Improving Network Attached Storage
## MSST 2017

Jim Finlayson

US Department of Defense

16 May 2017

Current Situation - NAS

- Experiencing significant data growth
- Mission Assurance inadequate/tedious
- Migration to new technology is extremely difficult
  - Human intensive process, requires dedicated people
  - Error prone because of volumes and personnel skill levels
  - Mission impact – downtime, changes to operational processes
- Vendor "lock-in" prevalent
- Impossible to back-up/archive other than most critical data
  - Assuming 1GB/sec tape infrastructure, 4TB/hr: 250 hours per PB
- 100s of NFS mount points
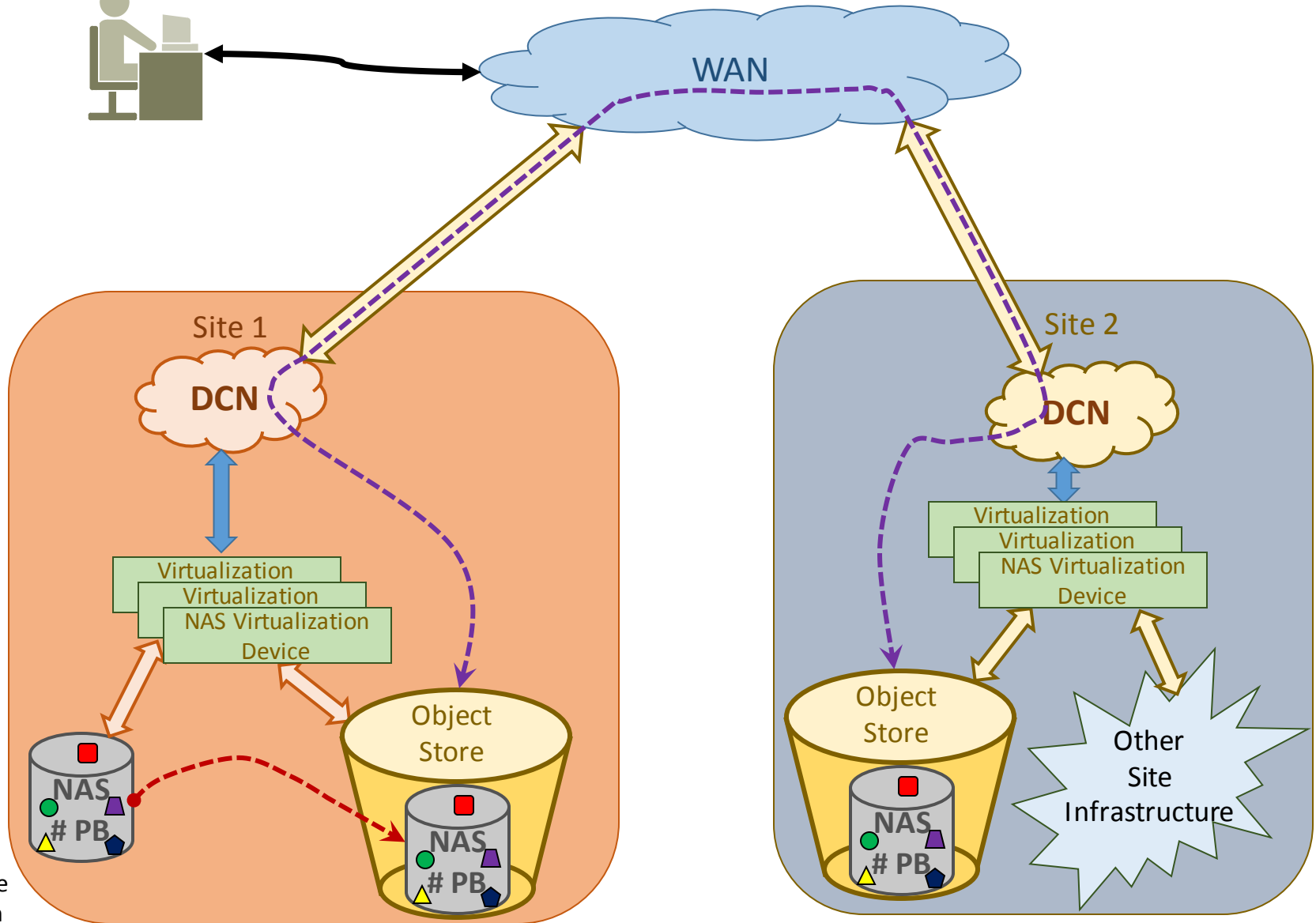
Current Situation
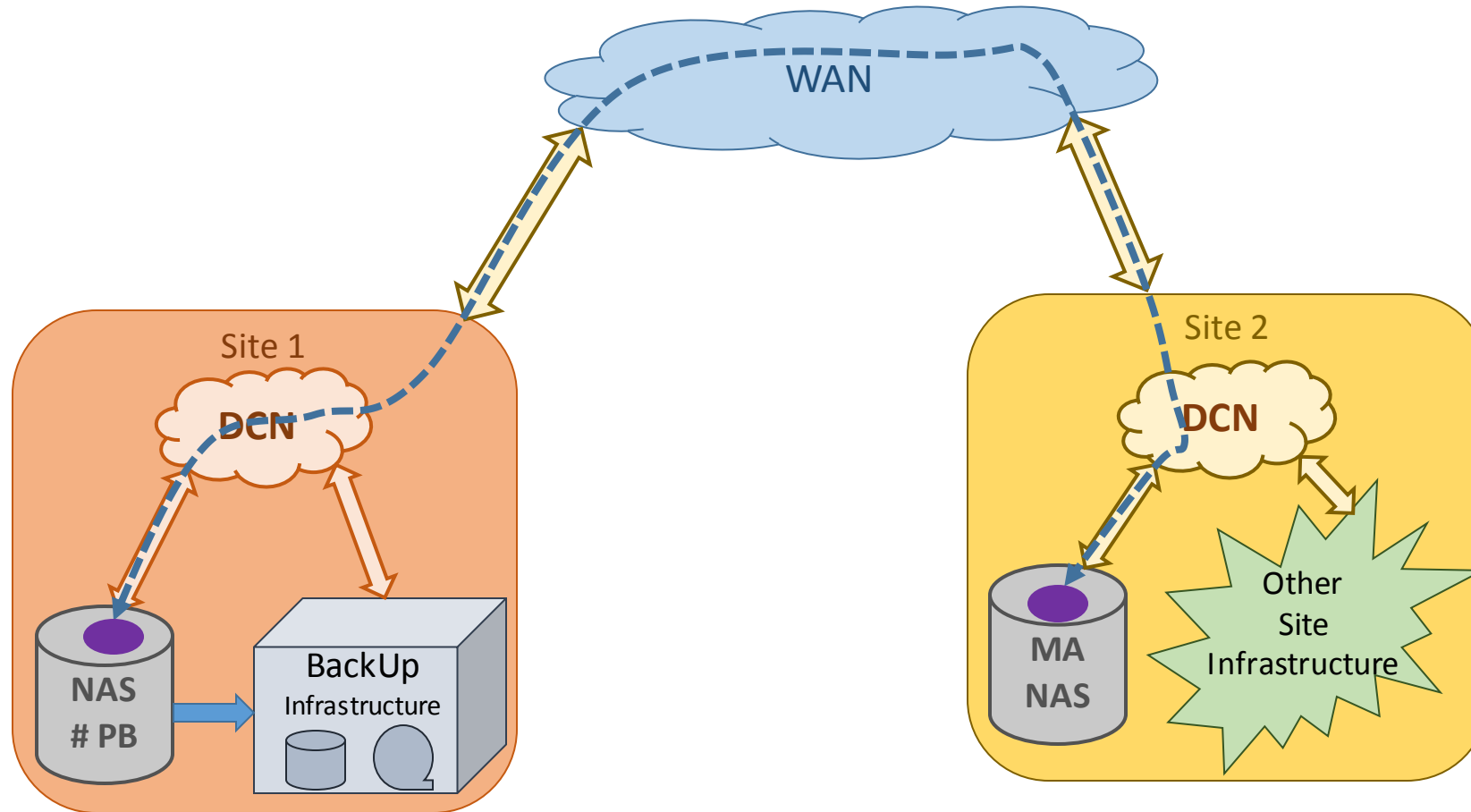
MA flows, via proprietary means, generally require close monitoring by humans.
Backups are local only, via separate infrastructure; minimal mission assurance

