

# IEEE NETWORK OVERVIEW

## ***Audience:***

Institute of Electrical and Electronics Engineers



**March 13<sup>th</sup> - 19<sup>nd</sup>, 2005**  
**Atlanta, GA**

## ***Prepared by:***

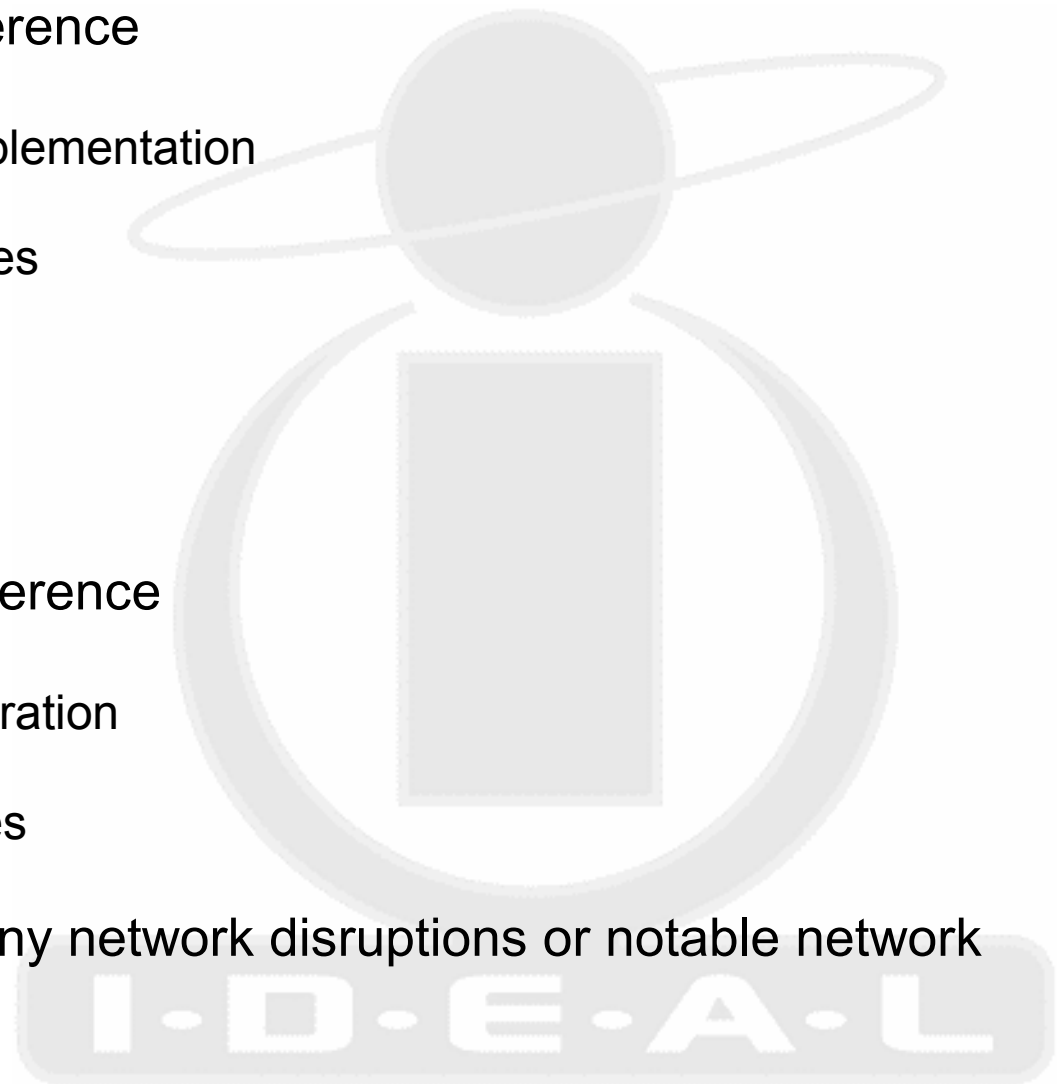
**Anthony L. Awtrey**  
**CTO**

**I.D.E.A.L. Technology Corporation**



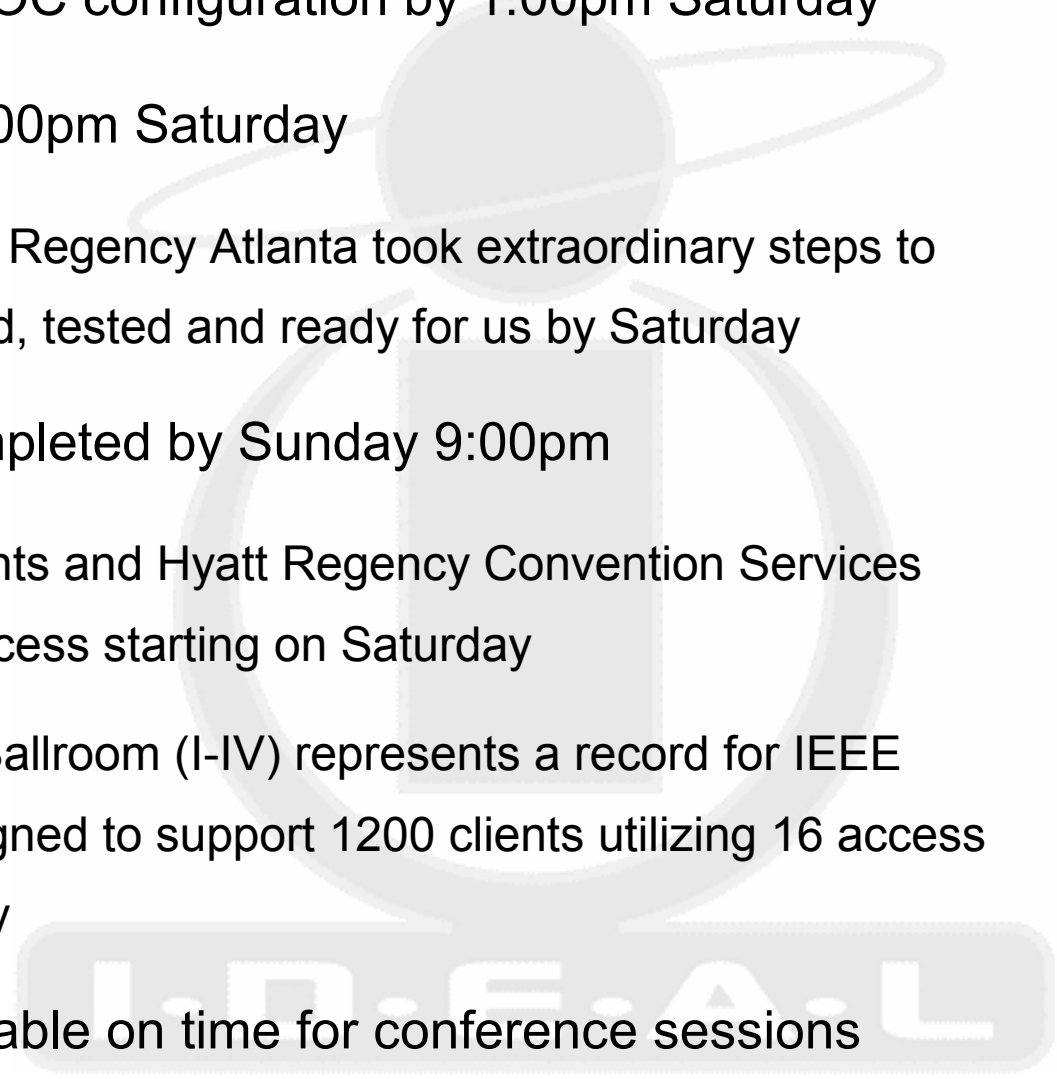
# NETWORK PLAN

- Provide network support for conference
  - Network topology design and implementation
  - Management of network resources
  - Facilitate Internet access
  - File and print server access
- Provide end user support for conference
  - Wireless and wired client configuration
  - Diagnose and resolve VPN issues
- Communicate with all members any network disruptions or notable network issues

