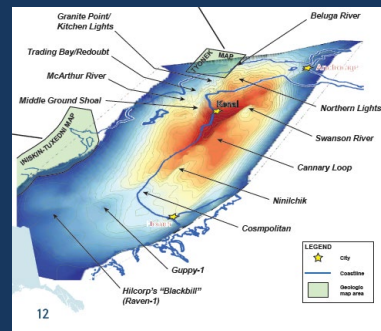
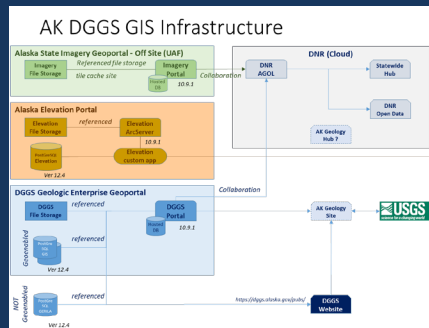
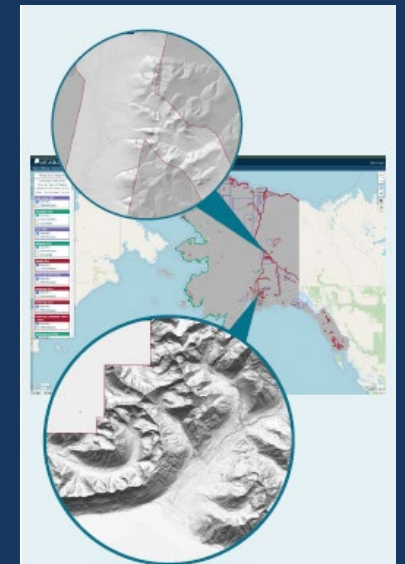
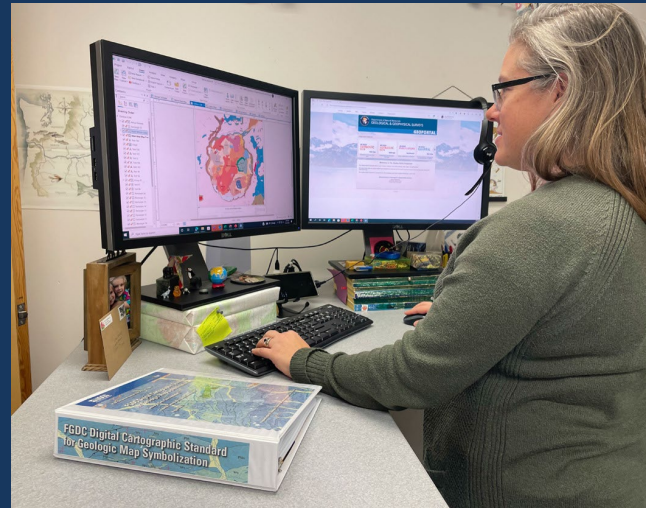
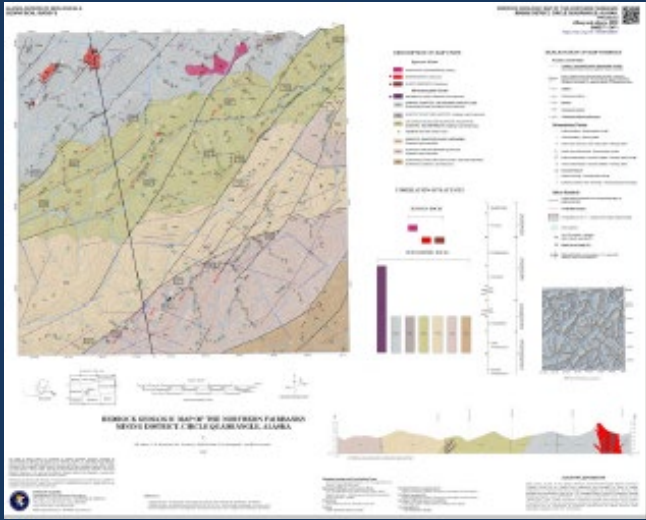


GIS at DGGS

Alaska Arc Users Group
16 Aug 2023 Meeting

Mike Hendricks



Agenda

- People and the Organization
- GIS Education at DGGS
- DGGS Geoportal Architecture
- Alaska Geologic Mapping System
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 - Field Portal
 - Multimap Database Architecture
- Select Web App Demos
- AK DGGS GIS Projects Goals – 2023/2024

DGGS is a heavy user of GIS

GIS at DGGS

Bi-weekly
GIS Coordination
Meeting

GIO
Leslie Jones

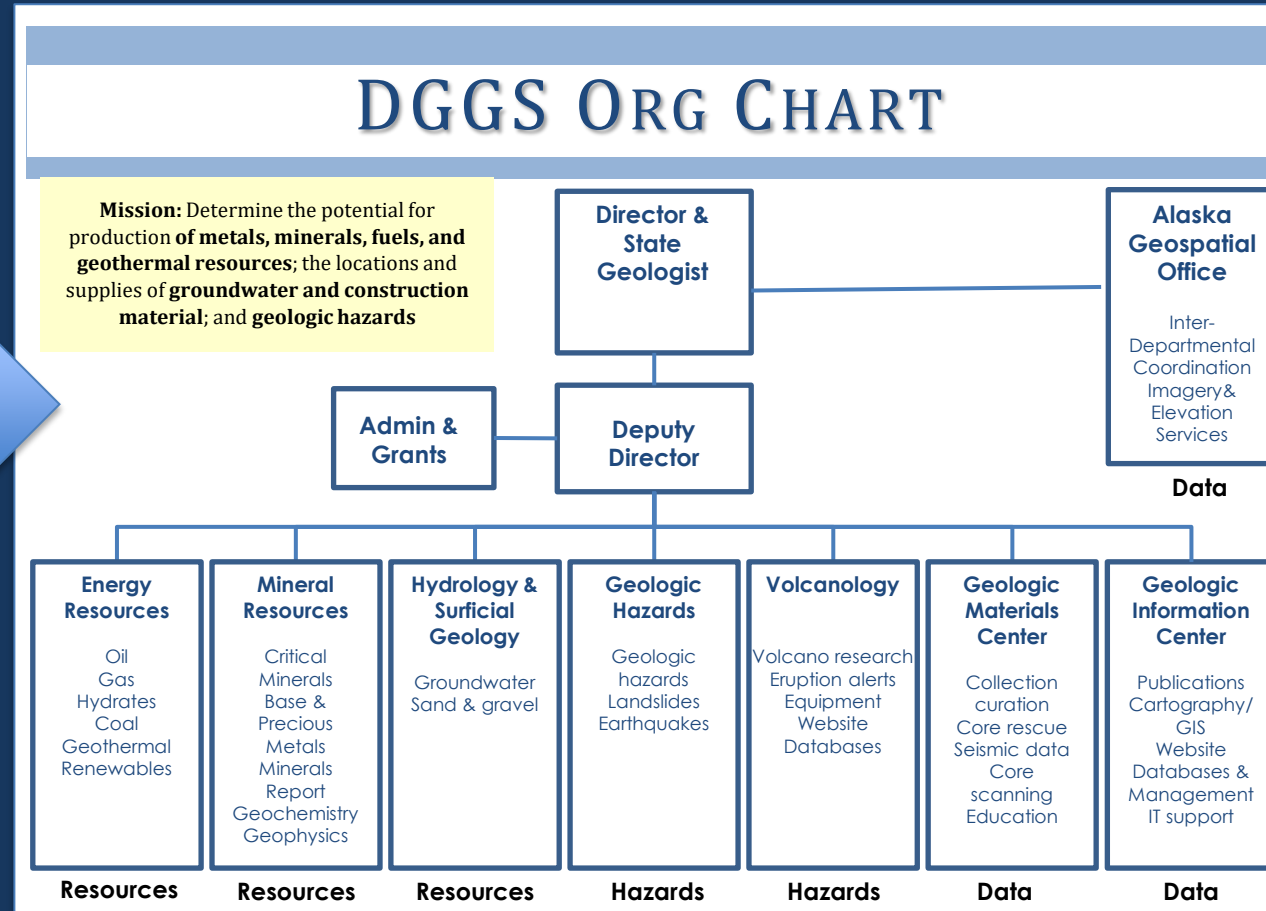
GIS Analyst 3
State Imagery & Elevation
Vacant

