

VoIP security – myths & realities



*Ishai Rosmarin
Sales Director – EMEA
IRosmarin@acmepacket.com*



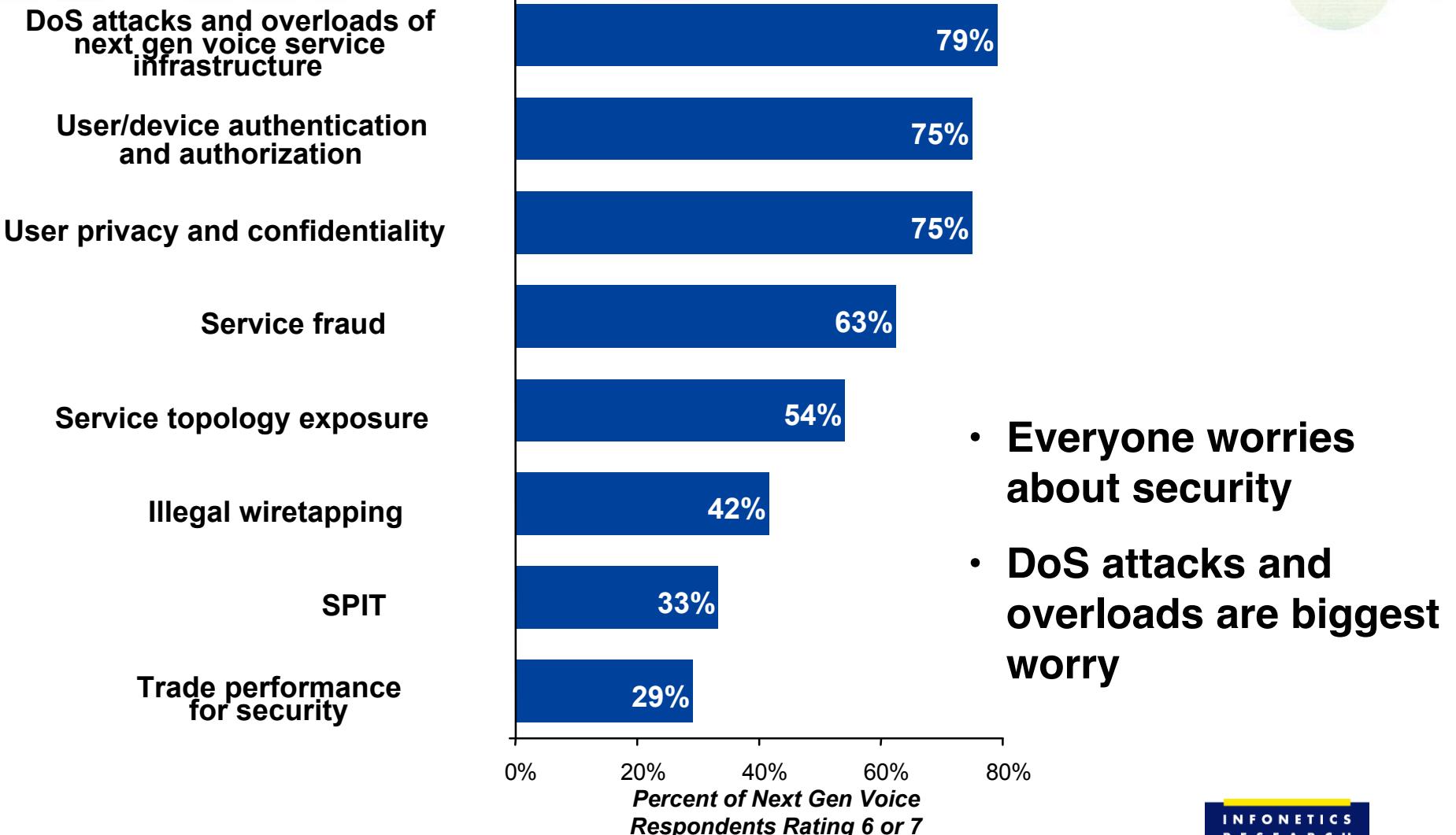
in IP
we don't
trust
anyone!

VoIP security in the news



- * ***VoIP Security Alert: Hackers Start Attacking For Cash* (June 2006)**
- * ***Two Men Charged With Hacking Into VoIP Networks* (June 2006)**
- * ***The Internet's a Scary Place for Voice* (May 2006)**
- * ***Is Your VoIP Phone Vulnerable?* (June 2006)**
- * ***Are Hackers Eyeing your VoIP Network?* (Sept. 2006)**
- * ***VoIP Security: It's More Than Data Security* (Aug. 2006)**