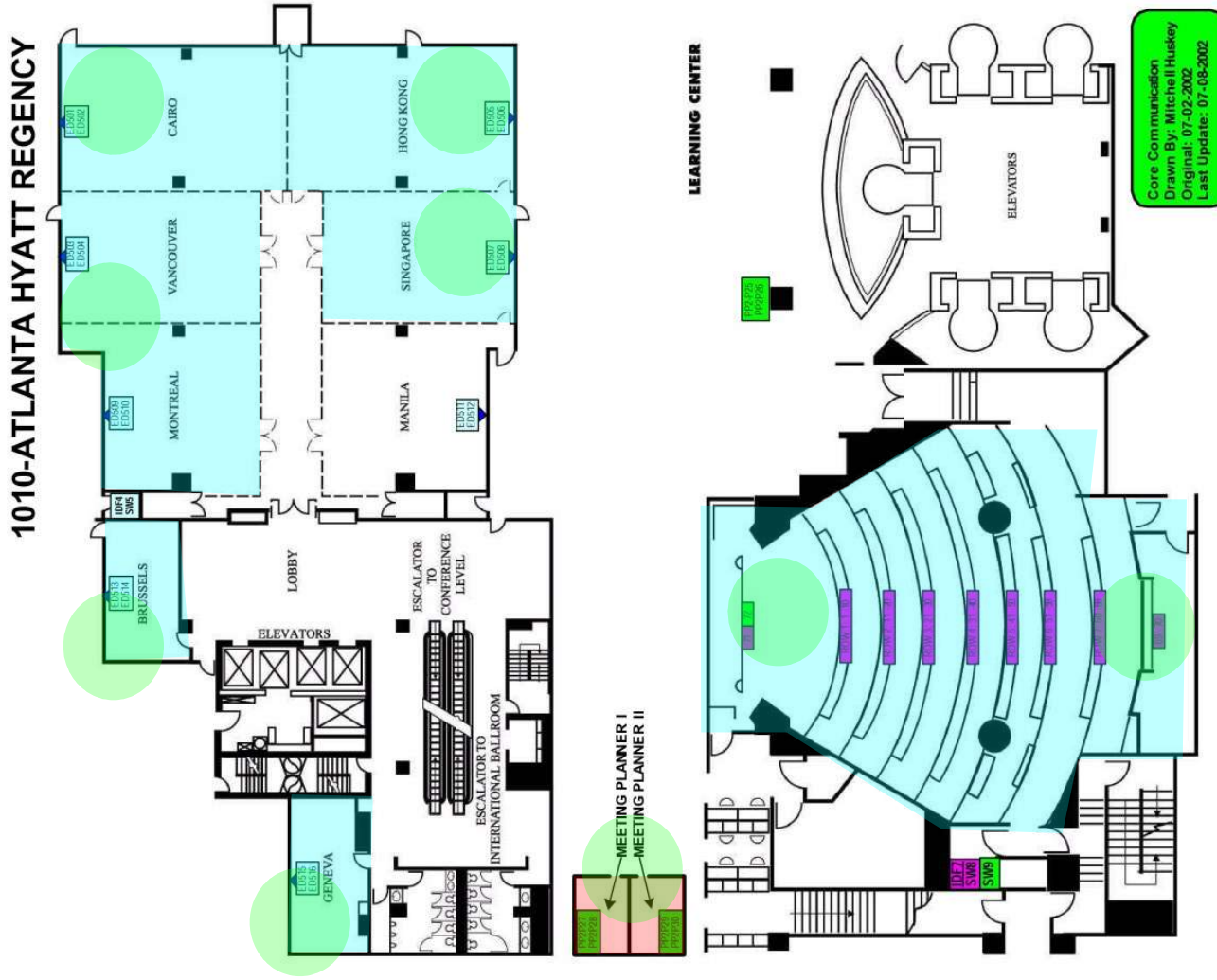


# NETWORK AVAILABILITY

- Equipment inventory and initial NOC configuration by 1:00pm Saturday
- Internet access established by 2:00pm Saturday
  - Core Communications and Hyatt Regency Atlanta took extraordinary steps to ensure that the DS3 was installed, tested and ready for us by Saturday
- Deployment of access points completed by Sunday 9:00pm
  - Thanks go to Face To Face Events and Hyatt Regency Convention Services who scheduled meeting room access starting on Saturday
  - The 28,832 sq. foot Centennial Ballroom (I-IV) represents a record for IEEE conferences with a network designed to support 1200 clients utilizing 16 access points during the opening plenary
- All services were active and available on time for conference sessions

