



Penn



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Agenda

- Campus & Organization Info
- About Penn's Networks & Services
- Rate Info
- Current and Future Initiatives
- Q & A

About Penn

- Penn is the largest private employer in the city of Philadelphia and the second-largest in the Commonwealth of Pennsylvania.
- 3 Campus Locations:
  - West Philadelphia campus: 269 acres, 155 buildings (excluding hospital)
  - New Bolton Center: 600 acres, 77 buildings
  - Morris Arboretum: 92 acres, 30 buildings

About Penn

- Students 23,980
  - Under Grad 10,163
  - Graduate 9653
  - Part Time 4164
- Faculty 4607
  - Standing 2488
  - Associated 2219
- Staff 20,381 (including Faculty)
- Hospital 14,487

*All Numbers as of Fall 2007

University Leadership

- Amy Gutmann Penn's President
  - Former Provost of Princeton.
  - Developed the Penn Compact
    - Excellence to Eminence
      http://www.upenn.edu/compact/
- Ronald J. Daniels Provost
  - Former Dean of Law at U. Toronto
  - Came to Penn in 2005
- Craig Carnaroli EVP
  - Came to Penn from Merrill Lynch in 2000
  - Strong fiscal leadership

Information Systems Computing

- Central IT Organization at Penn
- Provides Technical Leadership, Infrastructure, Standards, Support and Services, for the University.
  - Core Administrative Systems
  - Data, Voice, Video Networks
  - Support Services For Local Providers
  - IT Security & Standards Leadership
- 9 Technical Units and over 300 FTE & Contracted IT Staff.
- Mission Vision Value (MVV)
  - "Technology leadership through collaboration for today's solutions and tomorrow's innovation"
- http://www.upenn.edu/computing/isc/index.html

ISC Networking & Telecommunications

- 100+ technical staff/contractors
- $25M budget
- 25,000 phone lines/12,000 voicemail users
- 50,000 IP addresses/17,000 email accounts
- 43,000 + Ethernet Ports (10, 100, 1000BT)
- 9,000 analog video connections/70 channels of programming
- 50+ services from wiring, to email & web, to digital video, to R&D for emerging technologies
- Operate I2 GigaPop (MAGPI) - Serves many customers in the Tri-State region including Princeton, NJ Edge, U Del, Penn, and many County IU

About PennNet

- 8 Routers in 5 Distributed Core Locations
  - 2 External (Juniper M120)
  - 6 Central (Cisco 7609)
  - 90+ Routers in Building Distribution Layer (6504)
- Dual 10 Gig Central Core
- 600+ Wiring Closets on Campus
  - Nearly 2500 Network Electronic Devices in production
  - Foundry GS & LS Closet Switches (Some POE)
- Over 230 Routed Subnets on Campus
- 11 Remote Campus Sites
- Gig Ethernet Links to 2 ISP's
  - 450mb Rate-Limited Access to the Internet
- 105mb Access to Internet2*

About PennNet (cont.)

- Provide core services like DNS, DHCP, Time Synch, & Authentication servers, etc.
- http://www.upenn.edu/computing/pennnet/
- Established Basic SLA with Campus http://www.upenn.edu/computing/pennnet/sla
- IPv6 Progress
  - Native IPv6 deployed throughout routing core and out to a small number of server and end-user networks:
    - ISC Networking Department subnet (both wired & Wireless networks)
    - Network Engineering Lab
    - Several infrastructure server networks (NOC2, NOC3, Streaming Services)
    - School of Engineering & Applied Science (SEAS)
    - IPv6 enabled production services: DNS, NTP, and some internal Web servers.
    - Other services planned for the very near future: Jabber (XMPP) – (once NOC1 network gets v6 enabled)

About MAGPI

- Penn-Owned/Monitored GigaPoP in Philadelphia
- Core Operations at ISP Hotel in Center City (401 N. Broad)
- Internet2 Link Recently Upgraded to 10Gig (from OC48)
- Internet & Internet2 Service
  - 220mb Subscribed ISP Service
  - 2.5Gbps Subscribed to Internet2
- Core Routers Juniper M320 and M10

About MAGPI

- IPv6 Progress
  - Native IPv6 routing deployed throughout the network
  - External IPv6 peerings:
    - Upstream National networks: Internet2
    - IPv6 connectors: Penn, Princeton, New Jersey Edge
  - IPv6 enabled production services: DNS, NTP and SSH
- Other Projects and Initiatives
  - 10 GB Link from Princeton & NOAA Through MAGPI to ESnet
  - Investigating DCN with Some Customers (Rutgers and Penn)
    - Pricing of Infrastructure in Progress
    - Order and Implementation process development in Progress