Virtualized Access
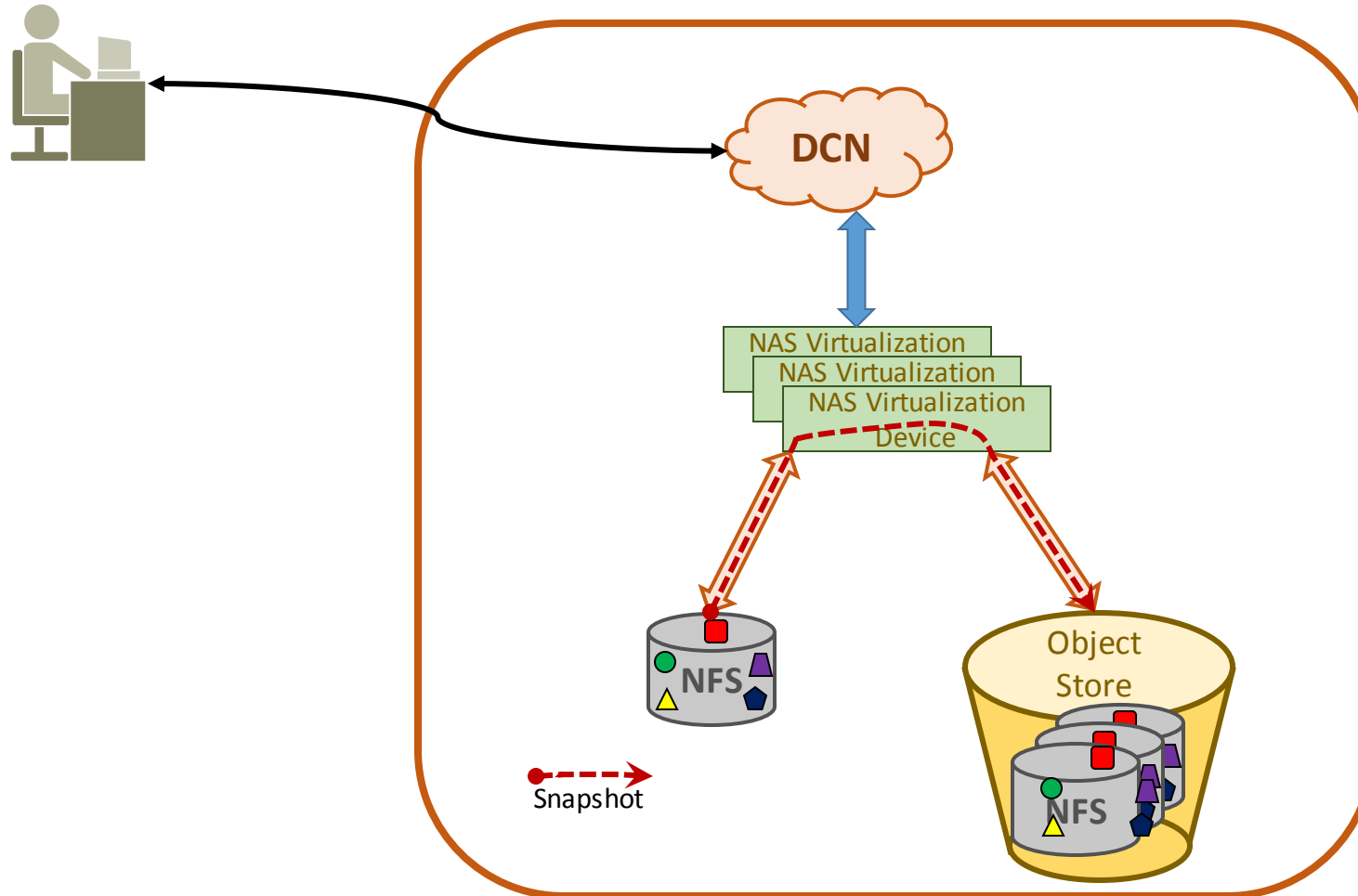
NAS Mission Assurance using Object Store with Virtualization