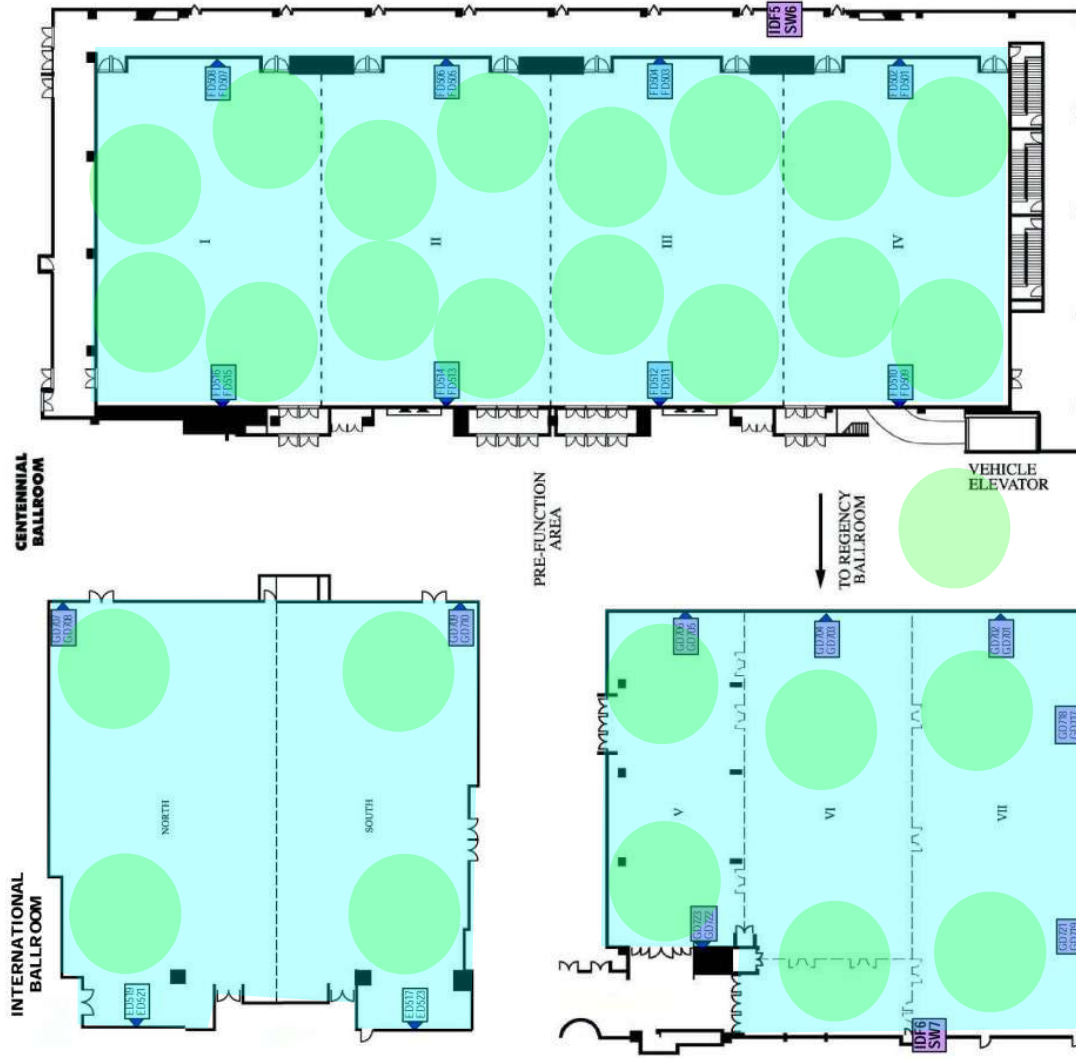


# HYATT REGENCY I



# HYATT REGENCY II

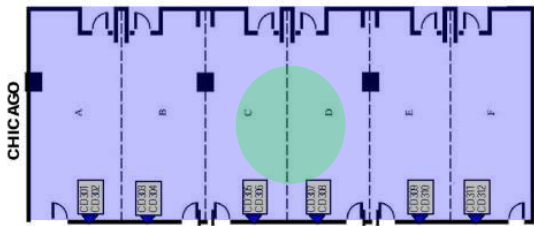
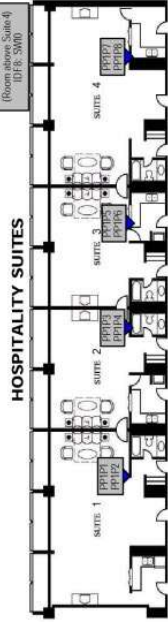
## 1010-ATLANTA HYATT REGENCY



