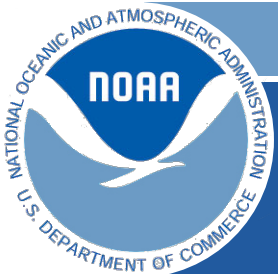




IOOS DMAC

The NOAA *OneStop* Data Discovery and Access Framework Project

Kenneth S. Casey, PhD
03 June 2016



Motivation and Scope

In response to the President's *Open Government Initiative* and related policies, NOAA has committed to providing improved public access to all of its environmental information, to enable research and commercial innovation through ease of data discovery and use

- **OneStop** supports NOAA's efforts by leveraging existing access technologies and infusing specific innovations to provide improved discovery, access, and visualization services for NOAA's data
- **OneStop** is viewed by a NESDIS as a pathfinder effort with an initial focus on selected high-priority datasets from NESDIS and other program data meeting *OneStop* standards, but eventually scalable across NOAA's data
- **OneStop** is implementing the USGEO Common Framework for Earth Observation Data and leveraging/supporting the NOAA Big Data Project (BDP) and Big Earth Data Initiative (BEDI)



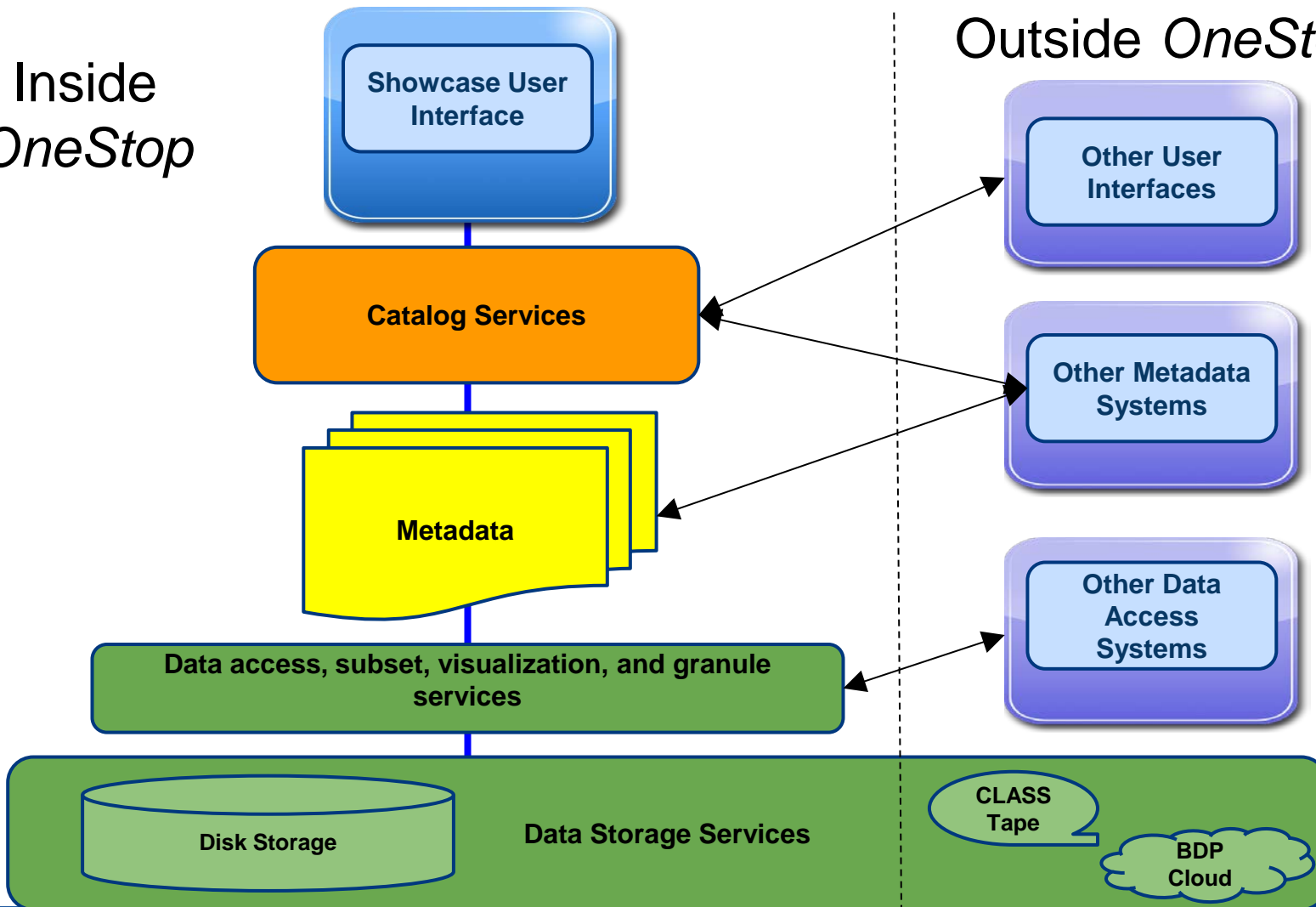
Architected for Success: Design, Architecture, and Storage ConOps



