DIGITAL MAPPING TECHNIQUES 2022

The following was presented at DMT ‘22
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The contents of this document are provisional

See Presentations and Proceedings from the DMT Meetings (1997-2022)
http://ngmdb.usgs.gov/info/dmt/
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

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

End of field event:
8. Enjoy

Evenings:
7. Integrate

Field Portal:
- Basemaps
- Feature Layers
- Web Map

Day:
3. check out
4. collect
5. check in

Base Camp:
- DGGS Field Server
- Portal editors
- Portal viewers
- ArcMap editors
- ArcMap viewers

View & Edit:

Create Tile Packages

Tile package

Prep Data Web Maps

Collect

To portal

Publish To portal

Check out

Check in

3

Copy Tile Packages to Field Devices

Tile package

Enjoy

Integrate

Field Geodatabase
Solution: “field portal”
(first iterations)

😊
- Fully Functioning Unit
- Redundant Hardware

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- Robust
- Meets the need

😢
- Expensive
- Heavy
- Many components introducing opportunity for failure
- Vulnerable to dust/dirt
Better Solution!

• Onlogic.com Industrial Mini-ITX ML500
• Intel i7 2.4 GHz Processor, 32GB 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!