About Telecom

- Verizon Centrex
  - DMS 100 Switch
  - Contract in renegotiated though 12/2010
- 35 RDP sites on Campus
- Over 200 Additional Wiring Closets
- Major Initiative to Reconcile Dial Tone Counts with Verizon
- Legacy Voice Services
  - Voice Mail (Redundant Octel 350)
  - Actively Retiring Legacy ACD's (9 Departments, 191 Agents)
- Long Distance
  - Paetec/Verizon backup

Unified Communications: PennNet Phone Project Status

- We have 1400 VoIP users using SER
- Slowed Conversion Process
- Production-grade
  - Redundant servers, gateways and PRIs
  - Automated monitoring (server, network, PRIs)
  - Single-line features, email/voice mail integration
  - 511/911
- Network architecture: layer 2 Quality of Service, separate vLANs & subnets in building networks

Unified Communications: PennNet Phone Project Status (cont.)

- Installation, Help Desk Support & Billing fully operational.
- Customer and Local Support Programs in Place
- Deployed telephone directory services.
- Deployed web “front-end” to Unified Communications Services
- Deploying IP-based call handling and distribution

Unified Communications: PennNet Phone Project Status (cont.)

- Plans to Migrate to Open SER
  - Upgrade Time Frame Uncertain
  - Testing BLA Feature
  - Call Hunting Tests in Progress
- ISTP Connectivity was suspended
- Open Issues:
  - Call transfers between PSTN Gateways
  - Call Forward All with Accurate CID
  - Problems with Polycom Handsets and Ring Group

Unified Communications: PennNet Phone Project Status (cont.)

- Verizon HIPC Product Evaluation (Work in Progress)
  - Began process in Fall of 2007
  - Required some infrastructure at our colo spot for Ethernet connectivity (100mb connection completed 12/2007)
  - 10 pilot Phones Delivered in March
  - 7 additional phones ordered through normal channels
  - Pilot Start in Early April (90 day pilot)
  - HIPC Service Not Quite Centrex Equivalent
    - Long Lead Times for Service Turn Up
    - Phone Configuration Service
    - Dial Plan and Feature Issues List Created
  - Summer Decision on Feasibility and Applicability of Service.

Unified Communications
Asterisk Voice Mail

- Production Asterisk Service for all PennNet Phone Users
- Open Issues
  - Too many rings before voicemail (Possible SER or Asterisk Issue)
- Pilot Asterisk Server (Centrex Voicemail Users)
  - 150 Asterisk for Centrex voicemail users.
  - Distribute Quintum IAD's as Front end to Asterisk Server
  - Working on fault tolerant design involving manual cutover of SMDI
  - Open issues with SMDI problems
    - The SMDI not sending information to Asterisk (less than 3% of calls).
    - No customer complaints, but we'll look into this further once we're corrected some of the other issues.
- Merge into one Asterisk server – Working with Digium on finalizing some custom patches to Asterisk (new features and fixes)

Unified Communications
Interactive Intelligence (I3) ACD Service

- Penn has three legacy ACDs for a total of approximately 191 agents
  - Cinphony, Teloquent, Verizon UCD
- ISC purchased I3 Contact Center and is migrating all of the legacy systems to one centrally run (and highly available) IP-based system. http://www.inin.com/
  - In addition to telephone calls, the Contact Center also routes email, web chat and inbound fax requests to agents.

Unified Communications
Interactive Intelligence (I3) ACD Service

- Interactive Intelligence (I3) ACD Service (cont.)
  - The rollout commenced on January 29,, 2008 and is expected to be completed by September 1, 2008.
    - Currently deployed ININ V2.4; Plan to install ININ V3.0 Fall-2008
    - 122/191 = 64% of conversions completed.
    - Departments Converted - Student Health, Veterinary Hospital, Facilities, Student Registration and Financial Services, Dental School, Penn Behavioral Health and ISC Provider Desk
    - Departments Remaining – Wharton MBA, Undergraduate Admissions, Office of International Programs

About PennNet Wireless

- Goal: Secure, seamless, cost-effective and ubiquitous wireless connectivity for Penn community by June 2010.
- AirPennNet: 930 ISC-Owned Wireless Access Points (AP's) on campus
  - Will Operate 350 additional SEAS and SAS AP's by FY09
  - All 802.1x Authentication
  - Equates to ~65% Campus Coverage
  - Goal: 100% by FY2010
- Web-intercept Gateway (Blue Socket) retirement end FY08

About PennNet Wireless (cont.)