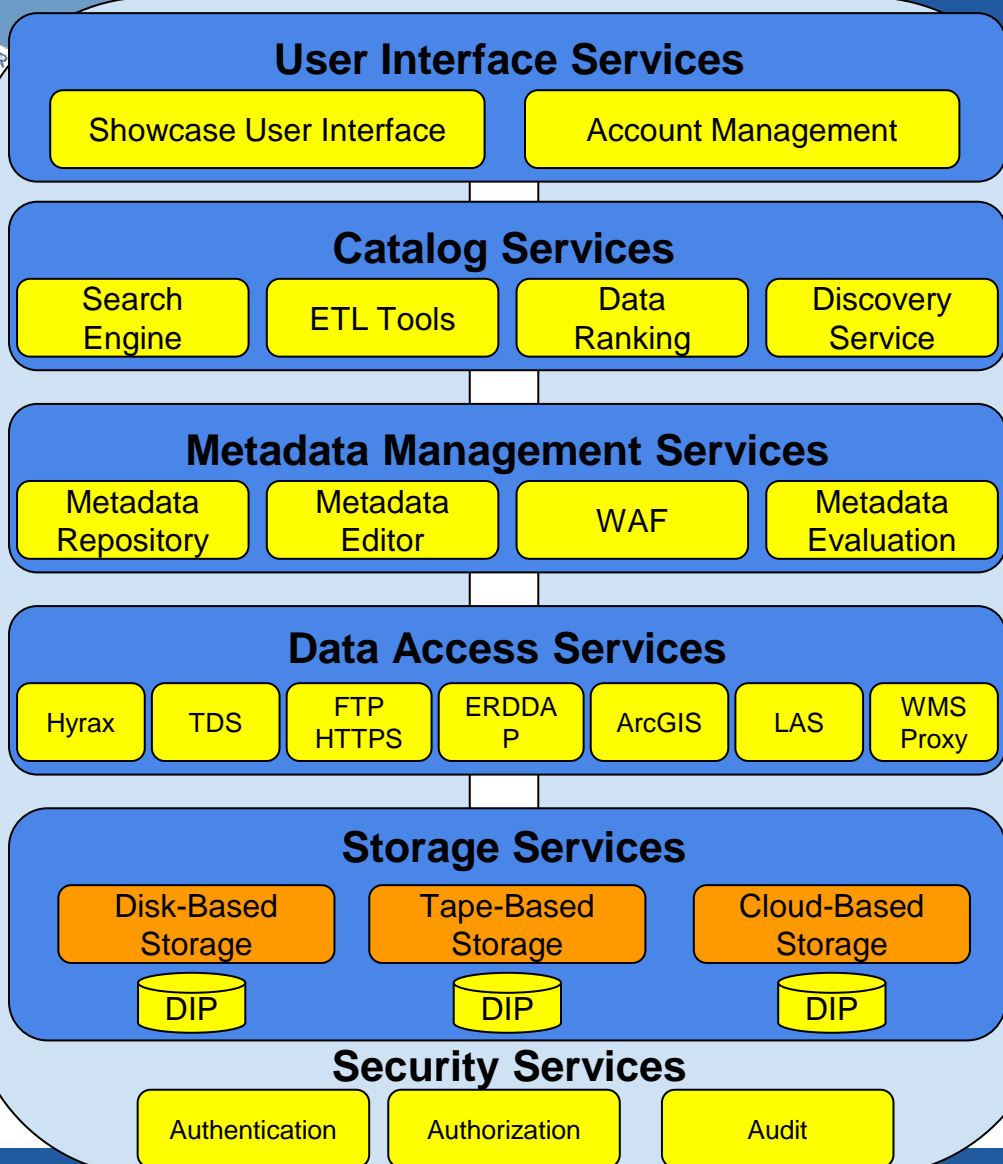
OneStop Data Framework^{30,000 ft}

Inside
OneStop

Outside *OneStop*



Design and Architecture^{10,000 ft}



- Build on foundation of existing, mature data standards and web services
- Emphasize not just interface, but the supporting data infrastructure
- User-centered, design focused