GIS Analyst 4
GIC Chief & Geologic Mapping
Mike Hendricks

GIS Analyst 3
Cartographer & Portal Admin
Amy Macpherson

GIS Analyst 3
GeMS Multimap DB
Pedro Rivera

GIS Analyst 2
GeMS QA/QC
Ally Steinleitner – Sep 2023



GIS Analyst 2
Lidar/Elevation
Jenna Zechmann

GIS Analyst 2
Coastal Data
KC Horen

~75% Have ArcPro Installed
~50% Regular Users
~25% Power Users

Many people at DGGS,
even though not
identified as GIS
Analysts



are
advanced users and
use GIS daily for data
collection, creation,
storage, and
distribution.



Michael Hendricks
GIC Section Chief
GIS Analyst IV



Chris Ramey
Data Processing Manager I



Kristen Janssen
Pub Specialist II



Oralee Nudson
Systems Programmer II



Simone Montayne
Geologist III



Thomas Cerny
Microcomputer/Network
Tech II



Sue Seitz
Analyst/Prog IV



Tommy Folan
Analyst/Programmer III



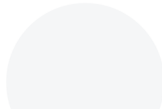
Amy MacPherson
GIS Analyst III



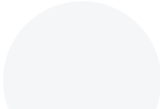
Hugh Winston
Analyst/Programmer IV/III



Pedro Rivera
GIS Analyst III



College Intern



GIS Analyst II

• Publication Support

- Ensuring our publication database is up to date
- Our web site provides easy access to the Division's vast array of geologic information
- All published data includes robust metadata
- Field and safety equipment is properly maintained and distributed to field crews
- Running the Publications Workflow and approval process
- Managing DGGS's public outreach efforts
- Providing illustration support for publications

• GIS Support

- GIS & cartographic technical support and information dissemination
- GIS training and support that includes weekly GIS Tips and Tricks classes
- GIS administration of the Division's geoportals
- Geoportal web app development
- Technical support for AK GeMS single map and multi-map development and production
- Quality Assurance/Quality Control for AK GeMS production
- Technical Assistance with Alaska elevation and imagery data storage and distribution

• IT Support

- Maintaining fast and reliable network capability
- Server design, operation, maintenance, and monitoring
- Database development and maintenance
- Software development, maintenance, and support
- Backup and disaster recovery planning
- New hardware and software support and documentation
- Desktop computer and printer support
- Coordinating with State of Alaska Office of Information Technology

EMBEDDED AND INTEGRATED SUPPORT CRITICAL

The GIC successfully supports the state's geologists, scientists, engineers, and decision makers with effective, timely, and low-cost solutions to complex problems.

This is only possible by having our team of highly skilled professionals Embedded and Integrated in the division.

This allows GIC staff to:

- work closely and directly with domain experts
- rapidly respond to issues
- develop cost effective storage and processing solutions that support the division and many others throughout the state.



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GIS Education at DGGS

Providing training and assistance is a top priority

- **GIS Tips and Tricks** – Weekly sharing of GIS knowledge has been going on for over 5 years (online for 2+)
 - Thursdays at 11 am
 - Sometimes geologically focused but often not, so DGGS “outsiders” welcome
- ESRI Training over the past two years used by 24 DGSS employees, *~1/3 of DGGS!*

Learning Formats

• Attendance at ESRI UC & Dev Conference	Instructor-Led	25
	MOOC	7
	Web Course	50
	Tutorial	1
	Document	11
	Video	22
	Training Seminar	4

GIS Tips & Tricks 2022 Topics

- ArcPro Templates, and Advanced Data Design - Attribute Rules, Contingence Values
- Data Quality Assurance(QA)/Quality Control (QC)
- ArcPro Basics - A Refresher
- ArcPro Basics - Attribute Tables
- ArcPro Basics - Editing
- ArcPro Basics - Queries
- ArcPro Basics - Vector Analysis
- ArcPro Basics - Raster Data
- ArcPro Basics - Raster Analysis
- ArcPro Basics - Cartography
- Sharing/ publishing Data
- ArcPro Basics - Tagging Services to share your data
- Field Maps - Minerals Demo
- Field collection - Basemaps, Raster Tile Packages, Vector Tile Packages, etc.
- Mobile Field collection. Demos & sharing
- Experience Builder
- Illustrator Tips with Kristen
- Esri Virtual UC
- ESRI UC Lessons Learned
- Packaging and Sharing Data
- 3D Visualization in ArcPro and Portal
- Arcade in ArcGIS - Customizing popups, labels, and visualization
- Elevation Data Processing at DGGs
- Dashboards Demos
- ArcPro Editing Basics
- ArcPro Feature Templates
- ArcPro Advanced Editing
- Cartography Guest Lecture - Terry Slocum
- AK GeMS Overview
- Efficiently creating Map Unit Polygons from Points and Lines
- Building and using the new Geophysics Data App
- Emergency Response, Coastal GIS Talk
- Dos and Don't of working with Elevation Data
- GIS Day
- Christmas and GIS
- Using the Geophysics Imager Service in ArcPro

