Strategic Plan for Facility Operations (2011)

Adam Walters, 4/26/10

Mission

Operation, maintenance, improvement, design & construction of Computing Division computer rooms, buildings & grounds, office and public areas in the Feynman Computing Center with offices and high availability computing; the Grid Computing Center with high density computing and specific high availability computing rooms (Networking & Tape Robot Room); LCC with LQCD and AMR computing; WH8-Fiber Central and specific office areas in Wilson Hall; WH5NW Server Room. The support and services for the areas listed above are provided by Facility Operations and are required for Computing Division to carry out its mission.

Current State

- The Data Center availability metrics have exceeded the documented goals. The Division has nearly kept up with new requirements and procurements by constructing, upgrading & optimizing computer rooms. In the last year, much focus was placed on the improvement of FCC.

- Buildings have been operating reliably, but have fallen behind in the replacement of aging infrastructure. Maintenance of critical equipment and infrastructure is performed by FESS or outside contractors.

- Offices have kept up with personnel needs, although barely, and need options for growth. There is need for a better office planning process.

Vision

- Continue to achieve excellent availability metrics. Provide space, power and cooling commensurate with stakeholder computing needs using modern computer room capacity planning practices and tools. Improve power efficiency in operation of computer rooms. Address the need for Test & Development computer room capacity and develop a plan for computer rooms/server rooms across the Fermi site which are managed by other Division/Sections.

- Provide reliable operation, maintainability and needed improvements to buildings. Adopt industry good practices to decrease energy usage within FCC.

- Provide sufficient office space to meet personnel needs. Upgrade selected office space to achieve modern esthetics and efficiency standards. Enhance the planning process for office space.

Stakeholders

Computing Division, running experiments, other D/S (BSS, FESS, PPD), GRID users and others

Goals and Objectives

Provide necessary computer room infrastructure maintenance, improvement and operational services for existing and new computer equipment.

Provide necessary building utilities maintenance, improvement and operational services.

Provide suitable & safe working conditions for all CD personnel including adequate work spaces; environment: ventilation, air quality, heating, cooling, humidity; ergonomics: workstations; furniture & storage; renovation & construction of offices; personnel relocation

Strategies

1. Optimize the maintainability of the Data Centers through comprehensive maintenance contracts
2. Proactively correct failures and address infrastructure risks and gaps in monitoring to increase the availability of the Data Centers
3. Provide Data Center capacity to meet computer acquisition timetables and work with stakeholders to plan for space and installations
4. Complete provisioning of remote monitoring for incident alerts and collection and analysis of energy effectiveness of computer rooms and building infrastructure
5. Follow architected model for computing which includes the addition of FCC3 High Availability computer room and plans to fallow FCC1
6. Develop & execute a plan for better capacity forecasting & planning
7. Execute replacement plans for aging/failing equipment
8. Modernize building and execute improvements
9. Formal maintenance program & documentation
10. Provide options for additional office spaces

Resource Needs

Facility capacity planning and forecasting is an area where better processes and tools will be necessary to predict the future needs for data center capacity. This is coupled with development and management of monitoring applications & tools targeted at understanding capacity usage and energy effectiveness. The tools must assist in the planning and change management of computing assets throughout the life cycle (procurement, modification, retirement).

The new applications & tools associated with Facility Capacity Planning, Facility Access & Security, Office Planning, Asset Tracking and other areas require a significant effort by database knowledgeable personnel.

Given the forecast & schedule for new construction of computer rooms, we need to conclude that some existing computing equipment may need to be relocated and incorporate this fact into our planning.

Progress Indicators

Achieve Data Center Availability Goals as described in the Facility Operations Outages and Availability Report (Docdb# 3768). Formalization of the process to forecast data center capacity 1-5 years.

Execution of general building improvements with emphasis on the replacement of FCC heat pumps (office units).

Degree to which we meet office space needs of personnel and the Division.

Project Plan / Schedule

FY11	FY12	FY13	FY14	FY15	$M
Re-Provision GCC CRA[1]					0.6
LCC 108 Cooling Upgrade					0.9
LCC FlyWheel/UPS Electrical					2.0
	Next Generation HDCC				8.2
	Tape Storage Room				0.9
	FCC2 Structural Upgrade[2]				0.4
	FCC Office Improvements				0.4
		GCC Computer Room D[3]			6.7
		WH Office Improvements			0.8
		FCC CR Fire Det/Sup Upgrd[4]			0.9
		FCC Sprinkler System Upgrd			0.6
		FCC Office Improvements			0.9
			FCC3 HACC Phase II		7.2
			WH8-FC Cooling Upgrd		1.2
			FCC Concrete Col. Repair		0.8
			Re-Provision GCC CRB		0.6
				GCC UPS Upgrade[5]	2.8
				Next Generation HDCC II	7.0
3.5	9.9	9.9	9.8	9.8	42.9

[1] Provision 208V electrical distribution, 15kW/rack density, 42" racks, remove ceiling
[2] Modifications to FCC2 structural systems to accommodate racks up to 2000 lbs (908kg)
[3] HACR disk storage room with standby generator for existing GCC Network Rooms & Tape Robot Rooms and mechanical/cooling
[4] VESDA fire detection systems with modern suppression systems in key areas of FCC computer rooms/utility areas
[5] Replace end of life UPS systems for GCC computer rooms
Next Generation Computing Facility – FY10 $25M; FY11 $25M