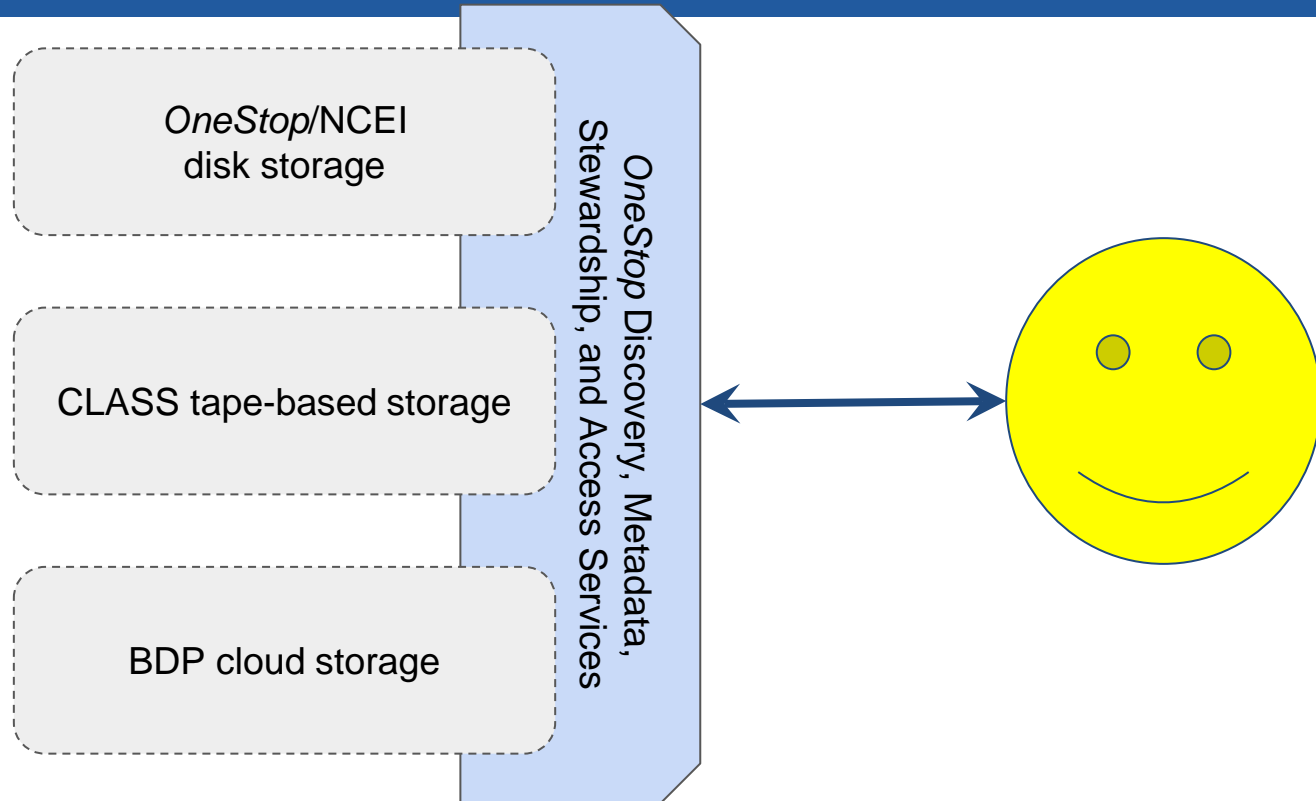
Design Principles

- Use existing enterprise capabilities when possible
- Rely on loose coupling of reusable system components
- Use standards at interfaces
- Use Open Source

DIP = Dissemination Information Package



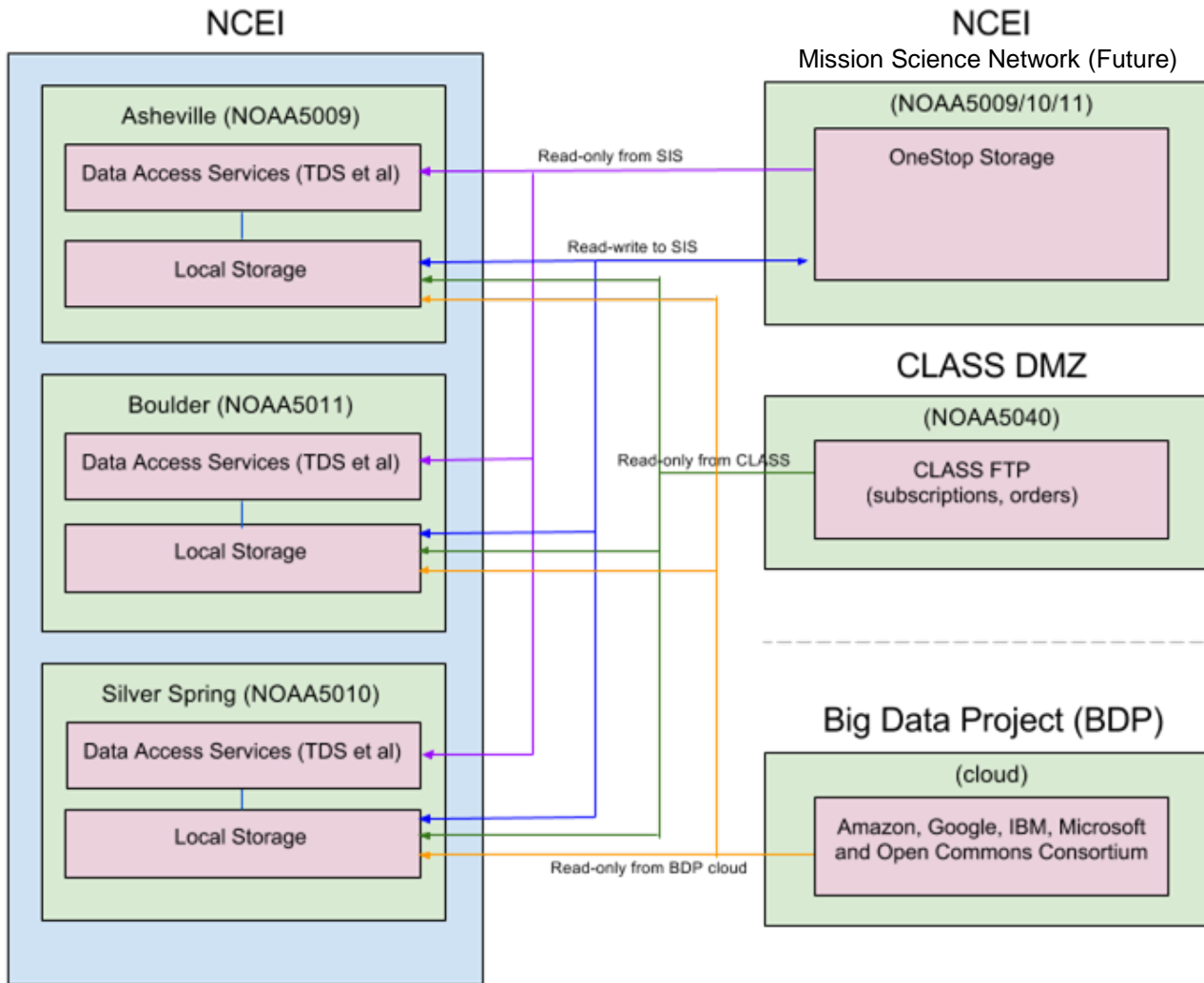
Storage Services Unified for Users



Unified access for the user regardless of storage medium
Any and all services for a given dataset provided to the user

Success Goal: 66% of users tested prefer new interface over old*
(metric to be vetted by professional external review team)

Storage Concept of Operations



Reflects [decision to place storage within NCEI 5009](#) system boundary.