GIS Tips & Tricks 2023 Topics

- Georeferencing Raster and Vector Data
- Sharing GIS Data
- Downloading Historic Single Frame Imagery from USGS Earth Explorer and Georeferencing in ArcPro
- Hosted Feature Data, editing, views, backing up, etc.
- Field Data Collection 1 - Collection Basics
- Field Data Collection 2 - Taking GIS Offline Topics. Checking out Pro, Creating tile Caches to sideload, etc.
- Field Data Collection 3 - Smart Forms, and Markup Layers
- Field Data Collection 4 - Smart Forms, and Markup Layers
- NAD27 vs NAD83 Quad Boundary Implications
- Automatic Notifications with Portal Survey 123
- Data Feeds (Live Data) in Web Maps: Inreach trackers, weather, etc.
- Digitizing and Geoprocessing Dangers related to Coordinate Systems
- Model Builder Basics and Tool Demos
- Illustrator Tips and Tricks
- Viewing the MultiMap GeMS Geologic Map Data
- Ten Years of GIS, Andrew Herbst Thoughts
- ESRI UC highlights
- ArcGIS Pro 3.1. Mixed Bag of Tips and Tricks
- **Many Planned for the remaining of the year**

Leveraging ESRI Support and Advantage Program

Past Advantage Program Activities

- GIS Architecture Review
- Data Reviewer QA/QC
- Advanced Imagery Services
- Widget Development

Upcoming

- Data Reviewer QA/QC
- Geologic Map Workflows (Tasks)

Some Support Tickets

- Enterprise Database Speeds
- Tiled map Service no longer running in AGOL new Map Viewer
- Hosted Layers not working
- Layers Generating large .ldmp files
- 10.9.1 enterprise upgrade failed attempt
- Large Tile Package object and files are on the server but not visible in portal or ArcServer
- Others

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AK DGGS Enterprise Geoportals

Our geoportal's allow users to share, discover, and access geologic data, maps, and interactive applications and are part of the State of Alaska Spatial Data Infrastructure.

- **DGGS Enterprise Geoportal**

<https://geoportal.dggs.dnr.alaska.gov/portal/home/>

- Our primary geologic geoportal

- **DGGS Enterprise Field Portals**

- Supports long term multi-user field GIS data collection in areas without internet access

- **Alaska Elevation Portal**

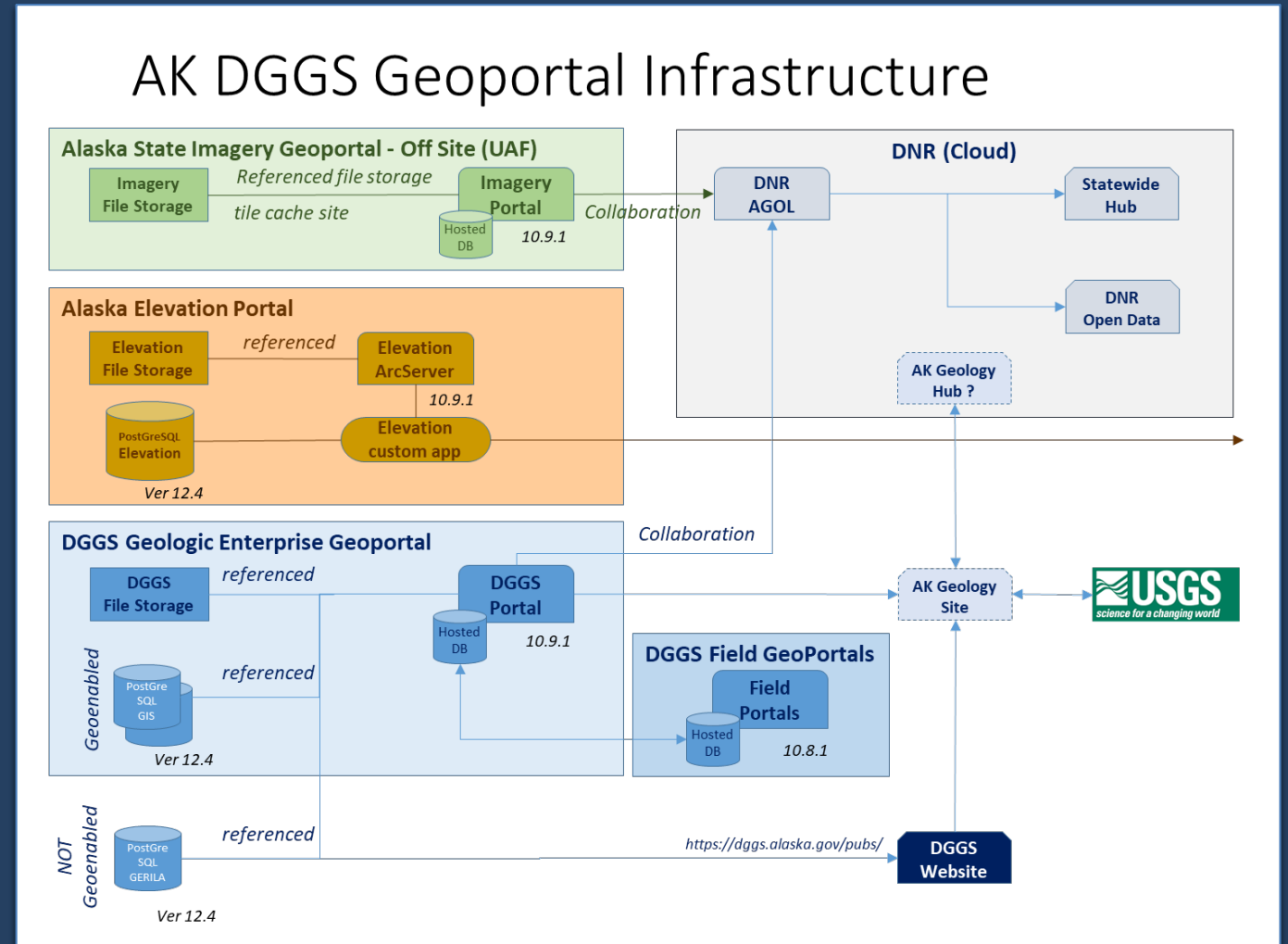
<https://elevation.alaska.gov/>

- Roughly, 12 Tbs of elevation data is available from our web

- **Alaska State Imagery Geoportal**

<https://geoportal.alaska.gov/portal/home/>

- Statewide Imagery Basemaps on a 10 petabyte storage solution hosted at UAF's Butrovich Computing Facility



AK DGGS Enterprise Geoportals

Fall 2023 – Enterprise Architecture Upgrade followed by version upgrade

- **Split into Multiple Virtual Machines**

Allows IT to optimize configurations for each component

- **Dedicated Image Server Machine**

Provides a distributed computing and storage system that powers the analytical processing and serving of large collections of imagery, elevation data, rasters, and other remotely sensed data.