- Guest Wireless Network Complete by end FY08
  - AirPennNet-Guest
  - Netreg Web Intercept, and Rate Limited
  - Will offer Ability to download SecureW2 Supplicant
- 100% Wireless Coverage in Residence Halls
  - No Guest Network
- Cisco AP 1131 & 1242 with 802.11a/b/g radios
- Use Cisco WLSE to Manage AP's
- Will Evaluate 802.11n and Alternative Vendor Hardware in FY09
- Most AP's Will Require HW Upgrade in FY10

PennNet Wireless Info

- Policy

  http://www.isc-net.upenn.edu/policy/approved/20010910-wireless.html
- Wireless Information
  - Coverage Maps
  - Getting Connected
  - Laptop Config Help
  - Wireless FAQ

  http://www.upenn.edu/computing/wireless/airpennnet/
- Registration of non-ISC Access Points

  http://www.upenn.edu/computing/PennNet/AP

Network Management

- Network Management Group Reports Into Network Engineering Services.
- Three dedicated staff perform this work.
- Primary Work is for Network Operations Consumption.
- Manage and Operate vendor based and custom tools.

Network Management (cont.)

- Monitoring Tools
  - CA Spectrum Network Node Mgr v8.1. (Fault Mgmt.)
    - SLA Measurement Work (Routing Core, Wharton, CHC, Penn Law)
    - Actively Monitor VoIP and ACD Gateways for DS0 Usage
    - Part of CA Beta program Evaluating 9.0.
    - Expect another 1 to 1.5 years of Spectrum
  - Attention! (Alarm Notification)
  - CA eHealth (Performance & Trend Reports)
  - Variety of Internally Developed Tools
    - CatsUp – Web-Based On Call Monitor (and PDA Access)
    - ALMO (Auth. List of Managed Objects)
    - SALT

Network Management (cont.)

- Future Initiatives
  - Evaluation of Newer Performance Management Tools
    - Needs Analysis Completed
    - Evaluated two Open Source Products
      - Zenoss, an open-source product with a commercial option
      - Zabbix
    - Intend to pursue commercial products.
    - Goal is to reduce our reliance on a single vendor (CA) and improve reliability and maintainability.
  - Inventory Reconciliation Project
    - ALMO and Argis Data.

PennNet Port Rental Rates

Port Bandwidth	FY'08 Rates	FY'09 Rates
10Base-T	$6.03/month	$6.03/month
100Base-T	$7.03/month	$7.03/month
1000Base-T	$30.00/month	$30.00/month
vLan Port Surcharge	$2.50/month	$1.25/month

Activation Costs	FY'07 Rates	FY'08 Rates
Ethernet Port	$35 Per Port	$35 Per Port

Moving to 4 year depreciation cycle on closet electronics in FY10

Central Service Fees

Fiscal Year	Per IP Address	Per FTE Count
2008* New Model	$7.45/month	$5.10/month
2009* New Model	$4.29/month	Costs TBD

The New Model:
Charges Based on 2 Weighted Measures:
- 20% based on number of IP addresses.
- 80% based on weighted headcount
  (Faculty=1 FTE, Staff=1 FTE, Students=.5 FTE).

Implementation:
The model will be implemented in three phases:
- FY08 - 1/3 of head-count-related charges to be implemented
- FY09 – 2/3 of head-count-related charges to be implemented
- FY10 – New model to be fully implemented

Telephone Rates FY2009

	Traditional Phone	VoIP Phone
Centrex Line/VoIP Line	$15.60/mo	$15.32/mo
Port Charge	N/A	$6.03/mo
MBS Set/Maintenance	$10.03/mo	$4.00 to $8.00/mo
Voicemail	$9.75/mo	$3.00/mo
Subtotal/Avg. User	**$35.38/mo**	**$28.35/mo**
		$32.35/mo
Average Usage – Local (.06/call)	$3.00	$1.50
Average Usage – LD (.10/min)	$3.00	$1.50
Total Cost	**$41.38/mo**	**$35.35/mo**
Activations or Conversions	$100.00	$95.00

Interactive Intelligence ACD (Sample Rates)