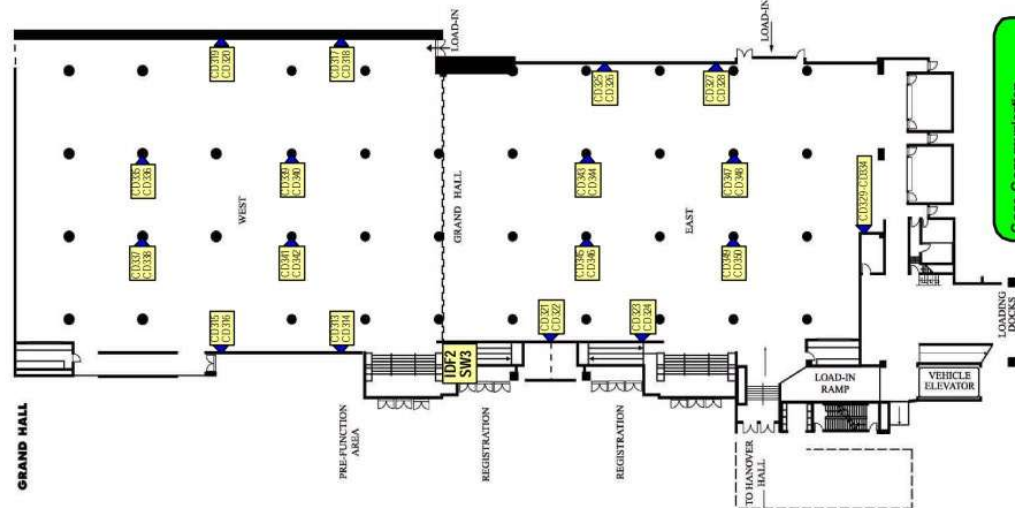
Core Communication  
 Drawn By: Mitchell Huskey  
 Original: 07-02-2002  
 Last Update: 07-08-2002

# HYATT REGENCY III

## 1010-ATLANTA HYATT REGENCY



Suite 226



Core Communication  
 Drawn By: Mitchell Huskey  
 Original: 07-02-2002  
 Last Update: 07-08-2002

# HYATT REGENCY IV

## 1010-ATLANTA HYATT REGENCY



ATLANTA CONFERENCE CENTER

# NETWORK STATISTICS

(Statistics accurate as of 9:00am 03-18-2005)

## ● Client Statistics

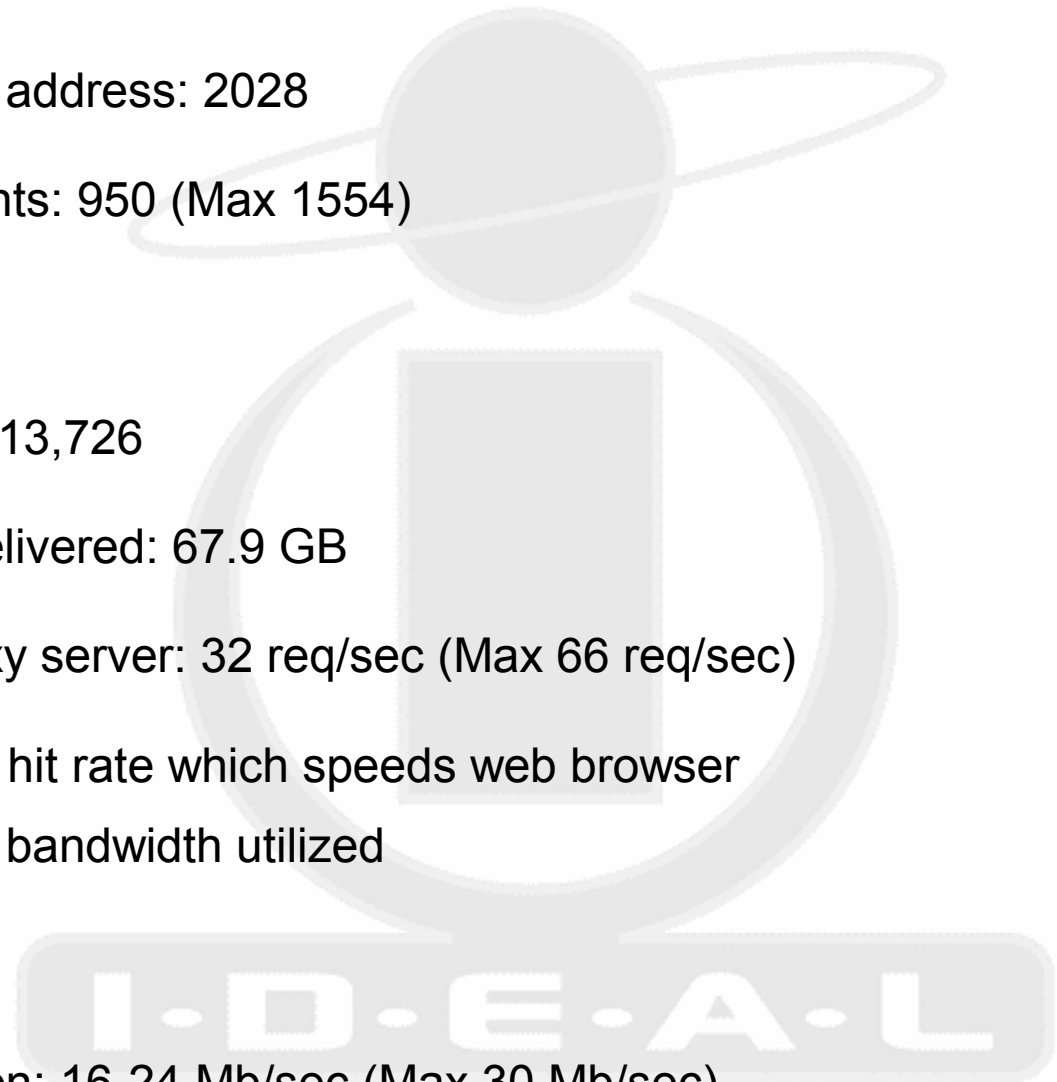
- Unique devices requesting an IP address: 2028
- Average concurrent network clients: 950 (Max 1554)