- **Dedicated ArcServer for referenced Enterprise stored Services**

ESRI Support suggested dedicated ArcServer for services using referenced data in an Enterprise Geodatabase (PostgreSQL).

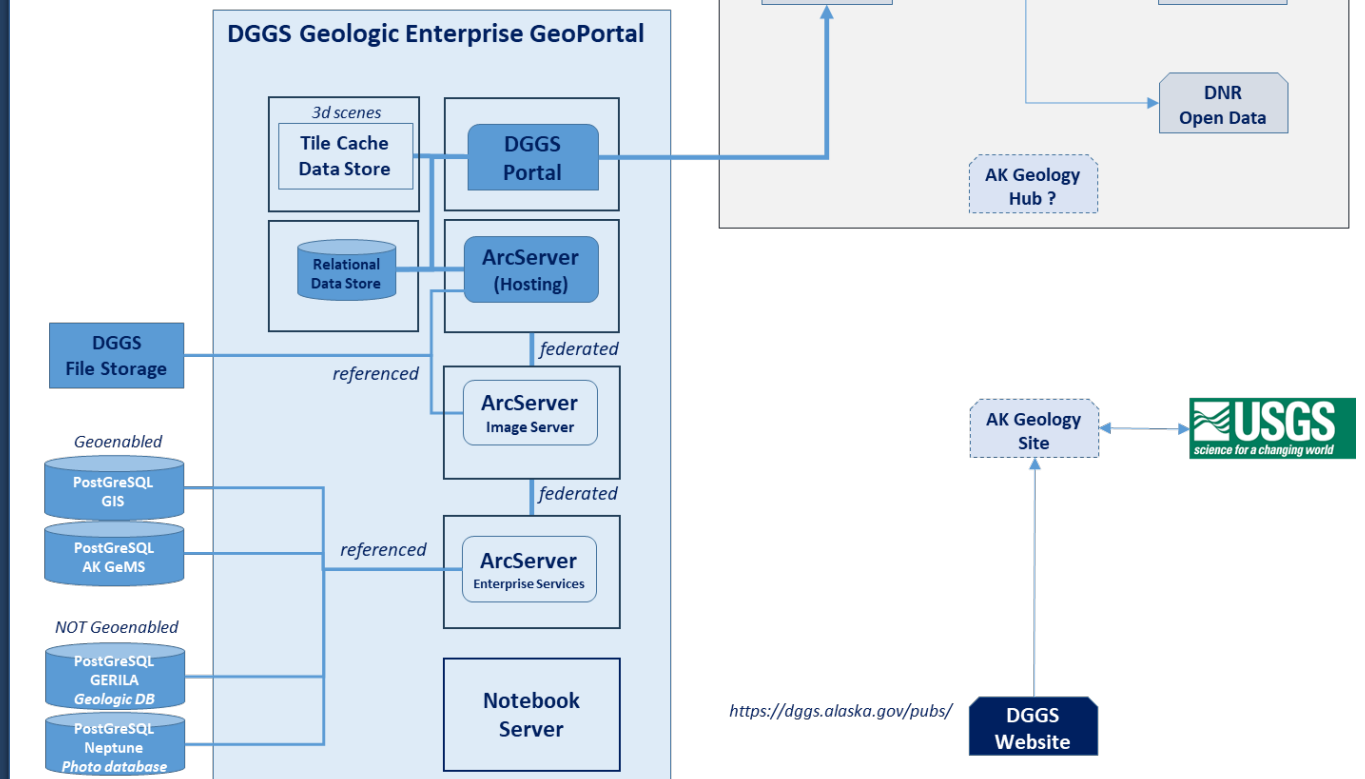
- **Dedicated Cache for 3D Scenes**

Stores caches for hosted scene layers

- **ArcGIS Notebook Server**

ArcGIS Notebooks provide a versatile web-based interface for powerful geospatial data analysis, with python notebooks. With notebooks, you can perform analysis, automate workflows, and immediately visualize data and analysis results in a geographic context