	Monthly Option			
Quantity	Description of Licenses	Agent License Amortized over 60-months	Base Monthly Cost	License plus Base Monthly Cost
0	**Business Client**	$ 1.43	$ 106.53	$ 107.96
0	Phone Only AGENT - VOICE ONLY*	$ 10.13	$ 106.53	$ 116.66
0	Phone Only/Recording*	$ 15.83	$ 106.53	$ 122.36
12	**Contact Center Level 1 (Voice only)**	$ 11.63	$ 106.53	$ 118.16
0	Cont Ctr Level 1/ Voice / Tracking	$ 13.05	$ 106.53	$ 119.58
0	Cont Ctr Level 1/ Voice / Recording	$ 17.33	$ 106.53	$ 123.86
0	Cont Ctr Level 1/ Voice Tracking & Recording	$ 18.75	$ 106.53	$ 125.28
0	Cont Ctr Level 1/ Voice / Message & Desktop Fax	$ 12.30	$ 106.53	$ 118.83
0	Cont Ctr Level 1/ Voice / Tracking & Recording, Message & Desk top Fax	$ 19.43	$ 106.53	$ 125.96
3	**Contact Center Level 1/ Supervisor (Voice only)**	$ 21.00	$ 106.53	$ 127.53
0	Cont Ctr Level 1/ Supervisor / Voice / Tracking	$ 22.43	$ 106.53	$ 128.96
0	Cont Ctr Level 1/ Supervisor / Voice / Recording	$ 26.70	$ 106.53	$ 133.23
0	Cont Ctr Level 1/ Supervisor / Voice / Tracking & Recording	$ 28.13	$ 106.53	$ 134.66
0	Cont Ctr Level 1 /Supervisor / Voice / Message & Desktop Fax	$ 21.68	$ 106.53	$ 128.21
0	Cont Ctr Level 1/ Supervisor / Voice / Tracking & Recording, Message & Desktop Fax	$ 28.80	$ 106.53	$ 135.33

- ❑ Monthly license fee plus usage. Monthly fee based on 5-year ROI.
- ❑ No installation charges

Wireless Rates

Installation Rates (Estimated)	FY 2008	FY 2009
Wireless LAN with 6 or more Access Points (AP)	$800/AP*	$800/AP*
Wireless LAN with 1 - 5 APs	$1100/AP*	$1100/AP*

Ongoing Maintenance Rates (per AP)	FY 2008	FY 2009
Access Point	$27.00/month	$26.00/month
AP Port Rental and Maintenance (100Base-T)	$7.03/month	$7.03/month
vLan Wireless Port Surcharge	$2.50/month	$1.25/month

*AP Hardware is included in installation

Penn Current Initiatives

- Next Generation PennNet
- Business Continuity
- ResNet AirPennNet Survey
- Other Projects

Next Generation PennNet

- Next Generation PennNet (A Multifaceted Project)
  - Diversification of Routing Core
  - Construction of Five Network Aggregation Points
    - Lights Out Operation
    - Hardened & 2 Factor Secured Locations
    - Self Contained and Separate from Building Infrastructure
    - HVAC, UPS, Generator Power
    - Four NAPs in New/Recently Constructed Buildings
    - Six to Nine Months to Construct, three to six months to Operation
    - Last NAP Competed December 2006
  - Triple Redundancy on Key Servers & Services
    - Infrastructure Networks (NOC DNS Servers)
    - Backup Campus Email Server
    - Off Site Web Hosting WWW.UPENN.EDU

Next Generation PennNet (cont.)

- Enhancement of Fiber/Conduit Infrastructure to Re-Feed Buildings (Work in Progress)
- Dual Feeds/Diverse Pathway10 Gig Core
- On/Off Campus ISP Presence
- Integrated Services (Voice, Data, Video)
- Self Funded From Network Chargeback, but Multi-Year Project
- Significant Infrastructure Funding will end by FY2010

Next Generation PennNet Status

- 5 NAP locations completed.
- NAP locations have redundant/diverse 10 gig feeds.
- 93 buildings have Gig Ethernet
- Approximately 70% of switches 10/100/1000 enabled
- Nearly all building backbones are gig Ethernet
- By June 2009, all switches will be 10/100/1000Mbps

NGP

Enhancement of Fiber/Conduit Infrastructure to Re-Feed Buildings and Increase Redundancy

- Most core pathway construction consists of 4 , 4” PVC incased in concrete. In Some cases, 8-way Conduits are Used.



NGP

Dual Feeds/Diverse Pathway10 Gig Core

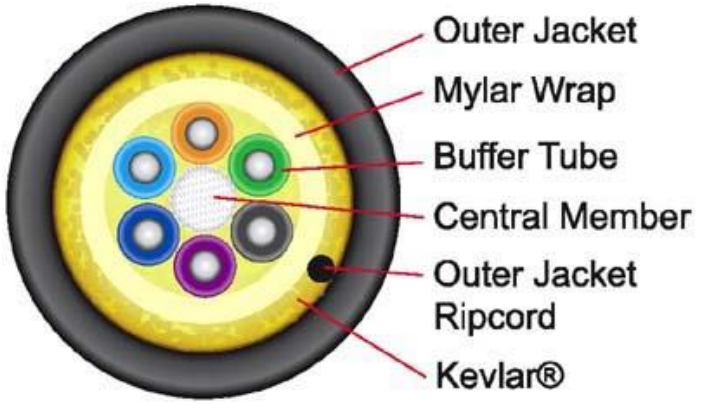
- Core Fiber Distribution is Singlemode loose tube.
- Dedicated core cable between NAP locations.
- Backbone (building distribution) count size varies depending on building count.

