Cyber Infrastructure and IT in the field.

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Who are we?

- Polar Research Operations Center
  - Organization Structure
  - Function

- Customers Current and Future
  - Center for Remote Sensing of Ice Sheets
  - IU Researchers

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Who am I?

- My name is Matt

- Education
- Cyberinfrastructure experience
- Polar CI experience

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Project History: IU/CReSIS Partnership

- CReSIS a great case study for difficult field operations.

- Airborne Synthetic Aperture Radar Systems
  - NSF Polar Grid Project
  - Operation Ice Bridge 2009
  - NSF Science & Technology Center grant for CReSIS
  - Operation Ice Bridge 2010-2012, 2012-2015

Campaign Workflow

- Predeployment
  - Requirements
  - Buildup
- Deployment
  - Operations
  - Personnel Rotation
- Post Deployment
  - Data Retention and Curation
  - Processing
- Lessons Learned

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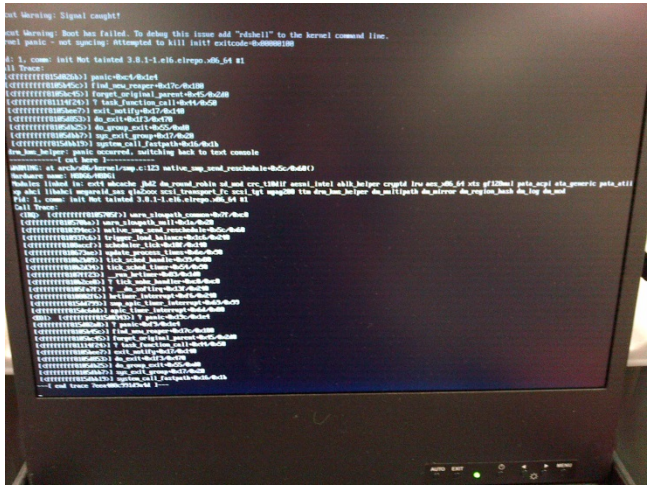

Predeployment

- Information gathering
  - Understanding the researchers need
  - Requirements!
  - Geographical limitations
  - 30-60-90 Deployment plan
- Identify key personal
  - Travel arrangements
  - Equipment shipping
  - Medical requirements
  - Backup personnel
  - Rotation schedule
- Workflow check
  - Backup and processing workflow

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Predeployment, Equipment Build

Physical Storage

You can’t control the shipment once it leaves

Hardened Plastic or Steel cases
Custom molded disk storage
Milspec is great but not always worth the cost
Physical weight concerns
Barometric relief valve, equipment pouches, caster wheels, etc. It’s the small things that make life easier.

Predeployment, Equipment Build

Servers

- Spec to the need (processing, power, size)
- Be redundant

Network

- Use a familiar fabric to suit the need
- Be redundant

Storage

- Use RAID (never level 5), skip the hot spare
- Your storage needs will be larger than planned
- Be redundant

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Predeployment, Software

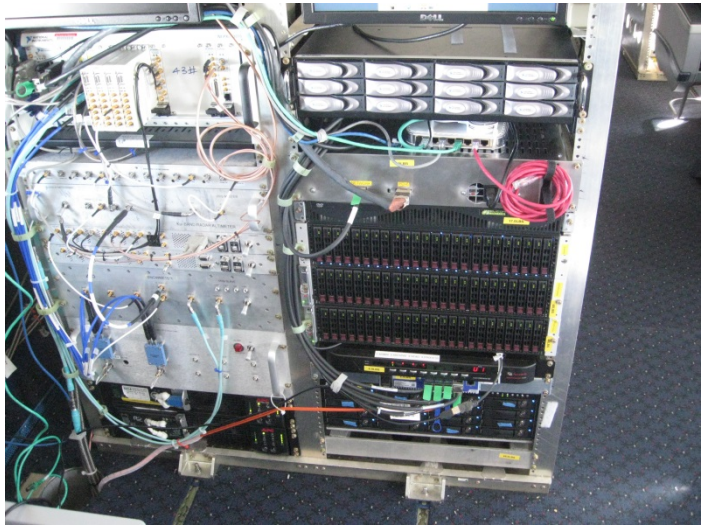
Copy repositories and OS installation media.