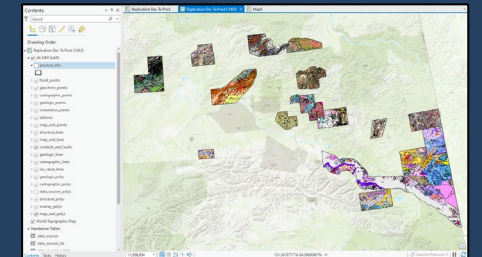
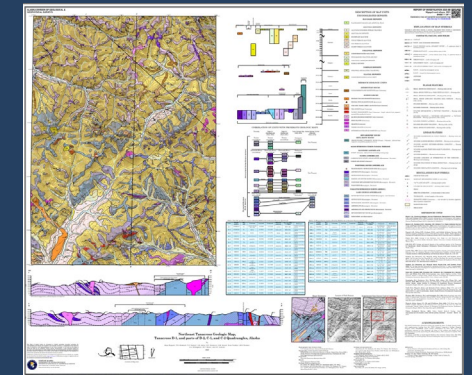
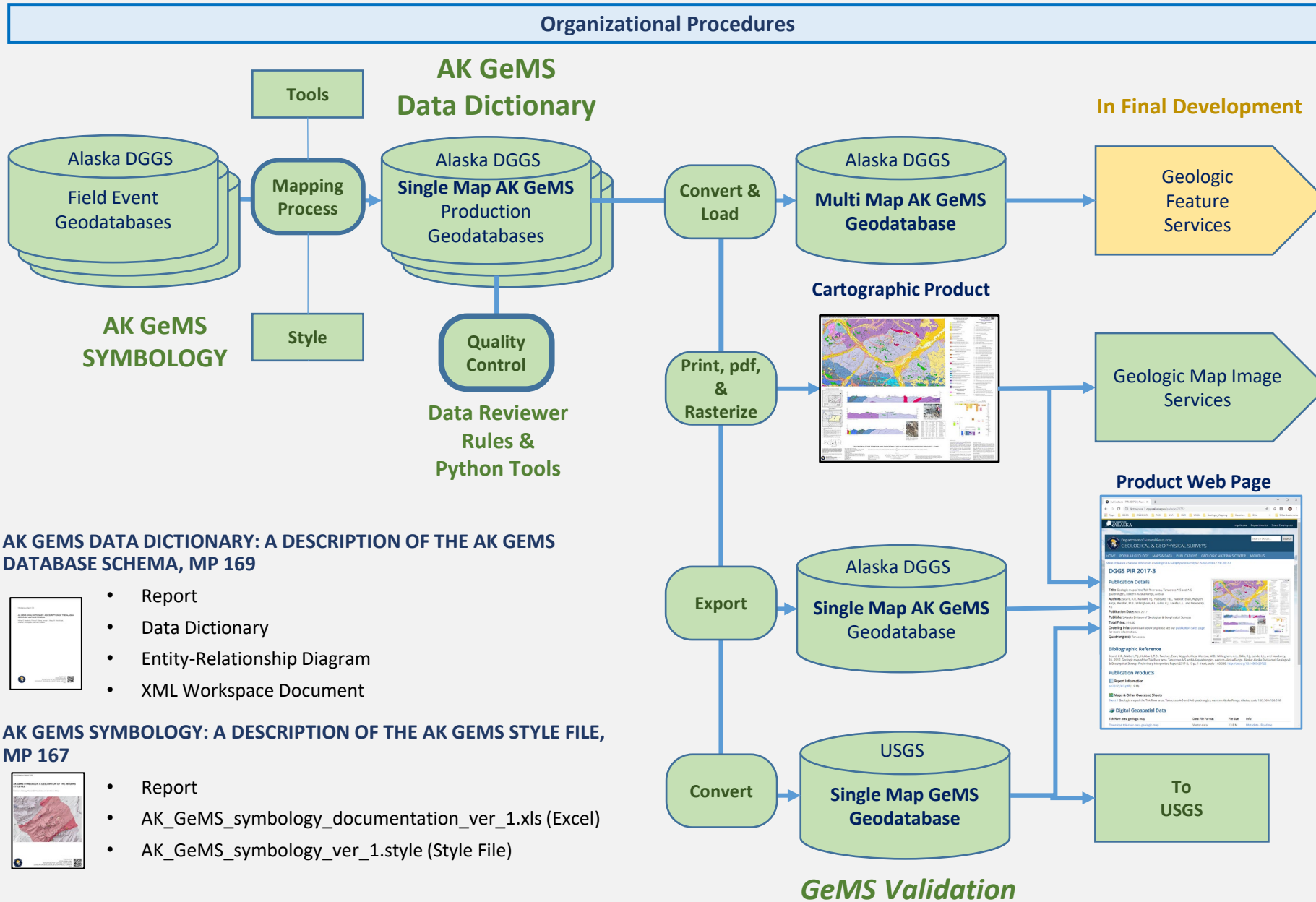
Splitting out our Enterprise Portal from a single machine to a multi-machine architecture



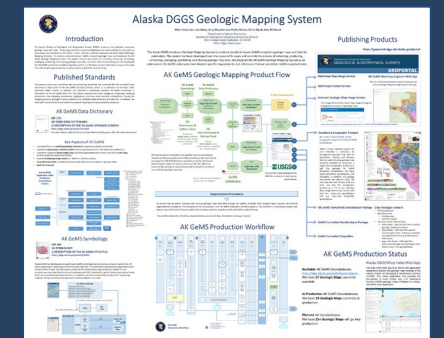
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AK GeMS Geologic Mapping System



Poster View of System



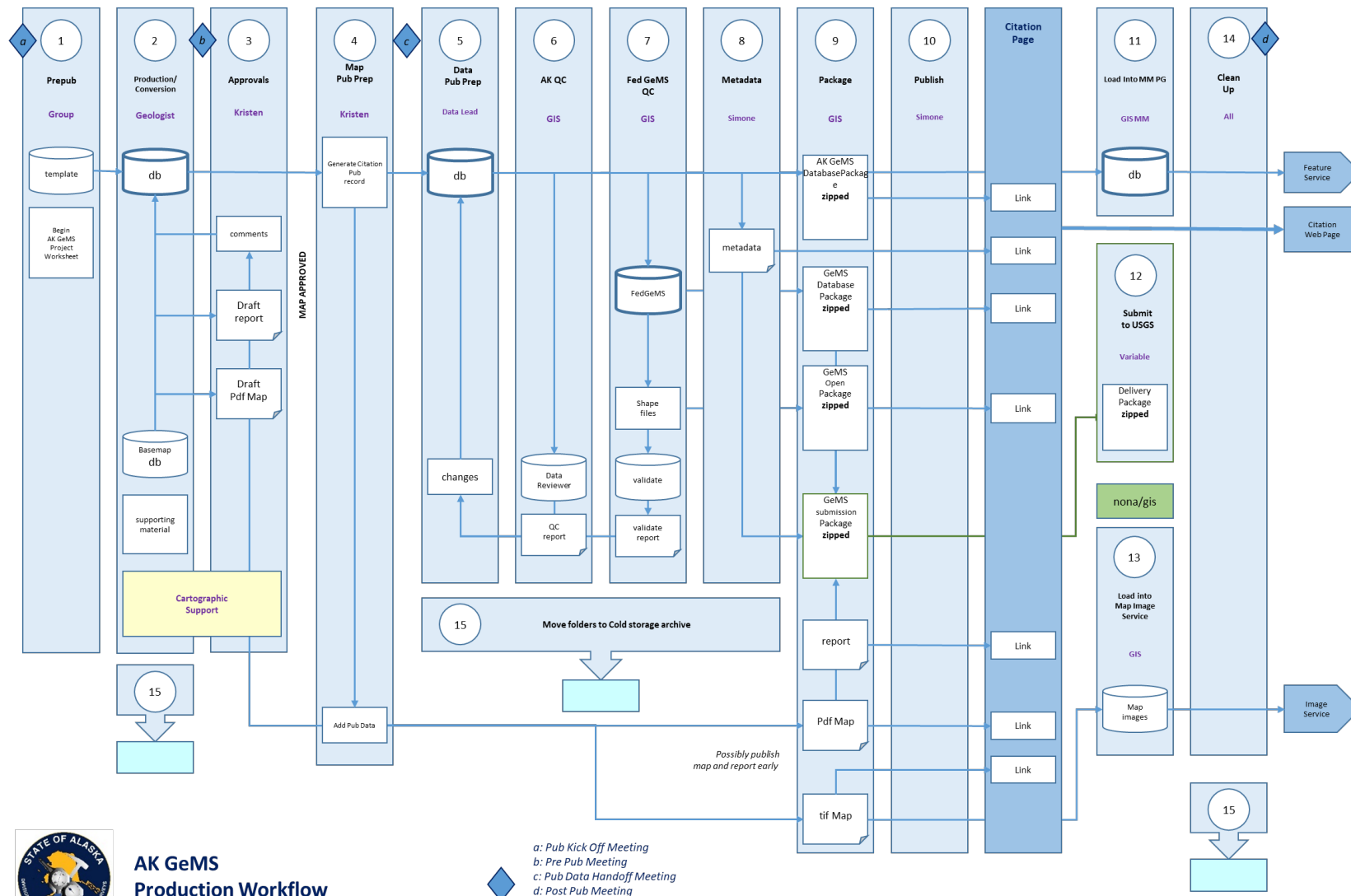
<https://doi.org/10.14509/30864>
dgggs.alaska.gov/pubs/keyword/gems

AK GeMS Production Workflow

Well-defined organizational procedures are critical.