Agreement between NCEI, OSGS, and OSPO to consider *OneStop* storage as the next step toward enterprise Storage Infrastructure Service (SIS) and as a step toward a key Mission Science Network (MSN) capability.



OneStop Featured Data Groups and *OneStop* “Readiness”



“OneStop Ready”

Readiness Metric	Requirement
ISO Compliant Collection-level Metadata	Every collection level record in the data group has an ISO compliant metadata record.
ISO Completeness Collection-level Rubric V2	Every collection level record in the data group shall have a completeness score of at least 90%.
OneStop Collection-level Readiness Rubric	Browse graphic, GCMD science keywords, ...
Standardized metadata exists for each granule or is embedded within each granule	ACDD and CF conventions for embedded metadata
Granule metadata contains <i>OneStop</i> -required content	See <i>OneStop</i> granule metadata specification
Machine Independent Data File Format	Each granule is formatted in a machine readable format, such as netCDF
Each granule is accessible via a URL	Minimally, direct download https/ftps but prefer interoperable services (USGEO Common Framework)
Data Stewardship Maturity Matrix (DSMM)	Assessment is complete and documented in collection-level metadata record
Product Maturity Matrix (PMM)	Optional. If PMM exists, then document results in collection level metadata



OneStop Featured Data Groupings

Data Group	Data Group SMEs	Number of Collections
<u>Group for High Resolution SST</u>	Korak Saha	81
<u>Digital Elevation Models</u>	Barry Eakins, Kelly Carignan	~ 241
<u>World Ocean Atlas 2013</u>	Tim Boyer	1
<u>Water Column Sonar Data</u>	Chuck Anderson, Carrie Wall-Bell	368
<u>S-NPP derived products (L2/EDR and NDE)</u>	Axel Graumann	75
<u>SAMOS QC'd Underway Ocean/Met Data</u>	Chris Paver	1 to N
<u>CO-OPS National Water Level Obs. Network and Physical Oceano. Real-Time System</u>	Tom Ryan	1 to N
<u>NEXRAD Level 2 and 3</u>	Steve Ansari	2
<u>OCS Hydrographic Survey data (L2 and some L1)</u>	Jason Baillio	17,763
<u>NOAA Climate Data Records</u>	Jesse Glance, Tom Zhao	32
<u>NDBC Coastal-Marine Automated Network (C-MAN) and moored weather buoys</u>	Tom Ryan	1 to N
<u>Reformatted Legacy GOES GVAR data</u>	Ken Knapp	2 to 10
<u>ESSA images</u>	Jason Cooper	1



“OneStop Ready” Status

[Click here for live status](#)

Data Group	Collection Metadata	Granule Metadata	Data Formats	Data Access	DSMM	PMM (optional)
Group for High Resolution SST	P	Y	Y	Y	P	
Digital Elevation Models	P		P	Y	P	
World Ocean Atlas 2013	P	N	Y	Y	N	
Water Column Sonar Data	P	P	N	N	N	
S-NPP derived products (L2/EDR and NDE)	P	N	P	N	P	
SAMOS QC'd Underway Ocean/Met Data	P	N	P	Y	N	
CO-OPS National Water Level Obs. Network and Physical Oceano. Real-Time System	P	N	Y	Y	N	
NEXRAD Level 2 and 3	P	N	N	P	N	
OCS Hydrographic Survey data (L2 and some L1)	P	N	P	Y	N	
NOAA Climate Data Records	P	N	Y	P	N	Y
NDBC Coastal-Marine Automated Network (C-MAN) and moored weather buoys	P	N	Y	Y	N	
Reformatted Legacy GOES GVAR data	N	N	N	N	N	
ESSA images	N	N	N	N	N	

Y = yes, ready; P = partially ready; N= not ready; grey = not yet assessed



User-Centered Development: Agile Epics and User Interface



OneStop Epics

As a	I want to	So that	Epic Story Detail
Role	some functionality	gain some value	
Stakeholder	See a thin vertical slice showing initial capabilities end-to-end	so that the software development team is confident in the design	Thin Slice
Developer	Review and refine architecture	so that the software development team is confident in the design	Architecture Refinement
Stakeholder	to view potential user interface options	so that we can present options to users. A public user's needs may differ from that of a scientist or economist.	UI Design
Developer	Provide a RESTful endpoints to allow distributed updates to the catalog index	so that the implementation supports a distributed geographic architecture	Catalog Index Service
Stakeholder	A high performance catalog index of NOAA datasets	so that there's a central location for quick searches of NOAA's data holdings	Load Catalog Index
Consumer	Save my search results, be notified of new datasets, rank datasets	so that I can participate in making NOAA data holdings more useful to myself and others	User Profiles
Consumer	Download datasets of interest	so that I can make value added products or perform custom analysis	Extract



OneStop “Thin Slice” Synopsis

Goals:

1. Become more familiar with *OneStop* datasets and metadata sources
2. Develop an initial capability that searches the NCEI-MD geoportal instance based on the REST API to locate candidate datasets.

