AK DGGS’ Hardware Solution for Collaborative Field Data Collection

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Collecting Field Data in Alaska

Data Collectors’ Needs:
• Online ArcGIS Enterprise geoportal
• Support various handheld wireless devices
• Allow for uploading new data daily
• Allow for sharing data among multiple people

Significant Challenges:
• Remote locations with very limited internet access and cell phone coverage
• Lots of dust and dirt

GCI cell phone coverage map from whistleout.com
Field Geology Support System - 2022

Prior to field event:
1. Prep Data Web Maps
2. Publish To portal

End of field event:
8. Enjoy
7. Integrate

Copy Tile Packages to Field Devices:
0. Create Tile Packages

Extended Field Events:
0. Copy Tile Packages to Field Devices

Base Camp:

DGGS Field Server

Field Portal

Evenings:

View & Edit
Portal editors, Portal viewers, ArchMap editors, ArchMap viewers

Daily:
3. check out
4. collect
5. check in
Solution: “field portal”
(first iterations)

😊 • Fully Functioning Unit
• Redundant Hardware

😢 • Expensive
• Heavy
• Many components introducing opportunity for failure
• Vulnerable to dust/dirt

• Robust
• Meets the need
Better Solution!

• Onlogic.com Industrial Mini-ITX ML500
• Intel i7 2.4 GHz Processor, 34GB RAM, 1TB disk storage
• Hosts ArcGIS Enterprise (server+portal+datastore)
Cool Features

• Fanless! No moving parts
• 8x8” and 8lbs, fits in a backpack or pelican case
• Display Port, RJ45, USB, with plugs to keep dust out
• Wireless Access Point
  • Wireless chip from EmbeddedWorks.net
    SparkLAN WNFQ-258ACN(BT) 802.11ac/abgn
    + Bluetooth M.2 (NGFF) Module | Qualcomm QCA6174A-5
• More Affordable
• Conventional 110volt power adapter
Software Stack

• Ubuntu Server 20.04
• Hostapd for wireless access point hosting
• dnsmasq for DHCP IP addressing
• Samba for file sharing and field photo backups
• Apache Tomcat web server
• ArcGIS Enterprise 10.8.1 upgraded to 10.9.1
Backup/Recovery through Distributed Collaboration

Distributed collaborations allow ArcGIS Geoportals to share and sync content using groups.

**Primary Geoportal**
(Field Portal 1)

**Backup Geoportal**
(Field Portal 3)

ArcGIS Enterprise 10.9.1 supports two way editing
Stable hardware allows for early and adequate testing!
Hardware Lessons Learned

• **Compatibility with multiple devices of various ages**
  • Supported wireless protocols matters!
  • We designed for 802.11ac, > 866Mbps
  • Some laptops, cell phones, tablets supported only 802.11n

• **Form Factor of M.2 storage**
  • NVMe vs. SATA
  • Missing “pig tails” for wireless antennas
Looking ahead

• Gather feedback from Geologists post field season
• Continue working on collaborations with DGGS geoportal
• Continue exploring backup and cloning options
Thank you!