## ● HTTP Statistics

- Total HTTP requests served: 8,613,726
- Total Gigabytes of HTTP data delivered: 67.9 GB
- Average rate of requests for proxy server: 32 req/sec (Max 66 req/sec)
- Proxy averaged a 45.11% cache hit rate which speeds web browser responsiveness and reduces the bandwidth utilized

## ● Internet Statistics

- Average Internet access utilization: 16-24 Mb/sec (Max 30 Mb/sec)





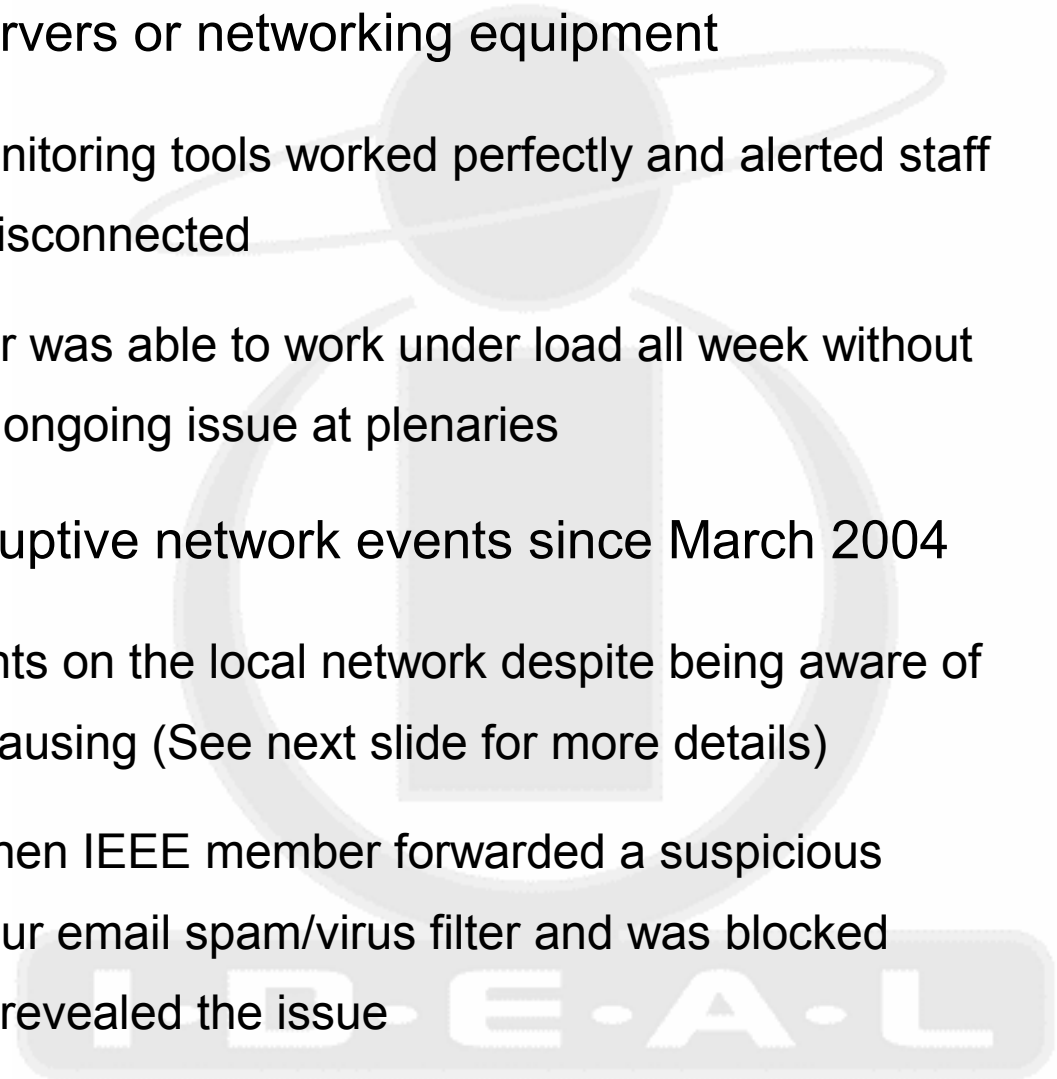
# NETWORK CLIENTS

19	3Com Corporation	4	Delta Networks, Inc.	1	Nokia Danmark A/S
1	Abocom Systems, Inc.	4	Edimax Technology Co., Ltd.	8	Nokia Wireless Business Comm.
1	Accton Technology Corp.	5	Enterasys Networks	15	Nortel Networks
3	Acer Technologies Corp.	5	Epigram, Inc.	1	Palm Inc.
20	Actiontec Electronics, Inc.	1	Ericsson Group	52	Philips Components
114	Agere Systems	1	Farallon Computing/Netopia	2	Planet Communications, Inc.
10	Airgo Networks, Inc.	13	Fujitsu, Ltd	23	Private
47	Aironet Wireless Communication	107	Gemtek Technology Co., Ltd.	22	Proxim, Inc.
1	Airvast Technology Inc.	2	Giga Fast E. Ltd.	4	Quanta Computer, Inc.
1	Allied Telesis K.K.	3	Global Sun Technology, Inc.	2	Realtek Semiconductor Corp.
8	Alpha Networks Inc.	25	Hewlett Packard	24	Samsung Electronics Co., Ltd.
4	Alps Electric Co., Ltd.	1	High Tech Computer, Corp.	1	Senao International Co., Ltd.
62	Ambit Microsystems Corporation	3	I-O Data Device, Inc.	3	Sharp Corporation
10	Ani Communications Inc.	58	IBM Corporation	1	Sitecom Europe Bv
40	Apple Computer, Inc.	536	Intel Corporation	10	SMC Networks, Inc.
1	Arima Computer Corp.	3	Intersil Corp.	27	Solomon Extreme International Ltd.
74	Askey Computer Corp.	1	Inventec Corporation	25	Sony Corporation
2	Asustek Computer Inc.	2	Lg Electronics, Inc.	1	Standard Microsystems Corp.
