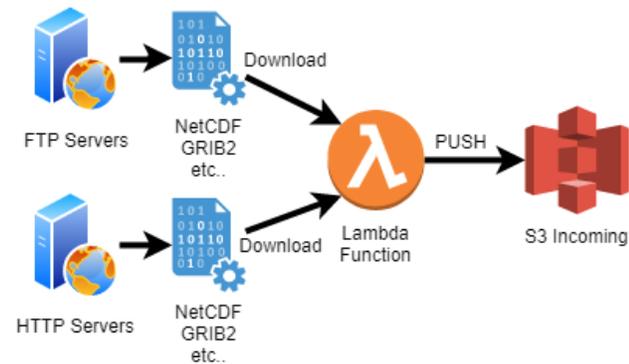
NOAA Precision Navigation Dissemination System

Data Acquisition

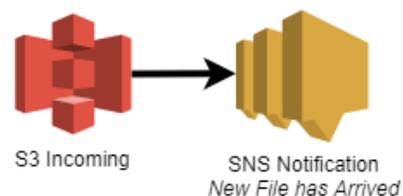
- Raw/native-format datasets pushed by data providers directly to S3



- Raw/native-format datasets pulled by PN from HTTP/FTP, stored in S3



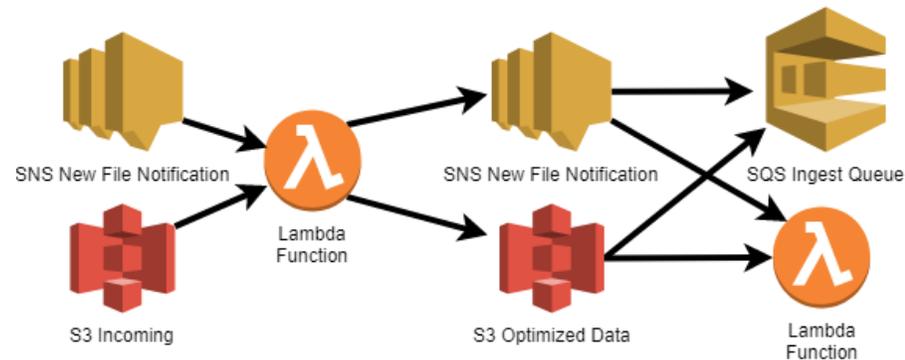
- Trigger file arrival notifications



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Data Processing

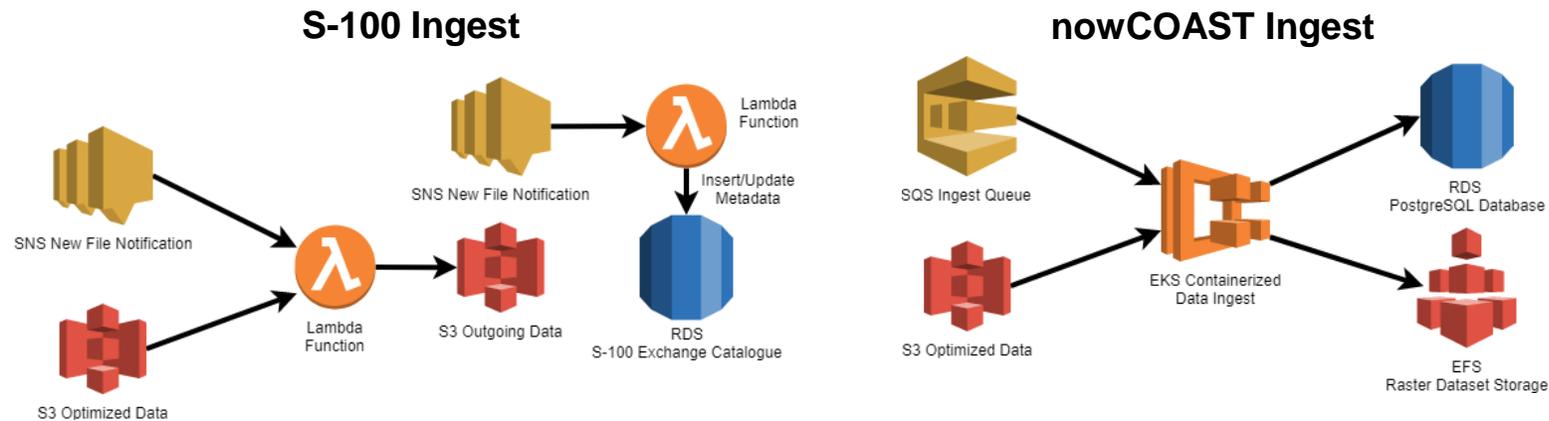
- **Event-based**
 - Processing triggered automatically by file arrival notifications
- **Transformation/Interpolation/Reprojection**
 - Model vertical datum → MLLW/MSL etc.
 - Sigma vertical coordinates → Depth-below-surface
 - Irregular/unstructured/curvilinear horizontal grid → Regular Grid
- **Conversion to optimized/interoperable formats**
 - NetCDF on native model grid → S-111/S-104 on Regular Grid
 - GRIB2, NetCDF, → Compressed/Tiled GeoTIFF
 - etc...
- **Populate ingest-ready queue and/or trigger ingest lambda**



