CD FY08 Tactical Plan Status

FY08 Tactical Plan Status Report for SCF/DMS/WAN Group

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FY08 Tactical Plan for Wide Area Networking

- Relevant Strategic Plan(s):
  - Strategic Plan for Wide Area Networking
    - https://cd-docdb.fnal.gov:440/cgi-bin/ShowDocument?docid=2236
- Tactical Plan Leader: Phil DeMar
- Organizational Unit home: SCF/DMS/WAN
- Tactical Plan Goals:

1. Support a highly redundant wide-area network infrastructure that provides reliable, capacious offsite access
2. Implement & enhance high bandwidth end-to-end data paths
3. Plan & implement activities that establish the Laboratory in a leadership position in the R&E network community
4. Provide the CMS Tier-1 Center with network infrastructure optimized for high bandwidth offsite data movement

Activities Summary: FTEs

Level 0 Activity: **Wide Area Networking** **% of FY Complete:** **68%**

Personnel Usage (FTEs)

Tactical Plan Level 1 Activity	Allocation FTE-yrs	Allocation FTE-mos	Actual YTD FTE-yrs (Ave/mo.)	Actual YTD FTE-mos	Actual YTD % Consumed YTD	Current FY08 Forecast
Advanced WAN Infrastructure	1.3	15.7	1.0	11.7	74%	~100%
Global Network Interfaces	0.3	3.7	0.2	2.16	66%	~100%
Leadership	0.2	1.8	0.1	1.28	71%	~100%
Management	0.4	5.2	0.1	1.62	31%	<100%
Network Performance Improvement	1.4	16.8	0.8	9.43	56%	~100%
Network Investigations	0.4	5.4	0.1	0.81	15%	<100%
Network WAN Ops/Support/Maint*	1.2	14.9	0.5	6.53	44%	<100%
Network Research	0.6	7.2	0.6	7.12	99%	>100%
Network Upgrades	0.4	4.8	0.1	0.41	9%	<100%
Network CMS WAN	0.4	4.8	0.4	4.74	99%	>100%
SciDAC Lambda Station	0.2	1.8	0.8	9.7	530%	>>100%
Total	6.8	82.1	4.7	55.5	68%	100%

* Listed under Site Networking Level-0 activity

FTE Expenditures Notes:

- Under-spending on Network Upgrades & Network Investigations
  - Product of furloughs & minimal upgrade funding for FY
  - Both activities expected to pick up in remaining four months
- Higher-than-budgeted SciDAC Lambda Station effort due to:
  - WAN technology shift created unanticipated demand
  - Desire to spend down allocated funding by end-of-year
- Activity for WAN Operations, Support, & Maintenance erroneously listed under Site Networking
  - Budgeted at 1.0 FTE of WAN effort & 0.2 FTE of Site Networking
  - Causes Crystal Reports to understate budgeted WAN effort
  - Will be fixed starting with June effort reporting
- Some adjustment to Crystal Report effort numbers needed to accurately reflect effort
  - ~3/4 FTE of Advanced WAN Infrastructure mis-entered as Research

Activities Summary: M&S (Internal Funding)

Level 0 Activity: **Wide Area Networking**

68% of FY Complete

Operating & Equipment M&S ***CD Internal Funding***

Tactical Plan Level 1 Activity	Operations and Equipment M&S: FY Obligation Budget	YTD Obligations + RIPS	% Spent	Current FY08 Forecast
50.02.10.05.01: Advanced WAN Infrastructure	47.7	4.6	10%	50%
Network Upgrades	72.5	45.3	62%	100%
Management	3.6	3.0	83%	100%
50.02.10.05.04.01: Global Network Interfaces	8.8	9.2	105%	>100%
Leadership (training)	6.0	0	0%	100%
Network Performance Improvements	3.0	0	0%	100%
Network Investigations	5.3	0	0%	100%
Network Operations & Support	24.1	8.4	35%	100%
50.02.10.05.06.01: Network Research	6.0	0.8	13%	100%
Totals:	177.0	71.3	40%	86%

M&S Expenditures Notes:

- Will not spend two WAN budget line items totaling $24k
  - Ciena maintenance ($9k) covered under ANL contract
  - DuPage Technology Park ($15k) switch - no justification right now
- Travel spending is muddled:
  - Already overspent on LHC & DOE-related travel:
    - Three unanticipated DOE Trusted Internet Connection (TIC) task force meetings
    - Crawford & DeMar actively involved in Internet2 Joint Techs workshops
  - Other travel budget line items under-spent in aggregate
    - But not enough to cover anticipated travel to end of FY
  - Additional Lambda Station-related travel on LS task code.
- WAN ProCard erroneously assigned to Site Networking task code (thanks, cousins…)
  - Fixed, but some WAN & Site task code balances will be skewed

Project Activity:
Advanced WAN Infrastructure - FY08 Goals

- Complete deployment of Chicago MAN:
  - Milestones: MAN fully deployed in Nov., 2007
    CMS Tier-2 circuits migrated over to MAN channels
  - Issues: ESnet upgrading their MAN equipment this summer
    We may begin to build 2nd MAN hub in WH
  - Risks: Funding for 2nd Ciena hub not clear
- Facilitate deployment & reliability of offsite end-to-end circuits:
  - Milestones: Dynamic circuits deployed to UNL & Caltech
    Static circuits deployed for Duke, Tennessee, DE-KIT
    Upgraded circuits for ASGC & IN2P3
  - Issues: Circuit technology ahead of policy & support considerations
  - Risks: Increasing support effort needed as deployment scales & complexity increases.

Project Activity:
Advanced WAN Infrastructure (cont.)

- Develop & deploy perfSONAR monitoring for circuit infrastructure:
  - Milestones: PingER adapted for deployment in perfSonar-PS
    Major contribution to perfSonar-PS distribution kit
  - Issues: Scaling perfSonar-PS deployment to T2s & T3s
    Deployment of European MDM perfSonar appliance
  - Risks: Support concerns as perfSonar deployment scales

- Develop passive network monitoring capabilities based on flow data:
  - Milestone: Prototype FTWatch network traffic sensor deployed
  - Issues: Developing prototype into a general use service
  - Risks: Support concerns if demand for the service emerges

Project Activity:
Global Network Interfaces

- *Promote & integrate the Laboratory's WAN activities into the global R&E network community:*

- Milestones: Successful demos at Internet2 Members Mtgs & SC07
  Major contributions to emerging dynamic services (LS) & advanced network monitoring (perfSonar)
  Crawford & DeMar Internet2/ESCC JointTechs session organizers/co-chairs
  DeMar ESCC Chair-apparent (starts officially 10/1/08)

- Issues: Demos consume manpower

- Risks: Increasing effort required as participation grows

Project Activity:
Network Performance Analysis

- Develop & enhance structured WAN performance analysis methodology
  - Milestones: Methodology developed and documented:

    https://plone3.fnal.gov/P0/WAN/netperf/methodology/
  - Issues: Next step: integration into content management system
    Long term objective: perfSonar monitoring integration
  - Risks: -----

- Assist collaboration sites in improving data transfer rates
  - Milestones: Worked with 10 CMS T2 sites to improve performance
  - Issues: Varying degrees of success; up to 10x improvement
    Sustaining effort on remote end often difficult
  - Risks: Increasing effort required as participation & interest grows

Project Activity:
Network Integration

- Deploy & develop IPv6 test bed
  - Milestones: Virtual testbed partially deployed, based around FAPL
  - Issues: Modest progress; casualty of lost effort from furloughs
    Expect to make progress in remaining 4 months of FY
    Close coordination with CST required
  - Risks: IPv6 emerging in unmanaged manner
- Connect Laboratory to Global Lambda Integrated Facility (GLIF)
  - Milestones: Progress is mainly PR; hurt by lost effort from furloughs
  - Issues: Expect technical progress in remaining 4 months of FY
- Develop WAN-emulation capability in FAPL R&D network test facility
  - Milestones: No progress; budget casualty in this FY
  - Risks: Limits our WAN systems R&D efforts

Service Activity:
WAN Operations & Support

- Operate WAN infrastructure at high level of reliability
  - Milestones: No unplanned outages or disruptions
    Scheduled maintenance outages caused no unanticipated loss or degradation of service
  - Issues: Lower than anticipated effort
    Still working to develop suitable uptime metrics
  - Risks: ------