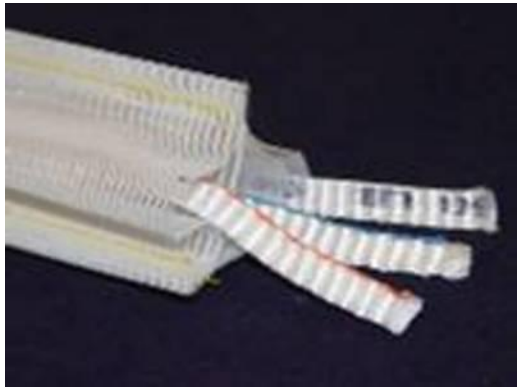


NGP

Enhancement of Fiber/Conduit Infrastructure

- Average Building Distribution is 12-24 strands per building.
- Use of Maxcell Innerduct to increase conduit capacity, and overall better cable management.





NGP

Enhancement of Fiber/Conduit Infrastructure

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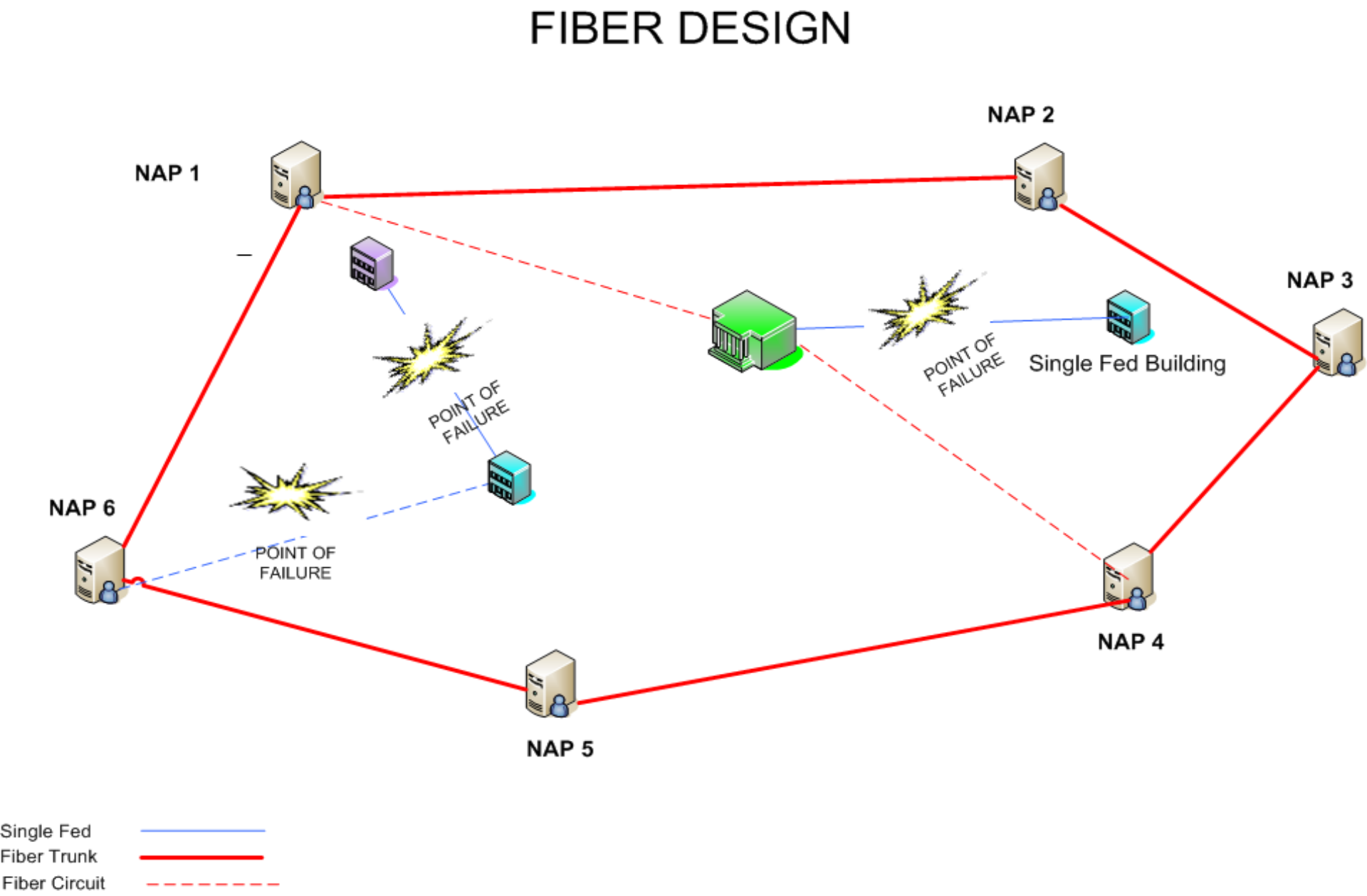
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Cost Savings