Functionality:

- Develop basic search client Search client queries against existing NCEI-MD geoportal instance and local catalog index for initial search capabilities or OpenSearch or CSW (see reference section below)
 - See reference links below
- Display result sets
 - Parse out browse graphics from ISO or JSON to display in client

Success Criteria:

1. A web page is available that allows a text and date search capability
 - a. Must be visually appealing
2. Results for *OneStop* candidate datasets meeting search criteria are displayed

See: https://docs.google.com/document/d/1Wc0FRch04jhMqjVljsrxoKzICRpB1g_YzFBmTaJ64Y/edit for full epic. Est: 2 Sprints

Wire Frames: Intro Page

Drawing from <https://standards.usa.gov/> and other sources

Intro page

One-Stop

https://www.ncei.noaa.gov/onestop

NOAA OneStop

Tagline about searching data

What are you looking for? Time Space

Search by Topic

World Economy Climate Safety Weather Ocean Air Solar Space

Featured Datasets Popular Datasets

Protecting Your Privacy | Information Quality | Disclaimer | USA.gov

FOIA | EEO | Contact us | Ready.gov | Need help?

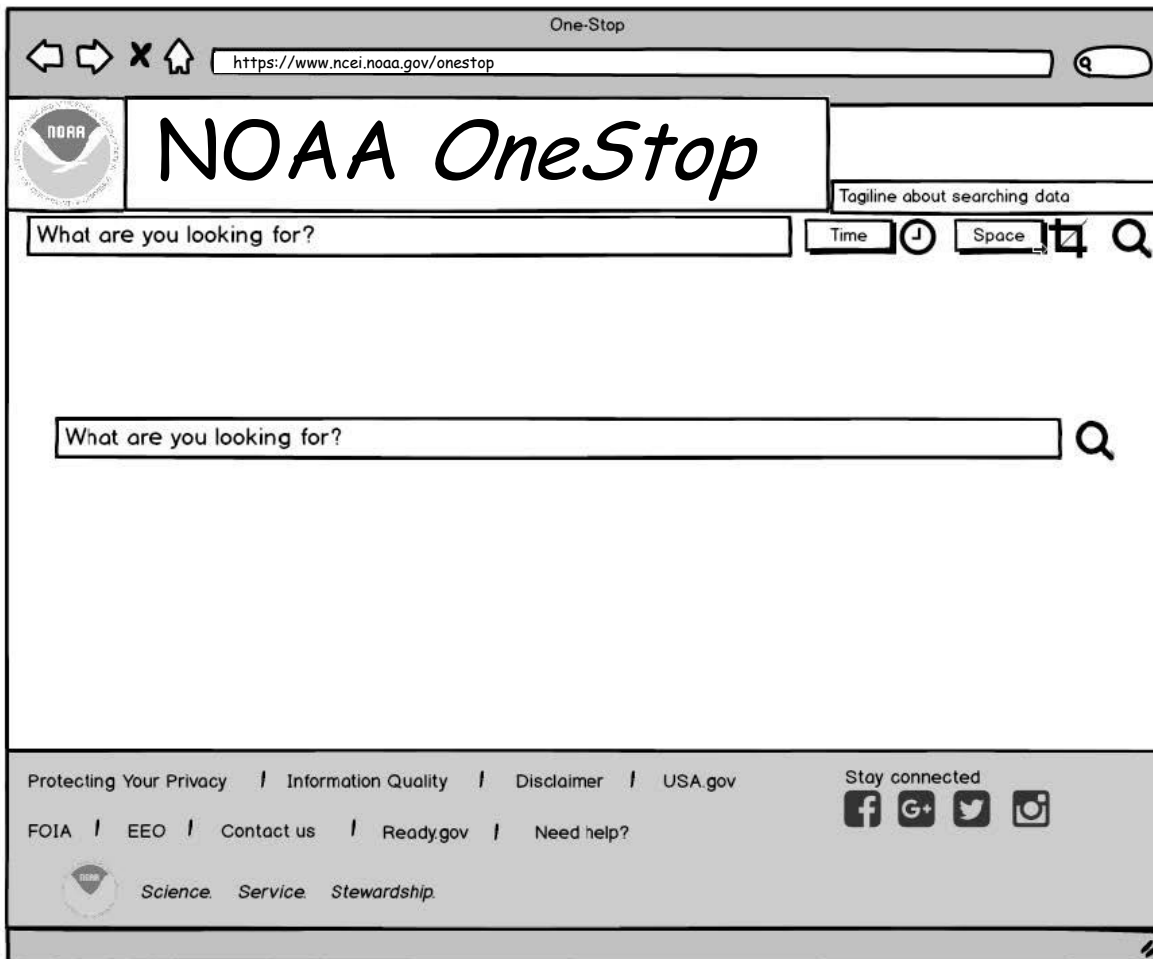
Stay connected

Science. Service. Stewardship.



Wire Frames: Simple Search

Intro page (Simple page)





Wire Frames: Grouped Results

Filter Bars page

The wireframe illustrates a search results page with the following components:

- Browser Bar:** Shows the URL `https://www.ncei.noaa.gov/onestop` and navigation icons.
- Header:** Includes the NOAA logo, the text "NOAA OneStop", and a tagline "Tagline about searching data".
- Search Bar:** A text input field with the placeholder "What are you looking for?", a search icon, and filter buttons for "Time" and "Space".
- Filter Bar:** A sidebar on the left with a "Refine by:" section containing expandable categories: Time Range (Daily, Monthly, Custom), Spatial, Instrument (Instrument 1, Instrument 2), Provider, Keywords, and Collections.
- Grouped Results:** Two main sections of results, each with a "Grouped by" header and a grid of four placeholder boxes (represented by squares with an 'X'). The first section is "Grouped by Instrument" and the second is "Grouped by Provider". Both sections have left and right navigation arrows.
- Footer:** Contains links for "Protecting Your Privacy", "Information Quality", "Disclaimer", and "USA.gov". It also includes social media icons for Facebook, Google+, Twitter, and Instagram, along with the text "Stay connected".
- Page-Footer:** At the bottom, it features the NOAA logo and the slogan "Science. Service. Stewardship."



