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General Lab Computing

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Introduction

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- The Lab's approach to general computing strikes a balance among:
 - Centralized infrastructure & services
 - Common tools & approaches
 - Flexibility in accommodating local requirements
- In the last two years, considerable progress towards:
 - Consolidation of roles & services
 - Better coordination & cooperation
 - Increased flexibility in shifting resources

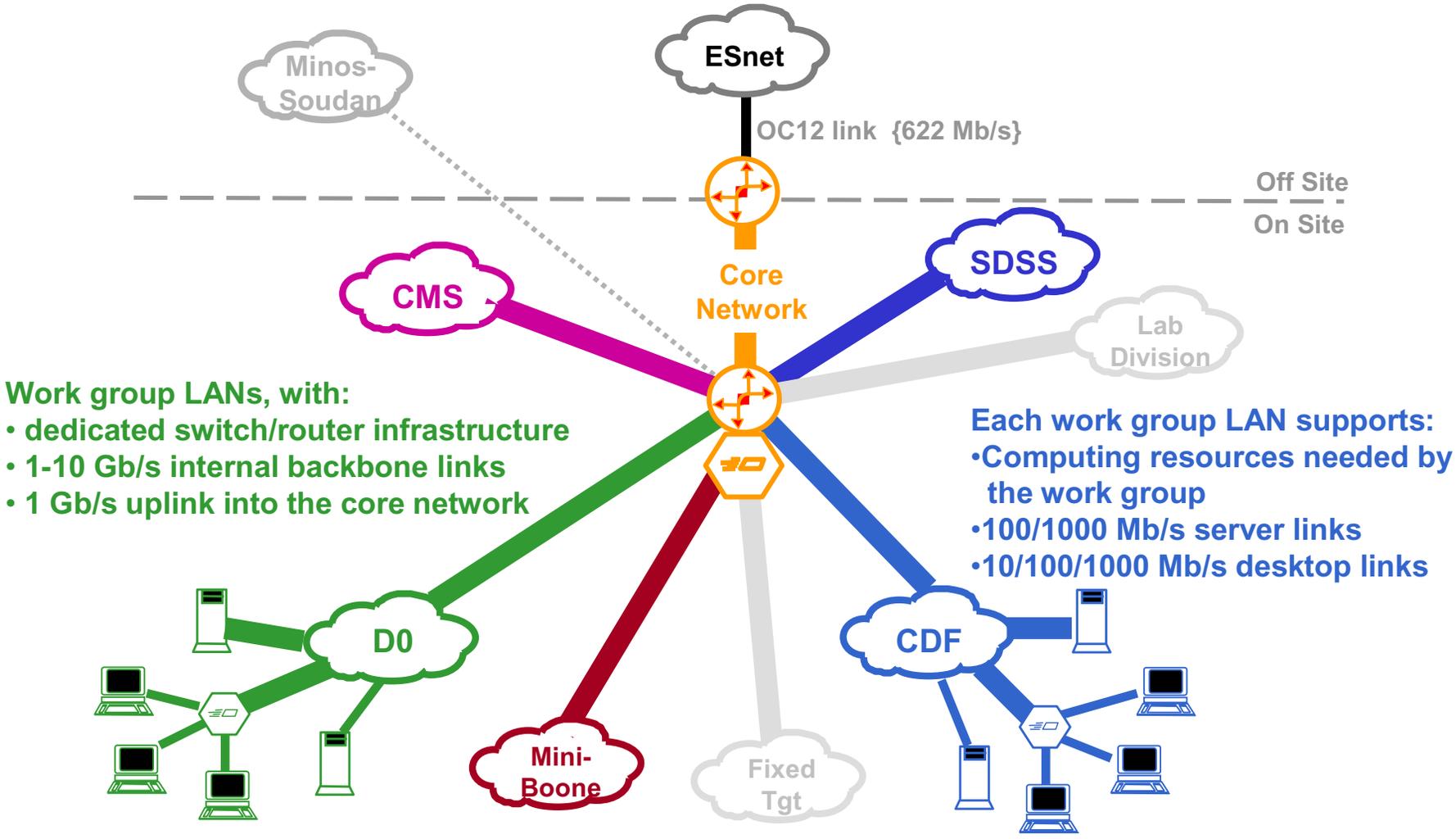
Networks:



- **Our role: Provide & support the facility network:**
 - Switches, routers, and cabling plant
 - Except for the Accelerator Division network (operated by AD)
 - Centralized network services
 - Wide area network connectivity
 - Simple today (ESnet), but about to become more complex
- **Our model: Work Group LANs:**
 - Allows us to design & implement network solutions tailored to each experiment or Division's requirements
 - Liaisons appointed for each work group to facilitate close coordination with our activities & their needs
 - Priorities driven by the experiments/Divisions

Work Group LAN Architecture

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Networks (cont):

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- Staff: 10 FTEs for networks; 5 FTEs for cable plant
 - Adequate for implementing & operating the network
 - But additional personnel effort needed to support:
 - Network research in areas that directly benefit experiments
 - Enabling or aiding users in making optimal use of the network
 - Increasing computer security demands on network services
 - Actively evolving our personnel skills into these areas
- Risk area: Wide area networking
 - Experiments to become dependent on reliable, very high capacity WAN bandwidth in the near future:
 - StarLight dark fiber an initial step to using optical networks
 - WAN research projects will help develop needed expertise

General Services



- Windows Support
 - Windows domain central infrastructure
 - Consolidates multiple WinNT domains w/ central management of accounts, authentication & policy (~2900 computers & active users)
 - Administered by CD (.5 FTE), lab-wide group makes policy recommendations, authorities delegated to local support
 - Distributed server & local desktop support
 - Good communication fosters common approaches
 - patch management, virus scanning, installation rollouts, license management, backup, etc.
 - Close integration of desktop hw & sw support & HelpDesk
 - CD supports 400 desktops (5 FTE), for CD, ES&H, LSS, MINOS, & servers for all these plus DIR, FESS, CDF (3 FTE)

General Services



- EMail (1.5 FTE)
 - Email gateways route email, virus scanning & spam tagging, processing ~800,000 message/wk
 - IMAP servers provide online storage of email & 2nd tier of virus scanning, backed by SAN
- OpenAFS (.5 FTE)
 - Global (in true sense) file system backed by SAN
- Web Servers (2 FTE)
 - Central web servers backed by OpenAFS
- Backups (.5 FTE)
 - Early stages of enterprise backup service
- FNALU (1 FTE)
 - Central general-purpose interactive & batch UNIX cluster
- Other services... (7 FTE)
 - Printing, CVS, sw & OS support, hw & sw contracts, hw repairs, licenses, news, video conferencing & streaming, ... (& would like to add more)

HelpDesk Services



- CD HelpDesk (4 FTE) first-tier support for users, dispatch for second-tier “experts”
 - Point of contact for accounts & authentication
 - Point of contact & dispatch for computer security
 - Remedy application to dispatch & track open tickets, escalate, page, etc.
 - 175 tickets/wk (60 for account mgmt)
 - 50 hw service calls/wk dispatched to service providers
 - Also used by AD & PPD
 - Integrated w/ automated monitoring
 - Still many manual processes
 - A service that’s in transition...

Computer Security

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- Integrated computer security program
 - Modeled on integrated safety program
 - Computer security team (4 FTE) provides:
 - Guidance on policy & best practices
 - Educational programs
 - Expert technical assistance
 - Central authentication & vulnerability scanning services
 - Interface to other organizations
 - Incident response team drawn across Laboratory
 - “Volunteer fire brigade” of local experts
 - 24x7 call rotation