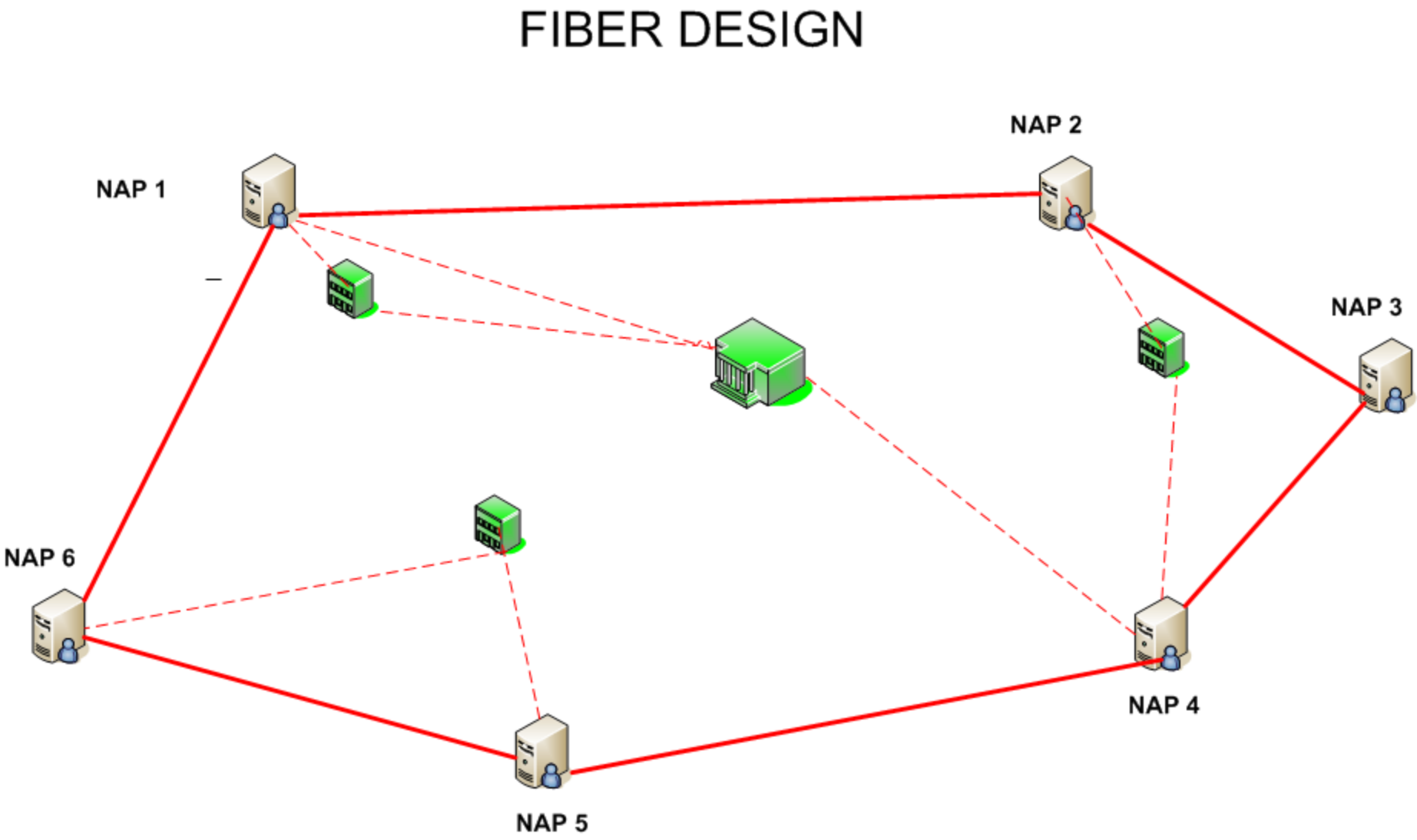
- Better Relationship With Facilities Management Construction Department
  - Communicate Plans / Ideas
  - Seek Input
  - Coordinate Work Schedules
  - Assist When and Where Applicable
  - Common Use of Resources
    - Engineers, Excavation Contractors, etc.
  - Savings so far this year - at least 200k.