Wire Frames: Icon Grid Results

Icon view

One-Stop

https://www.ncei.noaa.gov/onestop

NOAA OneStop

Tagline about searching data

What are you looking for? [Time] [Space] [Search]

Refine by: [X]

- Time Range
 - () Daily
 - () Monthly
 - ▶ Custom
- ▶ Spatial
- Instrument
 - Instrument 1
 - Instrument 2
- ▶ Provider
- ▶ Keywords
- ▶ Collections

Icons | Map | List | Apps

Sort By: Relevance

Title	Title	Title	Title	Title
Title	Title	Title	Title	Title

Protecting Your Privacy | Information Quality | Disclaimer | USA.gov

FOIA | EEO | Contact us | Ready.gov | Need help?

Stay connected

Science. Service. Stewardship.



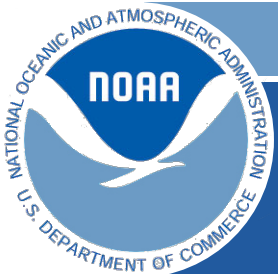
Wire Frames: Map Results

map view no filter bar

The wireframe illustrates the layout of the NOAA OneStop map results page. At the top, a browser window shows the URL <https://www.ncei.noaa.gov/onestop>. Below the browser is the NOAA logo and the title "NOAA OneStop". A search bar contains the text "What are you looking for?". To the right of the search bar are filters for "Time" and "Space". Below the search bar is a "Filters" section with buttons for "Icons", "Map", "List", and "Apps". The "Map" button is selected. The main content area is a map with three black location pins and a yellow bounding box. A "Refine by Bounding Box" button is located in the top right corner of the map area. At the bottom, there is a footer with links for "Protecting Your Privacy", "Information Quality", "Disclaimer", and "USA.gov". On the right side of the footer, there are social media icons for Facebook, Google+, Twitter, and Instagram, with the text "Stay connected" above them. The footer also includes "FOIA", "EEO", "Contact us", "Ready.gov", and "Need help?". At the very bottom, there is a NOAA logo and the text "Science. Service. Stewardship."



Ensuring Consistency and Rigor: Metadata Tool Development



Metadata Tool Assessments

- IT Tools and Services Team working with Metadata and Data Improvement Team, and other NCEI developers to assess metadata system in use today. Examples:
 - ATRAC
 - NCEI-MD Archive Management System (AMS)
 - Global Change Information System (GCIS)
 - Docucomp/CEdit
 - Geonetwork
- Examining feasibility of adopting/modifying existing metadata systems for use in *OneStop*
- More progress soon... developers on board in next week!



Ensuring Community Alignment: Map to USGEO Common Framework



USGEO Common Framework...

Discovery

Provide [CSW](#) and [OpenSearch](#)

Provide [Project Open Data](#) and [Schema.org](#) metadata

Mint [DOIs](#)

Publish WAF to [data.gov](#), expose via [OAI-PMH](#)

Use Resolvable Identifiers (e.g., ORCID)

Access

All: [HTTPS/FTP](#)

Grids: [WMS](#), [WMTS](#), [DAP](#), [WCS](#)

Unstructured Grids: [UGRID](#)

In Situ: [SOS](#), [WFS](#), [DAP](#)

Features: [WFS](#)

Tables: [TableDAP](#)

Documentation

ISO [19115-1](#) and [-3](#) preferred

ISO 19115-2 accepted

[ISO 19157](#) for Data Quality

[SensorML](#) for Instruments

Dynamic conversion of ISO to Project Open Data JSON

Formats

Numerical: [netCDF4/HDF5](#)

Imagery: [GeoTIFF](#)

Points/Lines/ Polygons: [GML](#)

Hydrological: [WaterML2.0](#)

Weather: [WXXM](#)

Vocabularies

Spatial Reference System: [EPSG Geodetic P.D.](#)

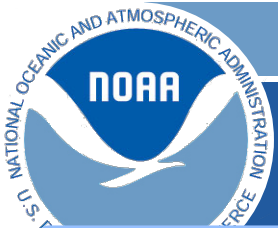
Hydrologic: [WBD](#)

Keywords: [OMB Circular A-16](#) GCMD

Parameter Names: [CF](#)

Content Models: [US GIN](#) [Darwin Core](#) [NEPAnode](#)

This map was generated by Kenneth S. Casey, based on the USGEO [Common Framework for Earth Observation Data \(2016\)](#).



...OneStop Currently Addressing

Discovery

Provide [CSW](#) and [OpenSearch](#)

Provide [Project Open Data](#) and [Schema.org](#) metadata

Mint [DOIs](#)

Publish WAF to [data.gov](#), expose via [OAI-PMH](#)

Use Resolvable Identifiers (e.g., ORCID)

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Vocabularies

Spatial Reference System: [EPSG Geodetic P.D.](#)

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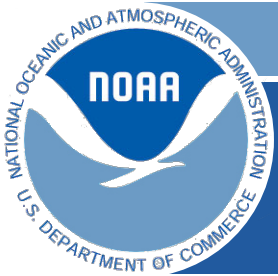
Parameter Names: [CF](#)

Content Models: [US GIN](#) [Darwin Core](#) [NEPAnode](#)