Project Activity:
Network Research & Development

- Research system performance limitations affecting WAN data transfers
  - Milestones: Two papers drafted:
    "End-to-End Network/Application Performance Analysis"
    "Reducing Packet Reordering thru Interrupt Coalescing"
    Funded for network flow data application-awareness
  - Issues: Preparing for next round of SciDAC proposals
  - Risks: ------

Project Activity:
WAN Infrastructure Upgrades

- Facilitate 10GE connections as needed for offsite connections
  - Milestones: Border & circuit routers upgraded with addtl 10GE ports
    10GE connections provided for new MAN channels (2)
  - Issues: Planning for WH hub for offsite connectivity
  - Risks: ------
- Upgrade backup border router to 10GE & deploy redundant circuit path
  - Milestones: Upgrade of backup border router to 10GE in progress
  - Issues: Working on LHCOPN (CERN) secondary circuit
    Failover of most E2E circuits left to routed IP path
  - Risks: ------

Project Activity:
WAN Infrastructure Upgrades (cont.)

- Deploy 10GE optical tap capability on facility DMZ
  - Milestones: Optical tap strategy replaced by spanned ports to CST DMZ 10GE switch deployed
  - Issues: Adding 10GE port capacity just starting
    New strategy will require CST 10GE switch
  - Risks: Path for scaling beyond 10GE capacity not clear
- Enhance R&D cluster (FAPL) systems capabilities
  - Milestones: Minimal effort so far; lower priority effort hurt by furlough
  - Issues: Expect to complete planned upgrades in next 4 months
  - Risks: ------

Project Activity:
CMS (Tier-1) WAN Support

- Upgrade Tier-1 facility, including redundancy at work group core
  - Milestones: FY08 Tier-1 network infrastructure upgrades completed
    Redundant LAN architecture in place
    New CMS LAN weather map deployed
  - Issues: FY09 Tier-1 network planning under way
    Evaluating benefits of redundancy vs addtl complexity
  - Risks: Path for scaling beyond 40GE capacity not clear

- Implement direct 10GE offsite path to facility border router
  - Milestones: 10GE direct connection to border router in place
  - Issues: Dynamic traffic rerouting mechanisms under discussion
  - Risks: ------

Project Activity:
Lambda Station Project

- Harden Lambda Station (LS) & integrate with dynamic circuit services
  - Milestones: LS integrated with Internet2/ESnet DCN/Oscars services
    LS-driven dynamic circuits in place at UNL & Caltech
    Flow analysis-based FT-Watch integrated with LS
    Successful LS demos at Internet2 Member mtgs & SC07
  - Issues: Sudden emergence of DCN service has LS in demand!
    Hardening delayed by lack of available scripting effort
    Working on convergence path w/ BNL TeraPaths project
  - Risks: Spend-down of project in FY08 well behind schedule
    Ongoing support concerns if LS is widely deployed
    Continual cycle of demos taking toll on effort

Service Activity:
ESnet MAN Support & Operations

- *Operate MAN infrastructure at high level of reliability*
  - Milestones: Fully-redundant MAN in operation since 12/2007
    Nagios monitoring & Ciena event logging deployed
  - Issues: Separate security plan under development
    Completing Work-for-others reimbursement with ESnet
    Developing in-house optical network infrastructure expertise
    Developing dual hub architecture at FNAL & ANL
    Documentation & public interface need effort
  - Risks: Direction & funding for MAN beyond 10GE unclear
    Primitive governance limits regional use possibilities

Tactical Plan Status Summary

- Status Summary
  - M&S spending and FTE expenditures seem reasonably in line with budget allocations
  - Lost furlough time hit network upgrades & investigations hard
    - Some catch-up anticipated over remaining 4 months in FY
  - Concerns about impact on effort to sustain global outreach gains
    - Configuration & operational support for E2E circuits
    - Product support for Lambda Station & perfSONAR efforts
    - Leadership efforts of Crawford & DeMar in Internet2 & ESnet realms
  - Lambda Station spend-down hurt by furloughs & lost personnel