5	Atheros Communications, Inc.	7	Lucent Technologies	5	Sychip Inc.
8	Belkin Corporation	4	Marvell Semiconductor, Inc.	4	Symbol Technologies, Inc.
2	Benq Corporation	3	Matsushita Electric Ind. Co	1	Test-Um Inc.
1	Billionton Systems, Inc.	8	Megahertz Corporation	49	The Linksys Group, Inc.
3	Broadcom Corporation	14	Melco Inc.	15	Toshiba Corporation
1	Cameo Communications, Inc.	4	Micro-Star International	2	U.S. Robotics, Inc.
2	Card Access, Inc.	1	Microlink Communications Inc.	9	USI
166	Cisco Systems, Inc.	4	Microsoft Corp.	2	Vmware, Inc.
1	Cnet Technology Inc.	1	Mitac International Corp.	1	Winbond Electronics Corp.
5	Compal Electronics, Inc.	1	Mmc Technology, Inc.	13	Wistron Corp.
30	Compaq Computer Corporation	1	Module Department	1	Woonsang Telecom, Inc.
2	Corega K.K.	2	Nec Corporation	23	Ww Pcba Test
1	Cybertan Technology, Inc.	1	Nec Customtechnica, Ltd.	43	Xircom
46	D-Link Corporation	74	Netgear, Inc.	1	Zyxel Communication
45	Dell Computer Corp.	1	No Wires Needed Bv	1	00:08:3B

**2028 Total**

# NETWORK ISSUES

- No significant outages of IEEE servers or networking equipment
  - Automated management and monitoring tools worked perfectly and alerted staff when network devices became disconnected
  - The new 802.16 document server was able to work under load all week without reboots which was previously an ongoing issue at plenaries
- Detected the most number of disruptive network events since March 2004
  - Some members left infected clients on the local network despite being aware of problems their computers were causing (See next slide for more details)
  - Detection of one false positive when IEEE member forwarded a suspicious email to an Internet site though our email spam/virus filter and was blocked temporarily until an investigation revealed the issue