NOAA Precision Navigation Dissemination System

Data Ingest

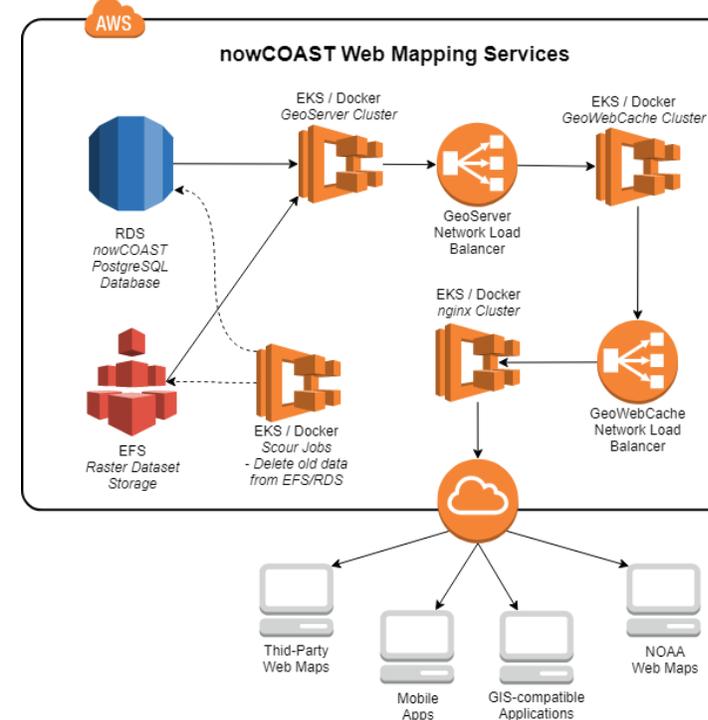
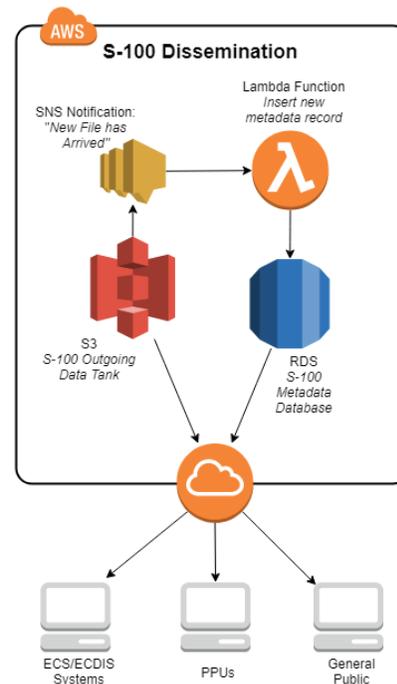
- Pull item from ingest-ready queue (if applicable)
- Insert/update metadata database/catalog records
- Store/process vector data within PostgreSQL/PostGIS (if applicable)
- Apply consistent/predictable file naming conventions
- Sync data to outgoing location, ready for dissemination



NOAA Precision Navigation Dissemination System

Data Dissemination

- Provide publicly-accessible endpoints
 - S-100 Exchange Catalog
 - Discovery Metadata
 - Dataset Metadata
 - Flat file access (HTTP/FTP)
 - Consistent file naming conventions/URIs
- Web Services
 - nowCOAST web services
 - OGC WMTS/WMS/WFS/WCS, MVT, etc.
 - REST API(s)



Breakout Group Questions

What methods make the most sense for you to discover and access data?

What are your format requirements/restrictions to easily and reliably utilize Precision Navigation data?

How would you prefer to contact NOAA when there are problems with the data delivery and dissemination system?

Breakout Session: 1:30 – 2:30 PM

Extra Slides

NOAA/NOS nowCOAST Web Mapping Portal

nowCOAST Web Mapping Services

Standards-compliant web service access
to raw data & visualizations

<https://nowcoast.noaa.gov>

Presently-supported web protocols:

- Open Geospatial Consortium (OGC) Web Map Service (WMS)
- GeoServices REST Map Services (ESRI ArcGIS Server REST)

Potential future supported protocols:

- OGC Web Map Tile Service (WMTS)
- OGC Web Feature Service (WFS)
- OGC Web Coverage Service (WCS)
- Mapbox Vector Tiles (MVT)
- Others as requested by users...

Presently-provided layers include:

- NOS Operational Forecast System (OFS) surface currents, temperature, salinity
- NWS Real-Time Ocean Forecast System (RTOFS)
- NOAA Weather & Ocean Observations
- NWS NDFD Gridded Forecasts
- NWS Watches, Warnings Advisories
- NHC Tropical Cyclone Track & Intensity Forecasts
- NCEP Real-Time Global Sea Surface Temp. Analysis
- NWS Real-Time Mesoscale Analysis (RTMA)
- NESDIS GOES Satellite Cloud Imagery
- Many more...



Weather Radar



Cloud Imagery



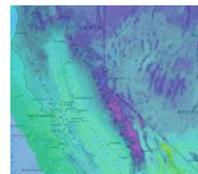
Rainfall Analyses



Outlooks



Watches/Warnings



Temp Forecast



Model Guidance