End

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Additional Materials

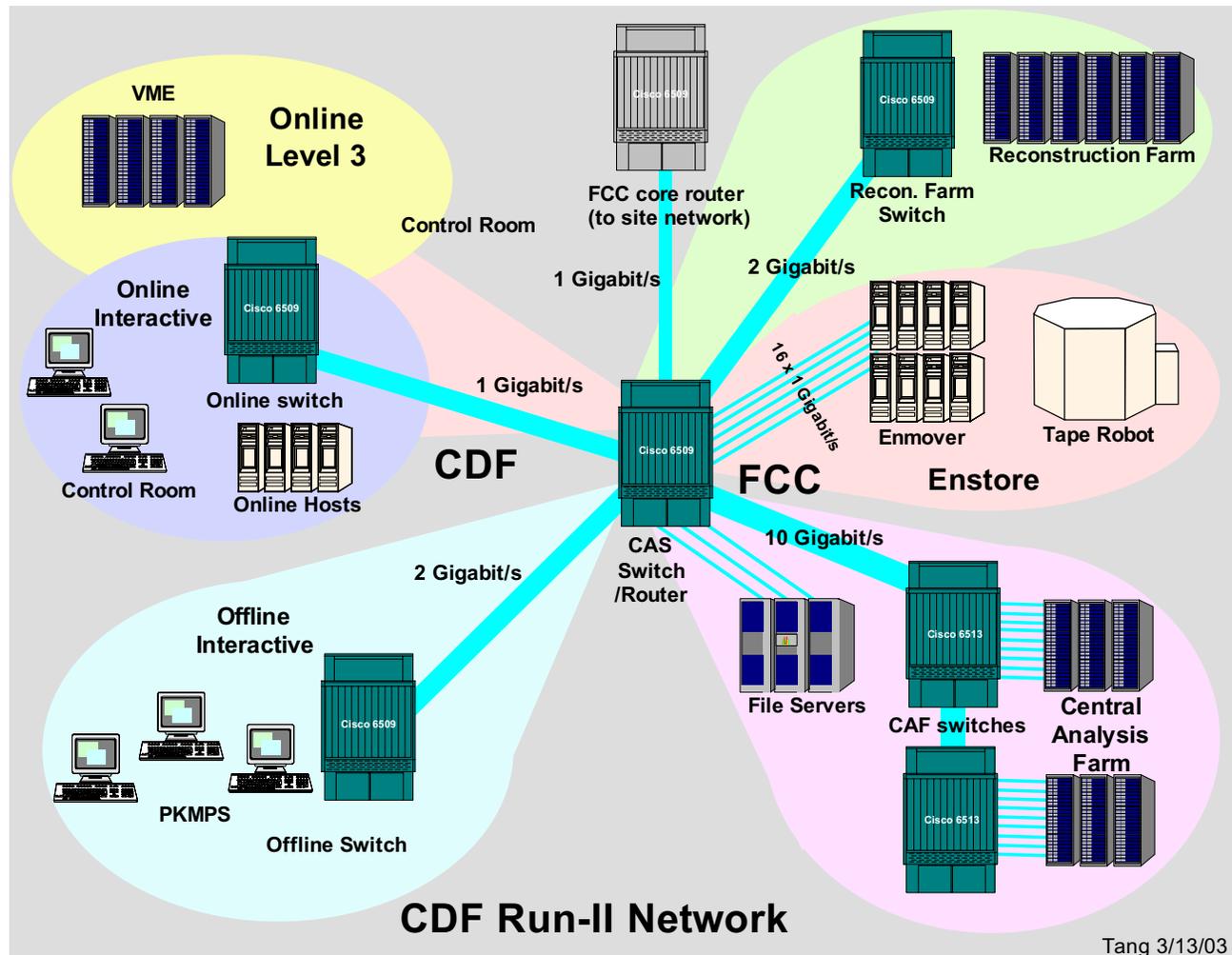
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Risk Areas

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- Find & maintain a “right” balance among:
 - Inhouse vs. outsource development & support
 - Some outsource successes already, & will do more
 - Loss of flexibility, local expertise
 - Requires (management) effort
 - Central vs. distributed management
 - Local organizations can react more easily to local needs
 - Be alert to opportunities to cooperate or consolidate
 - Stability vs. technology vs. cost
 - Diversity vs. conformity
- Movement to distributed Grid operations
- Reuse of personnel resources
 - More flexible now than we have been
- Loss of edge
 - Don’t react as quickly as user demands, esp. on new technologies
 - Need to maintain technology leadership

Run-II Work Group LAN Example **f**



Self-Assessment



- **Goal:** Provide efficient and reliable core computing and equipment services
- **Assessment:** The Department continually monitors and assesses performance in these functional areas, based on both client feedback and “hard” metrics, which are used in our on-going program to make improvements. Organizational and process changes, and new technology, have been used where appropriate to accomplish these improvements. The new organization of the Department has greatly contributed to the ability to flexibly bring together resources from anywhere in the Department to address problems or undertake new projects.
- A measurable success has been the Department’s contributions to the success of the Run II experiment’s data-taking and analysis in the areas of database administration and production farms processing. Another success has been our contributions to the Run II luminosity upgrades through support for the hardware modifications for the beam position monitors.
- One current area of focus is reliability and maintainability of commodity hardware for large computing clusters, where we continue to improve our processes for evaluation of hardware and certification of vendors. We are also working with vendors to improve overall uptime through more robust hardware and software and lower time-to-repair.