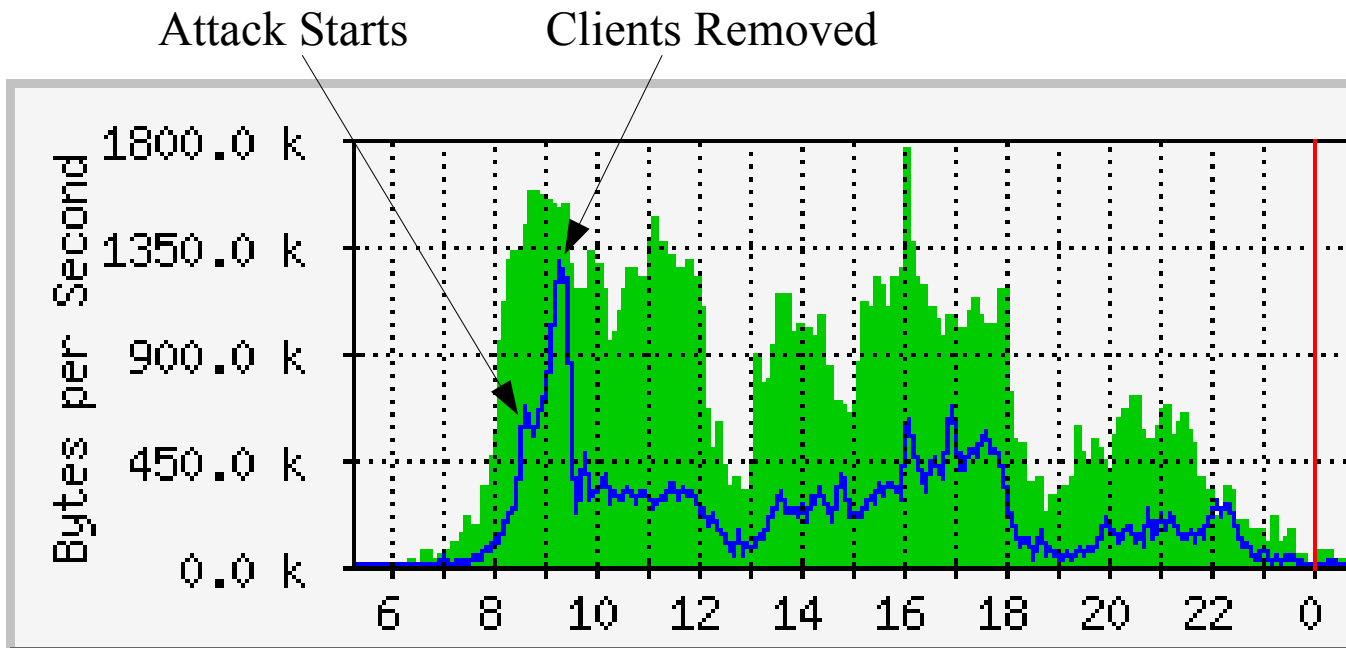


# ANATOMY OF A WORM ATTACK

This is a graphical view of our Internet connection utilization from Monday. Two clients were responsible for this particular attack. When both were removed from the network the Internet traffic returned to normal. Allowed to escalate, this would have made the network completely unusable.

Please note that while this chart shows the disruptive traffic is no longer reaching the Internet, it is still taking up bandwidth in the radio spectrum and the packets must be evaluated before being dropped by the gateway until the infected computer is taken off of the wireless network by the user.

**Internet utilization prior to attack: 700KB outgoing + 1400KB incoming = 16.8Mbps**  
**Internet utilization during attack: 1400KB outgoing + 1600KB incoming = 24.0Mbps**



Legend for Internet Bandwidth Chart:

**Blue Line** on chart shows data leaving out of our network to the Internet

**Green area** on chart shows data arriving into our network from the Internet

Total bandwidth calculated by adding incoming + outgoing rates

Data is represented in kilobytes per second

# NETWORK ISSUES (CONT)

- Both Centennial Ballroom (I-IV) and Regency Ballroom (V-VII) experienced extreme signal congestion on 802.11b channels
  - Access points were configured properly with reduced output power and specific fixed data rates as in all previous plenary/interim large room sessions
    - The access points also configured to advise clients to transmit at reduced power levels, but not all 802.11 driver implementations observe this correctly
  - According to some 802.11 engineers, the very high wireless signal congestion was exacerbated by room décor which utilized aluminum, steel, copper and wire mesh that reflected and scattered the 2.4GHz signals
  - 802.11a was unaffected due to lower number of clients and no channel overlap to provide adequate coverage of the facility space
  - Centennial Ballroom II meeting chair requested a wired café in the rear of their meeting room to provide an alternative to the wireless network on Tuesday

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