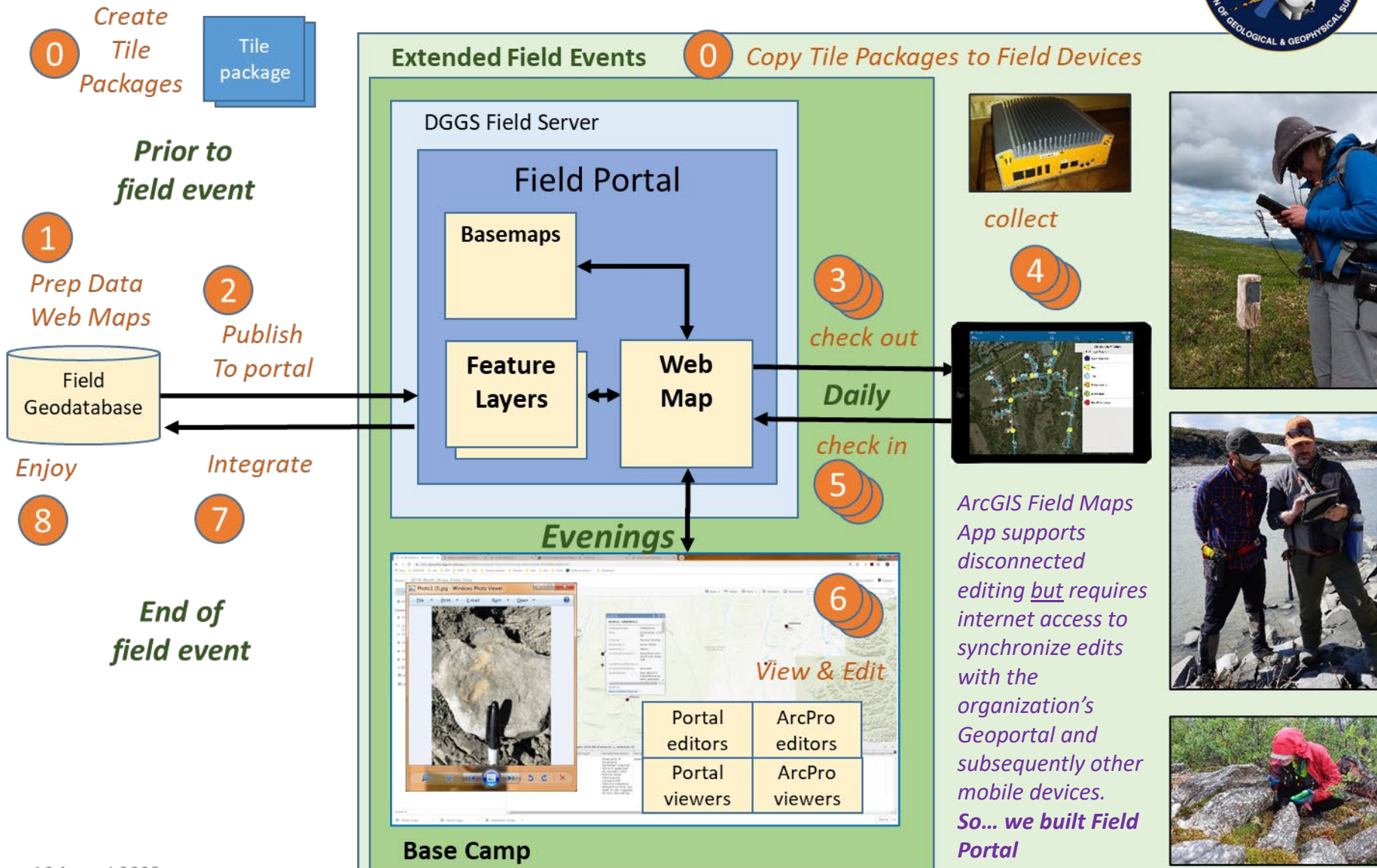
Key Aspects

- The backbone of our procedures is our **AK GeMS production workflow graphic**.
- This workflow is a **16-phase process** that takes a map and its data from pre-publication through production, quality control, publication, and archiving.
- The workflow identifies:
 - **Order**
 - **Responsibilities**
 - **Location of data**
 - **Production meetings**
 - **Products**



AK GeMS Production Workflow

Field Geology Support System - 2023



AK DGGGS developed a Field Geology Support System that runs a customized installation of ArcGIS Enterprise (Portal) on a mobile server that can be transported to remote field camps.