Mitigating Risk



Mitigating Risk



NGP

Managing The NAP's / Data Centers

- Operations Management
- Change Control
- Preventative Maintenance
- Long Term (Life Cycle) Management

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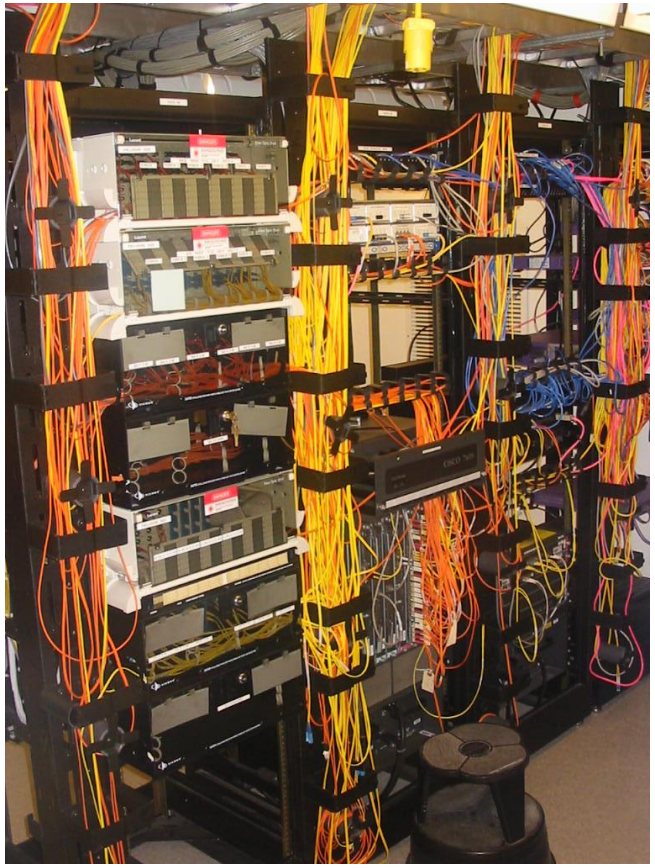
Managing The NAP's / Data Centers

Operations Management

• Defined Emergency Response Procedures.

• On Call Notification / Immediate Response to the following:

- •High/Low Temperature
- •Low /High Humidity
- •CRAC Unit Water Detection
- •Power Problem to Equipment in the Node Room
- •UPS Status Bypass, On Battery etc
- •NAP Water Detection
- •Fire Alarm (Node Room/Building)
- •FM200 Discharge



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Managing The NAP's / Data Centers

Operations Management (cont.)

- Inspections for Cleanliness and Adherence to MAC Polices are Conducted Weekly.
- Environmental Inspections are Conducted Weekly and Readings are Recorded to Track Cooling and Electrical Statistics.
- Preventative Maintenance is Conducted Quarterly by an Authorized Maintenance Company.
- Equipment Life Cycles are Managed for Proper Budget Forecasting



NGP

Managing The NAP's / Data Centers

Change Management

- All Equipment MAC's Require Authorization.
- All Equipment is Continuously Inventoried,
- Heat Loads are Taken Weekly.

BUILDING	NODE ROOM SQ FT	CALCULATED ROOM AREA BTU'S **	UPS - RATED KVA CAPACITY	UPS - CURRENT KVA USAGE	UPS - CURRENT UTILIZATION IN % of KW	UPS - CAPACITY LEFT IN KVA *	CRAC - TONNAGE NODE ROOM N+1	CRAC - RATED BTU CAPACITY x 2	CRAC - 90% USABLE BTU CAPACITY x 2	Using UPS CURRENT CALCULATED ROOM LOAD IN BTU'S	% OF ONE CRAC UNITS CAPACITY VS. KW LOAD	TOTAL NODE ROOM HEAT LOAD IN BTU'S ***	% OF ONE CRAC UNITS CAPACITY VS. TOTAL ROOM LOAD
VAGELOS LABS	400	10,900	30	15.9	53	11	5 x 2	56,500	56,500	43,401	77%	54,301	96%
COLLEGE HALL	600	16,350	15	4.5	30	9	5 x 2	56,500	56,500	12,283	22%	28,633	51%
HUNTSMAN HALL	320	8,720	30	21.3	71	6	5 x 2	58,300	58,300	58,140	100%	66,860	115%
MODV	497	13,543	30	20.1	67	7	5 x 2	56,700	56,700	54,865	97%	68,408	121%
SAMSON EAST	500	13,625	30	18.0	60	9	5 x 2	58,300	58,300	49,133	84%	62,758	108%
LEVY *	500	13,625	80	19.2	24	53	5 x 2	134,200	134,200	52,408	39%	66,033	49%

Business Continuity

Integrated BC Planning for Entire Organization

- Look at All Services Offered by the ISC
- Objective look at vulnerabilities (single points of failure) and make recommendations
- Determine the impact to the University by ranking based on the highest impact to the largest number of faculty, staff and students
- Apply factors to each for clarity across team members (Life Safety, Data Asset Protection, Security, Penn Image, and University Business)

Business Continuity (cont.)