OneStop Currently Addresses

OneStop Partly Addresses

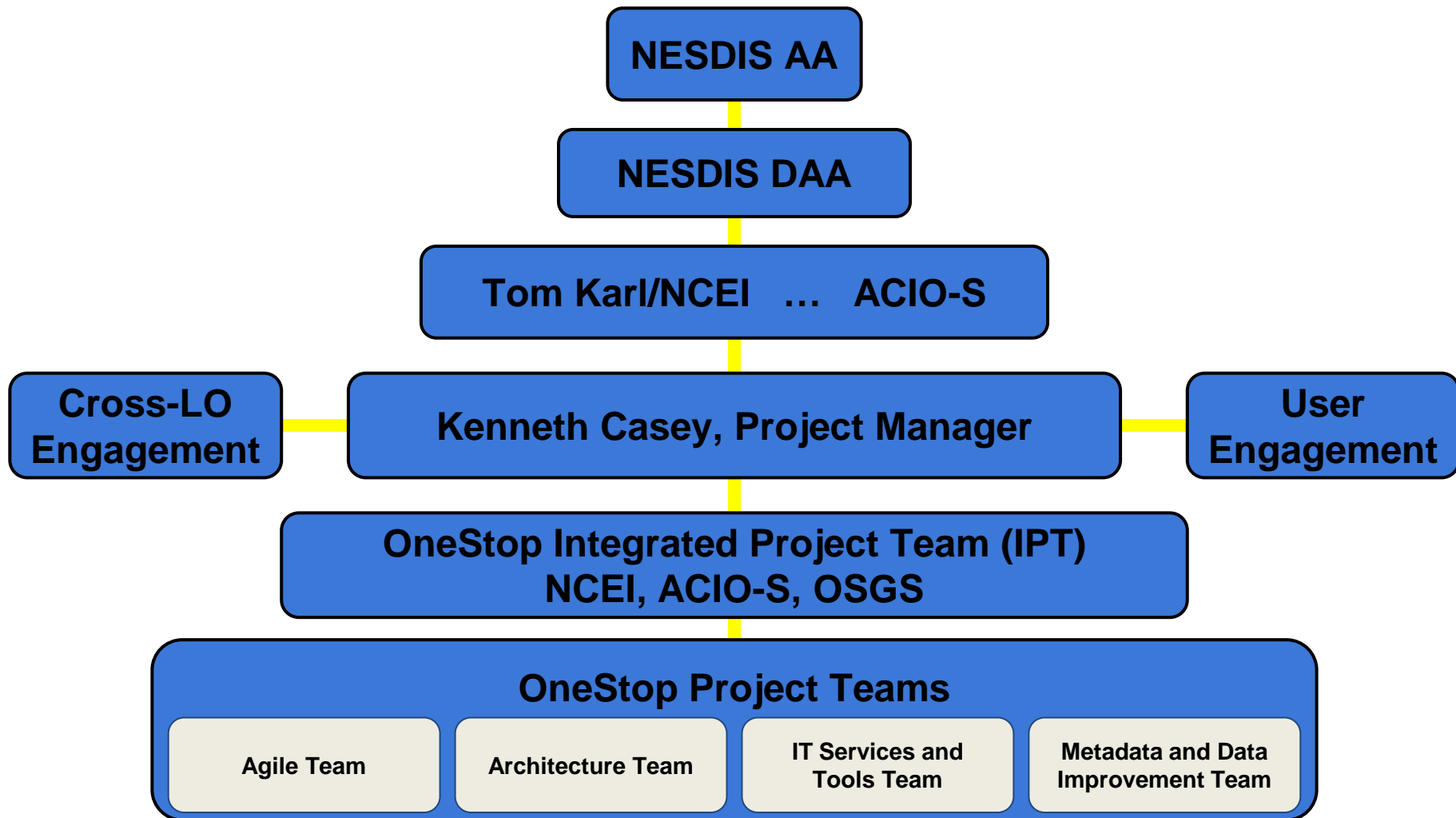
OneStop Not Addressing



Organized for Success: Project Organization, Personnel, and Schedule

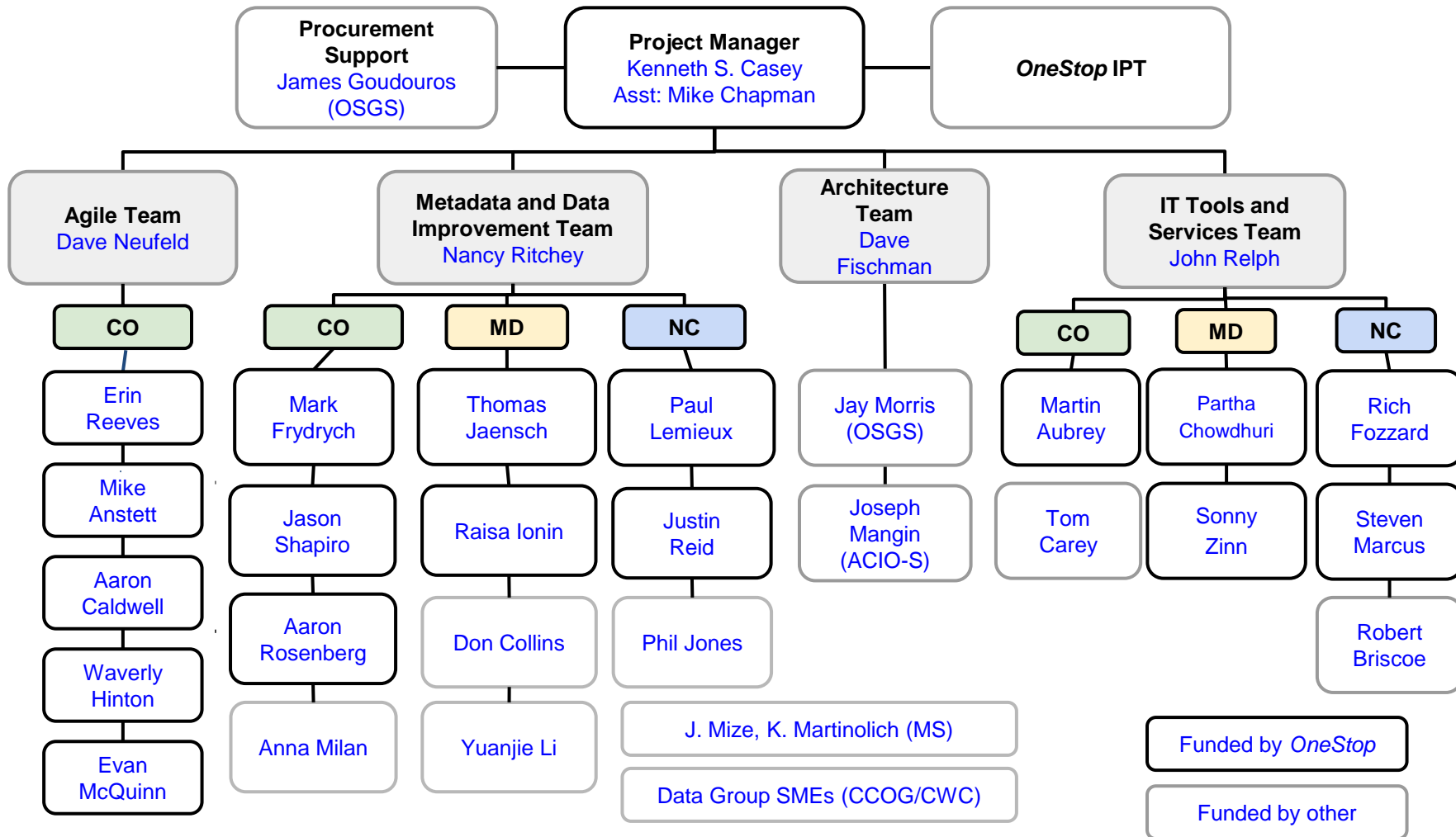


Project Organization





Organization Chart (for positions > 10% FTE)



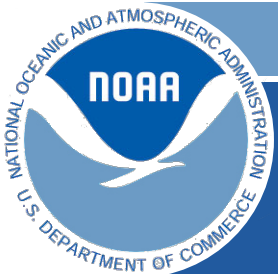


OneStop Schedule

(top level with selected milestones shown)

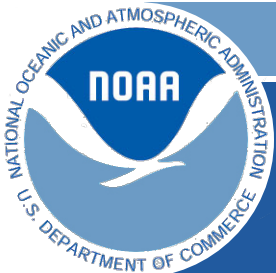
[link to full schedule](#)

Task Name	Days	Start	Finish	Progress
1.0 Architecture	60	Thu 10/1/15	Fri 12/24/16	
Design and Architecture Document			Thu 12/17/16	100%
2.0 Identify Web Services	59	Thu 10/1/15	Wed 12/23/15	100%
3.0 Data/Metadata Best Practices	59	Thu 10/1/15	Wed 12/23/15	100%
4.0 Storage/IT Support	184	Wed 11/18/15	Fri 8/19/16	63%
Storage ConOps			Tue 5/24/2016	100%
5.0 Development Team Setup	123	Thu 10/1/15	Thu 4/28/16	100%
6.0 Develop Beta Version	164	Mon 4/7/16	Tue 12/6/16	14%
Release Beta			Wed 12/7/16	
7.0 Internal Evaluation Report	26	Wed 12/7/17	Tue 1/17/17	0%
8.0 Develop Release 1.0	53	Tue 1/17/17	Fri 3/31/17	0%
Release 1.0			Mon 4/3/17	
9.0 Professional Usability Study	20	Mon 4/3/17	Fri 4/28/17	0%