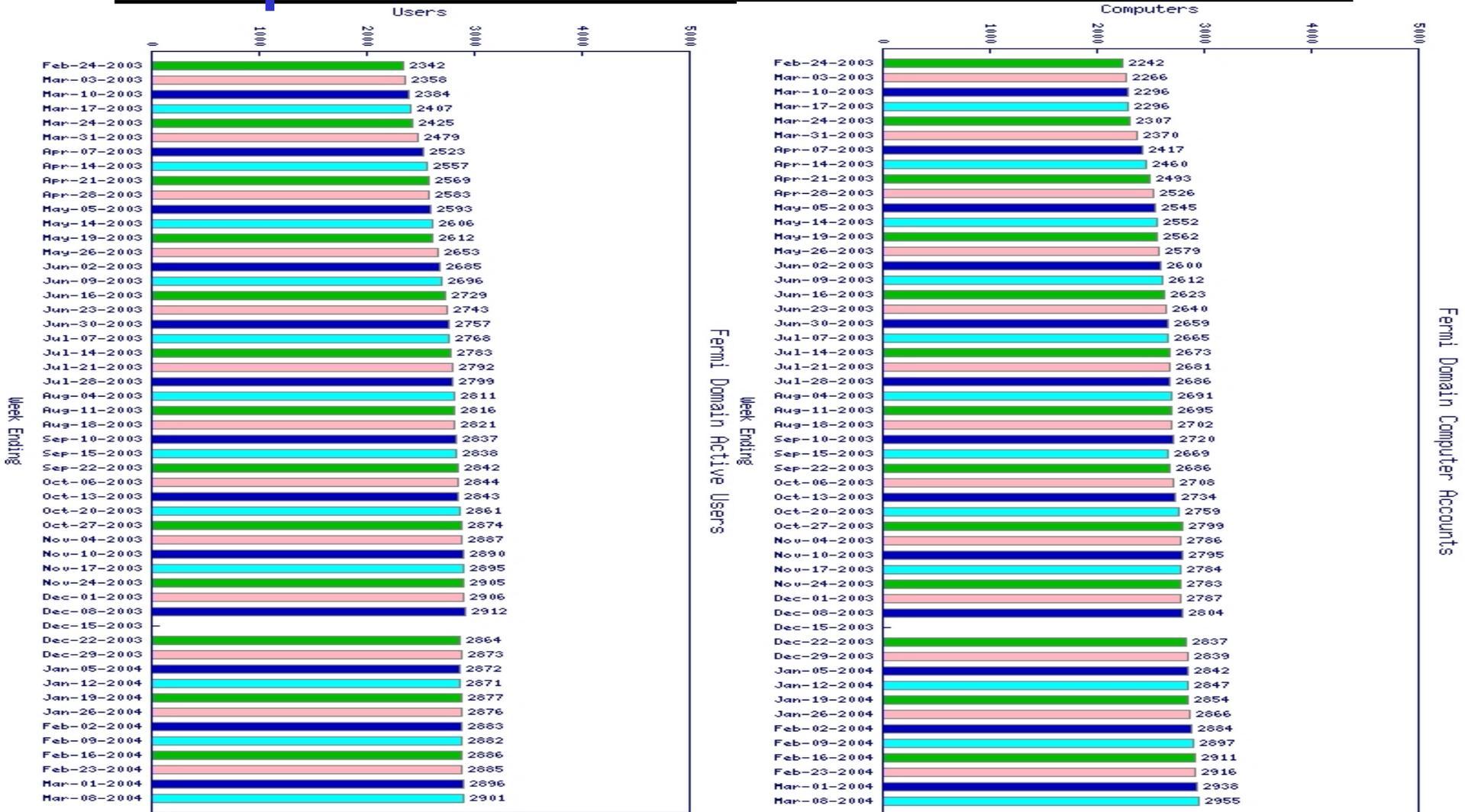
Self-Assessment



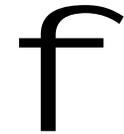
- **Goal:** Furnish a centrally-managed campus network, continuously evolved to meet modern usability expectations, having a configuration allowing for central management, and low operational costs.
- **Assessment:** Such a high-quality managed network exists, and has the requisite properties. Challenges of adequate management were met in relevant areas, including management software enforcing elements of proper use (autoblocker), increased Netflow support , migration of monitoring to HP OpenView, tracking core use and advocating 10 GB modules as apropos, and extensions of the inter-building fiber plant. The Core Network Computer Security Plan was revised.
- **Goal:** Furnish a designed network for the lab's data-intensive computing, including Network-based storage systems, network-based analysis clusters, and production farms.
- **Assessment:** This has been an outstanding success. Such networks are now deployed or planned to be deployed in every appropriate area.
- **Goal:** Furnish off-site connectivity apropos for the production needs of the lab's current experiments, and for inter-lab systems development and demonstration needs.
- **Assessment:** Production traffic is to be handled by ESNNet. An OC-12 upgrade was obtained in time to support the lab's production traffic. A Fiber RTU to the Starlight Optical interchange facility is in process, but is proceeding more slowly than hoped for. This RTU will allow the Lab to connect to research and production networks with novel technologies and at very high bandwidths.