Use a specific point release across servers.

Use standard tools and copy their online documentation

Homebuilt software should be in version control and deployed accordingly.

Deployment



Keep IT professional
- Avoid field hacks
- Document everything
- Send status reports
- Traditional operator or sysadmin role
- Be proactive in addressing issues

Personnel Turnover
- Plan time for field techs to overlap
- Use this as an opportunity to move gear or data

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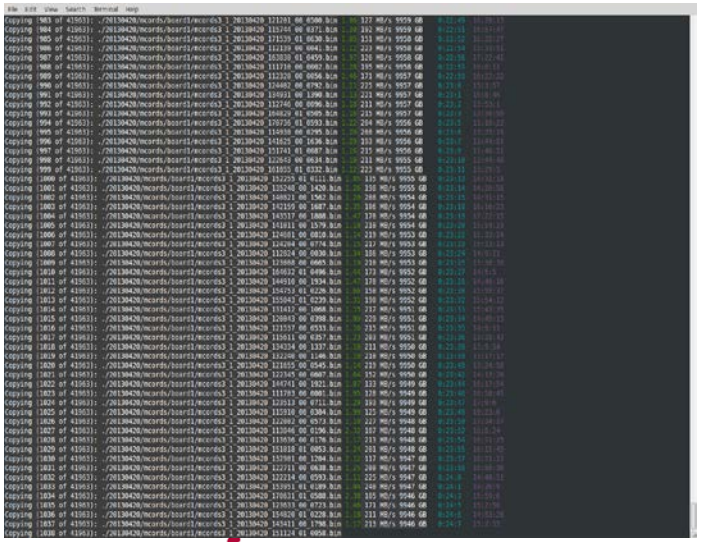
Deployment, data management



Cyberinfrastructure or IT should not be the cause of missing data.

Keep multiple copies of processed data and raw data.

Hash and verify all data that needs to be kept. The hash should follow the data.

Mount source data read only, use read only LUNs

Keep a log file metadata

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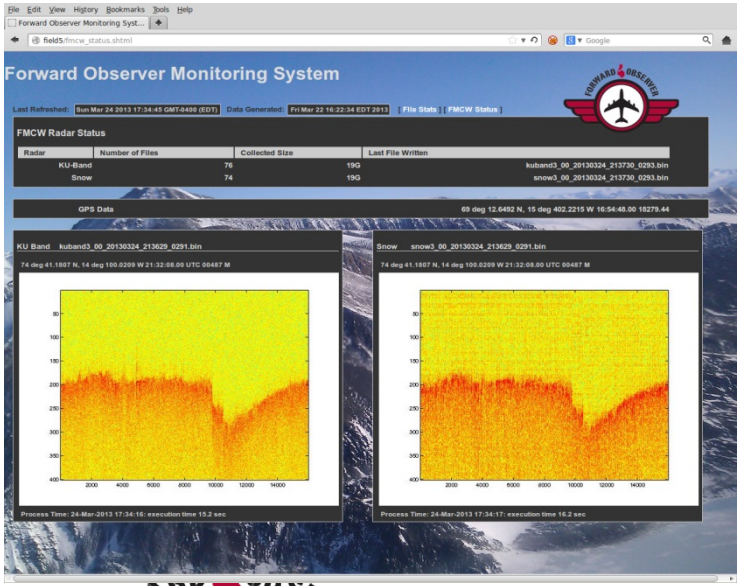
Deployment, processing