Current Activities/Motivation

- Activities
  - CRADA – testing identified issues
  - Taught NAS virtualization vendor the testing framework
- Motivation
  - Save precious Government $$$$
  - Lessen user impacts
  - Solve backup problems
  - Minimize tedium/outages related with NFS migration
  - Leverage lesser skilled personnel to manage migrations/operations
  - Increase Mission Assurance posture while lowering NAS Total Cost of Ownership
  - Better RTO, RPO targets

Benefits

- Object Store
  - Houses snapshots independent of NAS – "NO BACKUPS!!"
  - Provides MA for "free"
  - Requires minimal amount of dedicated personnel
  - Allows competition without "lock-in"
- NAS Virtualization
  - No downtime for migration
  - Transparent to users
  - Multi-vendor support enabled
  - Allows competition for NFS scale-out
  - Temporary "lock-in", but there is always a plan

Musings

- Pitfalls of working with small startups
  - Like to say "Yes" without understanding the big picture
  - Need to educate that multiple requirements are "AND" not "OR"
  - Classified environment – CRADA costs US Government only my time
- Parallel file systems, in general, are not feature rich (robust)
- Get rid of tape – too labor intensive
- Improve data availability
- Problems identified, developing solutions requires CRADA
- Need a "fresh look" at our networked POSIX 1003.1 accesses
- Reducing TCO while modernizing infrastructure
- Traditionally BU/Recovery does not scale in large data environments

Acknowledgements

- Meadowgate Technologies, LLC
  - CRADA partner
- Oracle Corp. – gracious loan of NAS appliance
- IBM Corp. – gracious loan of object storage
- Avere Systems Inc. – gracious loan of NAS virtualization appliance
- Vencore, Inc.
  - SETA support