Win2k Domain Users & Computers

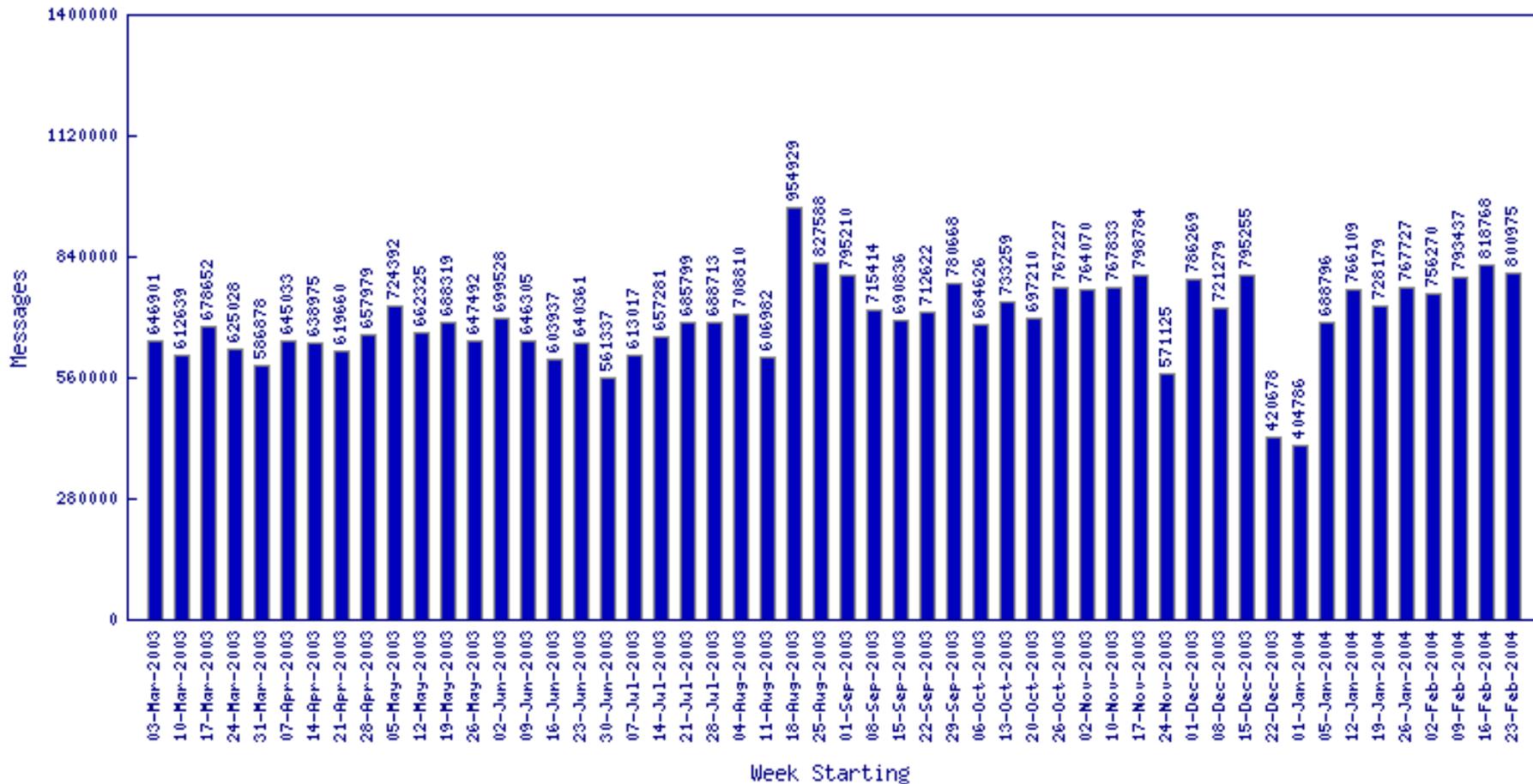
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Email Gateway Traffic



FNAL Gateway Messages per Week



(More stats: <http://computing.fnal.gov/email/statistics/>)

HW & SW Maintenance Costs

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