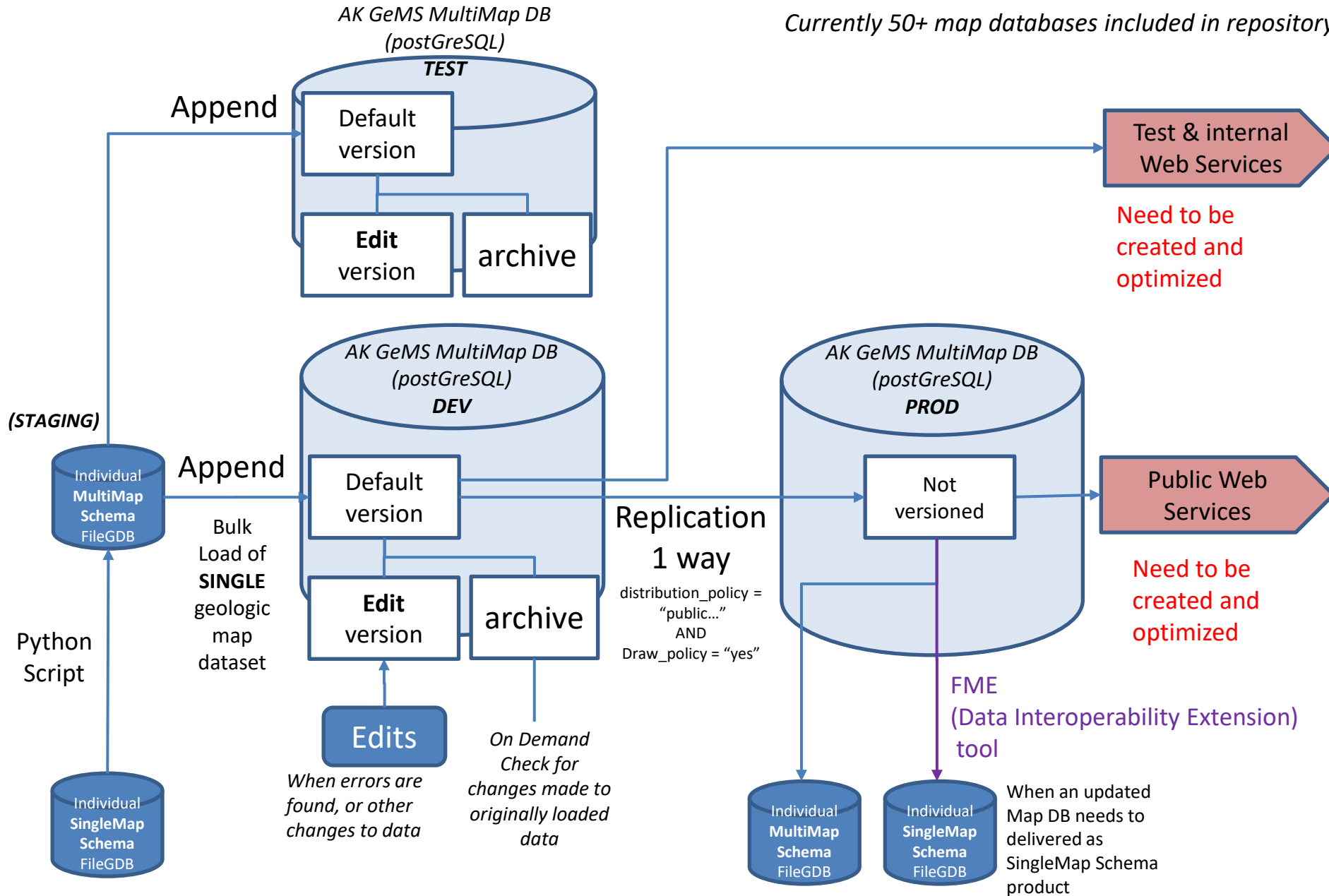
The Field Geoportal includes a wireless network that allows it to become the central data hub at the remote field camp and where all field personnel can easily, backup, access, edit, and share data.

DGGGS's Field Portal was awarded \$2,100 in prize money at this year's UAF Arctic Innovation Competition

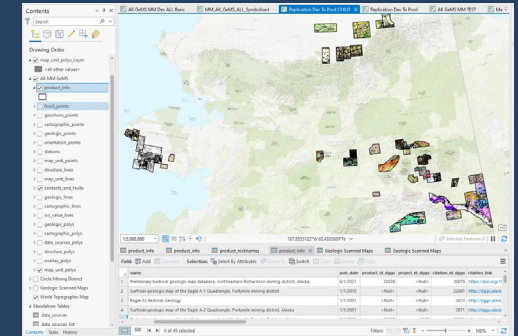
Alaska DGGS Multi-Map GeMS DB Architecture

AS OF
10 May 2023

Currently 50+ map databases included in repository



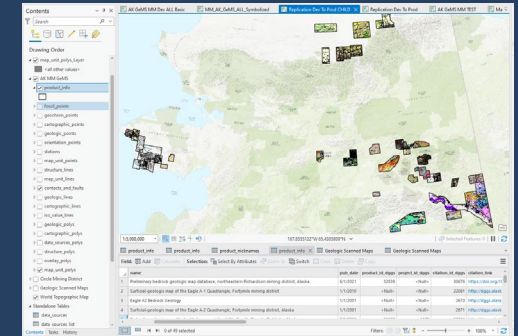
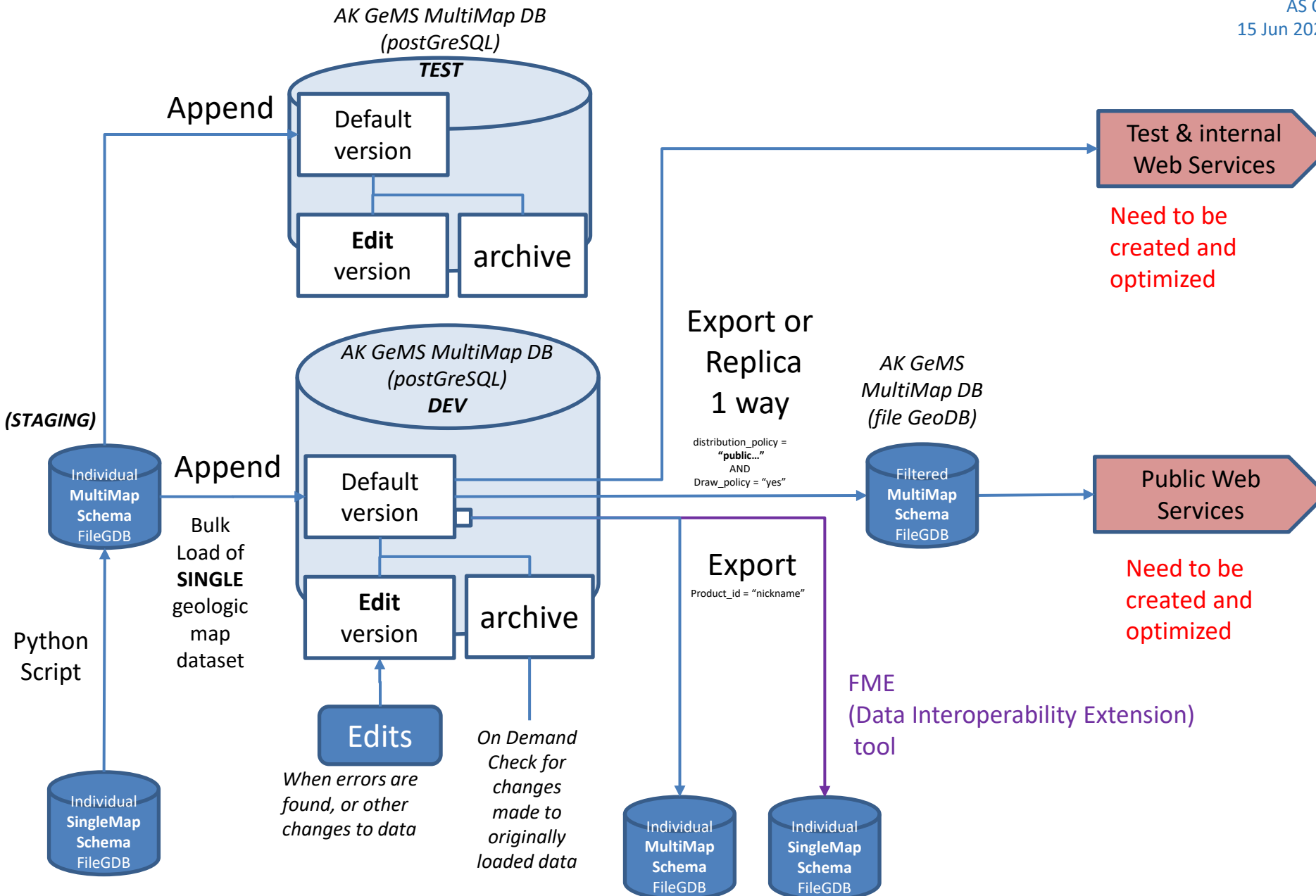
A repository of individual AK GeMS single map databases stored in a single optimized PostgreSQL geodatabase.