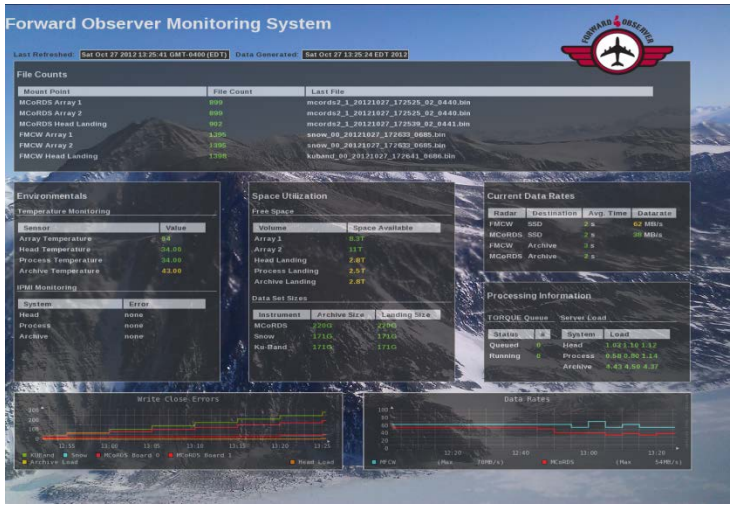


Data management should take priority over processing.

The field tech should be savvy with the tools the processing tools from an administrative side.

Processing will heat up a small room

Deployment, prevention



Equipment will act differently than in the data center

Monitor logs for strange syslog activity

Monitor IPMI for hardware events

Watch disk space usage and change disks with headroom, monitor SMART data

Make sure automated tasks are happening.

Ensure software RAID 1 is working (if used)

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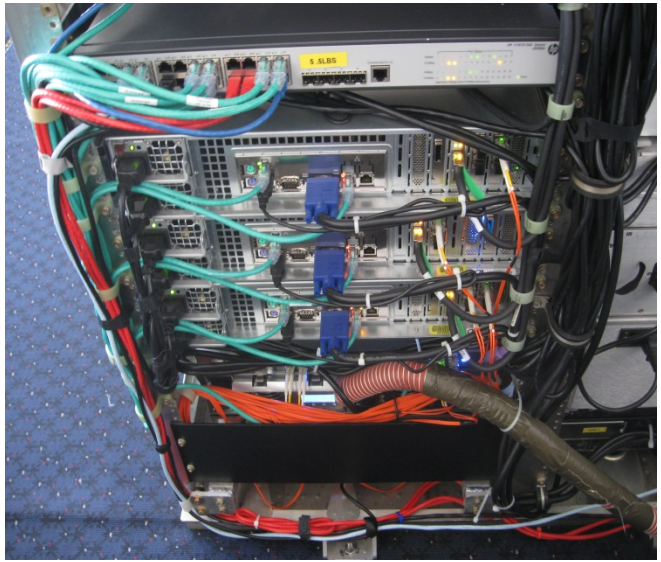
Post Deployment



Pay attention to shipping
- Use multiple return paths for shipping data

Turn over the data ASAP
- Keeping the data on the disks increases risk
- Check the hash of all copied data

Check in file meta data into version control

Document lessons learned

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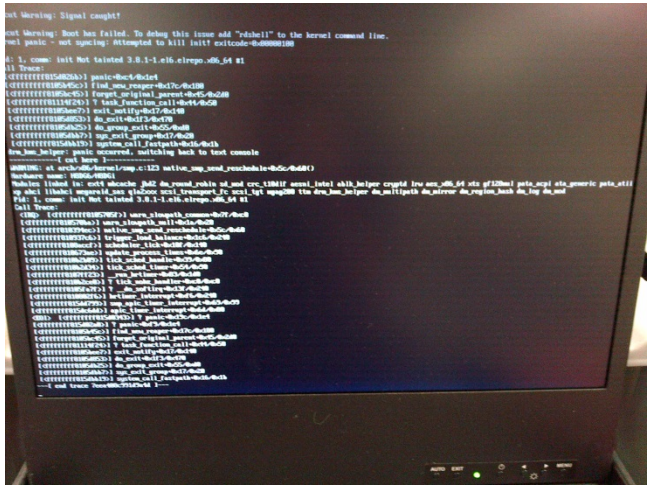
In Closing



Keep it simple

Treat the data as gold

Document

Community

Thanks!

- Questions: proc@iu.edu
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  - NASA Operation Ice Bridge
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