10.0 Develop Release 1.1	64	Mon 4/3/17	Fri 6/30/17	0%
Release 1.1			Mon 7/3/17	
11.0 Data and Metadata Improvement	325	Tue 12/15/15	Wed 3/31/17	15%
2 data groupings			Thu 6/30/16	75%
5 data groupings			Fri 9/30/2016	0%
10 data groupings			Wed 3/31/17	0%
12.0 Relevance Ranking Improvement	265	Fri 2/5/16	Wed 3/15/17	5%
13.0 Metadata Management System	378	Tue 12/15/15	Wed 6/15/17	0%
14.0 WMS Proxy	336	Fri 2/5/16	Wed 6/15/17	4%



Summary: Accomplishments to Date

- [OneStop Design and Architecture Document](#) and review
- GEARS Enterprise Architecture Team concurrence
- IRMAC Procurement [Request](#) and [Approval](#), storage location selected (after extensive cross-NESDIS discussion)
- [OneStop Storage ConOps](#) (v1.1 signed by NCEI/OSGS)
- Data Format Best Practice: [NCEI netCDF Templates v2](#)
- Metadata Content Guide: [Version 0.5](#)
- [Datasets](#) selected, improvements [tracked and monitored](#)
- Hired ERT, GST, and CIRES team members
- Engaged community through [Communications Plan](#)
- Detailed [Project Management Plan](#)
- [Agile Epics](#) leading to user stories and requirements
- Initial user interface wireframes developed
- USGEO [Common Framework map](#)



OneStop

Questions?