PROPOSED Alaska DGGS Multi-Map Ver 2.0 GeMS DB Architecture

AS OF
15 Jun 2023

A repository of individual AK GeMS single map databases stored in a single optimized PostgreSQL geodatabase.



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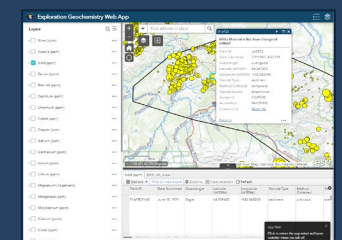
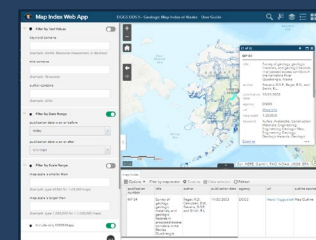
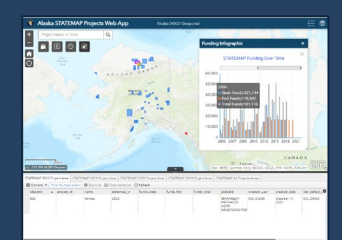
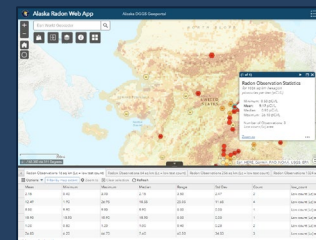
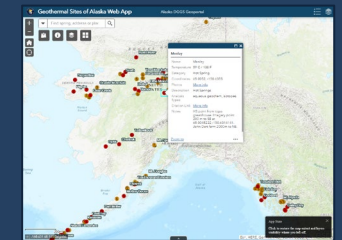
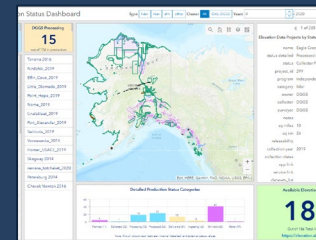
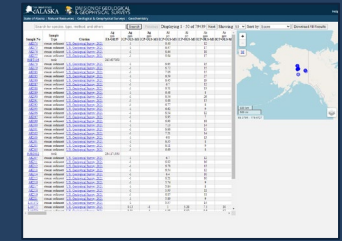
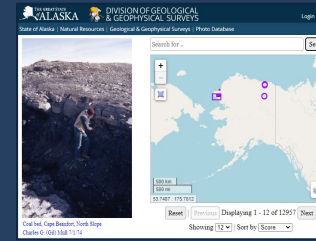
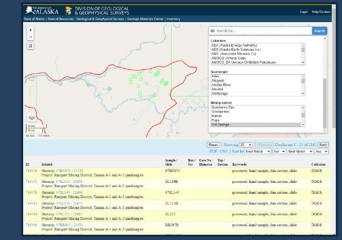
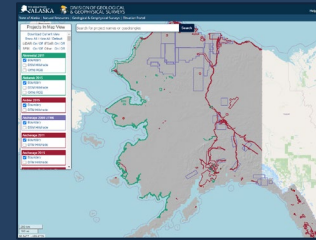
Some of our Geospatial Web Maps & Apps

Interactive Maps

- [AK Elevation Portal](#)
- [Geologic Materials Center Inventory](#)
- [Geologic Photos of Alaska](#)
- [Alaska Geochemistry](#)
- [Palynology Database](#)
- [Alaska Geologic Data Index \(AGDI\)](#)

Enterprise Geoportal Apps

- [Geothermal Sites of Alaska Web App](#)
- [Alaska Radon Web App](#)
- [Map Index Web App](#)
- [Airborne Geophysics](#)
- [Exploration Geochemistry Web App](#)
- [Alaska Tsunami Inundation Maps](#)
- [AK GeMS Multi-Map Explorer \[In Development\]](#)



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AK DGGS GIS Projects Goals – 2023/2024

- AK Geologic Mapping System
 - Publish AK GeMS (Geologic Mapping Schema) ver 2.0 & Publish Symbology version 2.0 (style file and feature templates)
 - Transition Geologic Map Quality Control (QC) to ArcPro. Implement Advanced DB features, such as Attribute Rules and Contingence Values. *Advantage Program*
 - Role out AK GeMS Multimap Database Users toolbox and publish Services and Web App
 - Geologic Map Workflows (Tasks) *Advantage Program*
- Field Data Collection
 - Continue support use of Field Portal (disconnected enterprise portal)
 - Work to ensure Field Maps App is used to its fullest capability and users are trained
 - Test the use of ArcPro on field tablets to support requirement for field “sketching and mapping”, as opposed to point centric data collections
- Build Alaska Geology DGGS Hub/Site that incorporates 1) DGGS portal content, 2) DGGS publications Content, 3) Alaska USGS Content, and 4) integrates into DNR/AK Hub architecture
- Upgrade our Enterprise Portal as well as transition from a single server to a split server architecture
- Continue to support State Imagery and Elevation Efforts
- Design Landslide Inventory Database and build as a branch versioning service
- Report a Landslide and/or Snow Avalanche using Survey 123
- Increase use of Geopackages for data distribution
- Continue GIS Tips and Tricks Weekly sessions

Questions

Additional Presentations available at:
<https://dggs.alaska.gov/pubs/> Author Search for Hendricks
or GeMS Project Presentations
<https://dggs.alaska.gov/pubs/project/1607>