Goals & Objectives

- Eliminate single point of failure.
- Redundancy routing core and services.
- Create Hardened Network Aggregation Points (NAP) in strategic campus locations
- Redundant High Speed Links Among NAPs
- Network redundancy to every campus building.
- Reduce catastrophic disaster recovery time from 2 weeks to under 2 hours.
- Provide infrastructure foundation for next generation data, voice and video services.

Business Continuity Phases

- Business Continuity Strategy
  - Phase 1: Identify the Top **12** Vulnerabilities that Affect Delivery of Infrastructure or "User Visible" ISC Services
  - **Phase 2: Make Recommendations for Risk Elimination or Mitigation (FY2008)**
  - **Phase 3: Perform a Business Impact Analysis & develop strategy and plan to rectify (FY2009)**

Business Continuity Progress

- 80% of Network Connections Moved to Other NAP Locations
- 50% of Building Networks Have Dual Feeds
- Critical Voice Services Replicated
  - Dual Octel 350's (involve Manual Cut Over)
  - Asterisk Voice Mail Service (with redundancy)
  - VoIP Service Fully Redundant SER & Three gateways to PSTN
  - Significant Migration off Legacy ACD Services
- High Availability Network Design for Penn Community Servers

Wireless Resnet Survey

- Drivers
  - Wireless Installed in Summer of 2006
  - Wireless new service in Residence Halls.
  - Ramp up Local Support for SecureW2 802.1x Supplicant
  - Use of Student ITA Workers For Front Line Support
  - AirPennNet Received Feedback of Poor Service in Spring 2007 RA Survey
- Key Players
  - ISC N&T & TSS
  - CHC
  - Student Groups (UA and Advisory Board)

Wireless Resnet Survey (cont.)

- Process
  - Reviewed all 2007 Survey Results
    - Very Vague Answers Given Based on 3 Questions
    - Classified Answers as Network, Desktop, User Error
  - Developed AirPennNet Survey (January 2008)
  - Interviewed Student Groups
    - Information Gap
    - Support Process Needs Help
    - Some Wireless Problems (Coverage & Supplicant Issues)
      → ***Pointed to Poor Wireless Service***
  - Student Involvement
    - Survey Draft Process
    - Edit of Content (Known that ISC Originated)
    - Test Surveys
    - Endorsement of Survey

Wireless Resnet Survey (cont.)

- Survey Content (5 Major Objectives)
  - On Campus Student Feedback on Wireless in Residence Halls
  - Wireless Service as a Whole
    - In General – Does it work?
    - Ease of Use/Access
  - Locate Service Problems
    - Did you Ever Have Problems
    - How Many Students Really Have Connection Issues
  - Support process
    - Is your Local Support Useful or Not
    - Timely Ticket Closure
  - Information About AirPennNet
    - How Much Do You Know About AirPennNet
    - Source of Your Information.
- Survey Running From 04/21 through 05/05/2008

Wireless Resnet Survey (cont.)

- Responses After First Week
  - 12 Percent Response from 7000 Students
  - Very Good Response Given Class Schedule
  - Most responses contain useful/constructive information
  - Offered capability to open Request for Assistance
    - To date 56 Requests Opened
    - Students Have Been Contacted
- Response Highlights
  - Need to Update Our AirPennNet Website
  - Need to Publish Changes to Wireless in Schools/Centers
  - Local Support Should Be Better Equipped
  - Students Admit to Being “Lazy” on Follow Up on Troubles

Other Projects

- East Campus Postal Properties
  - 43 Acres of Land Just Acquired
  - Planning and Design for Integration into the University's Master Planning Efforts
    - Strategic Plans for the Next 30 years
    - Ties into Main Campus and to Center City
- Public Safety Work
  - Emergency Phones
    - Parking Garages and Buildings Competed
    - Elevator phones Next
  - Cameras
    - Direct fiber feeds from DPS PennComm Center
    - Will Pilot IP Cameras in Some Campus Locations
  - Alarm Circuit Network
  - DPS Pursing Siren Alert System (Baycomm)

Other Projects (cont)

- Emergency Notification
  - Vendor MIR3
  - Operational Summer2007
  - Campus pilot on February 2008
  - Key Participants (DPS, ISC, Verizon, Cell Phone Vendors)
  - Split Test Work Phones Then Cell/Email
    - 12,600 Work Phones (Faculty & Staff)
    - Eliminated Shared Lines From List
    - 50K SMS
    - SMS, Cell, Email 4 minute delays between Start of Messaging
    - Some Issues with Return Calls to Vendor
    - Message delays after start of test
      - Work phone -9 min.
      - SMS -19 min.
      - Realtime Reporting Problems
  - Next Test TBD

Questions?