Security Concerns



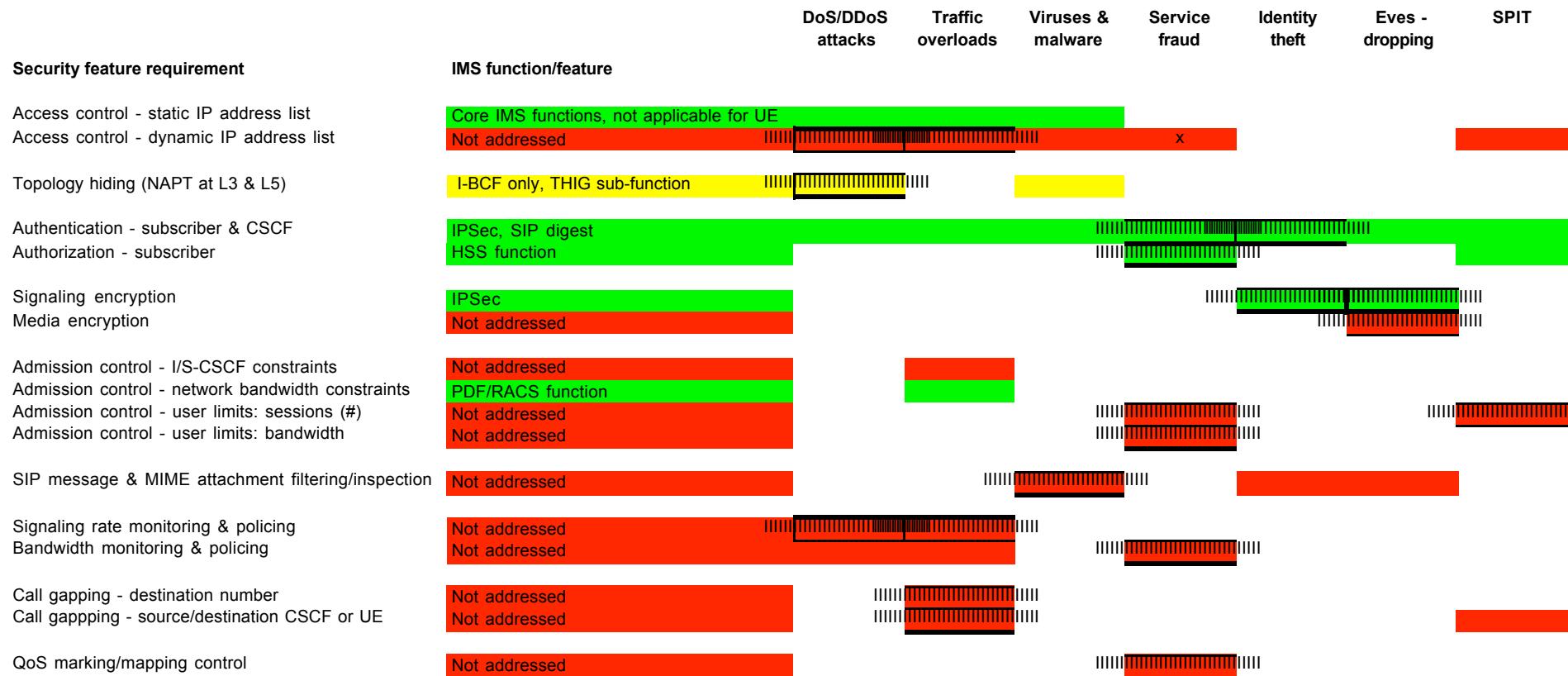
VoIP security threats & solutions



Security Threat	Comments	Impact	Probability			Security Solution
			VoIP over Internet - free, anonymous	VoIP over Internet - fee, not anonymous	VoIP over managed network	
DoS and DDoS attacks (service provider infrastructure)	-Requires sophisticated attack capable of covering tracks; -Catastrophic impact as all subscribers are impacted	10	1	3	2	-Access control and packet filtering; -Topology hiding and disintermediation; -Rate limiting and call gapping; -Dynamic attacker detection and blocking
Viruses and malware	-Impact varies based on service provider infrastructure, enterprise IP PBX or residential PC	3 to 8	5	5	5	-Authentication & authorization; -Deep packet inspection; -Signature detection; -Authenticated encryption
Service fraud	-Requires technical sophistication; -Impact depends on business model	5	N/A	5	5	-Bandwidth policing; -QoS marking/mapping; -Admission control; -Authentication & authorization; -Intrusion detection
Identity theft (phishing, not man-in-the-middle)	-Requires slightly more technical sophistication than SPIT; -Man-in-the-middle requires same degree of technical capabilities; -Information can be used for other attacks with various impacts	2 to 5	8	6	4	-Authentication & authorization; -Authenticated encryption
Eavesdropping/ user privacy	-Requires technical sophistication and access to wiring closets	2	5	5	2	-Authenticated encryption; -Anonymize user information
SPIT	-Requires little sophistication; -Annoying more than harmful	1	10	8	6	-Authentication & authorization; -Call screening and filtering; -Access control; -Topology hiding; -Intrusion detection

Note: probability and impact ratings on 1 to 10 scale with 1 being low and 10 being high

IMS: Is Missing Security



DoS/DDoS attacks threaten subscriber retention and revenue

* Types

- Malicious attacks
- Non-malicious – poor behaving endpoints, power outages

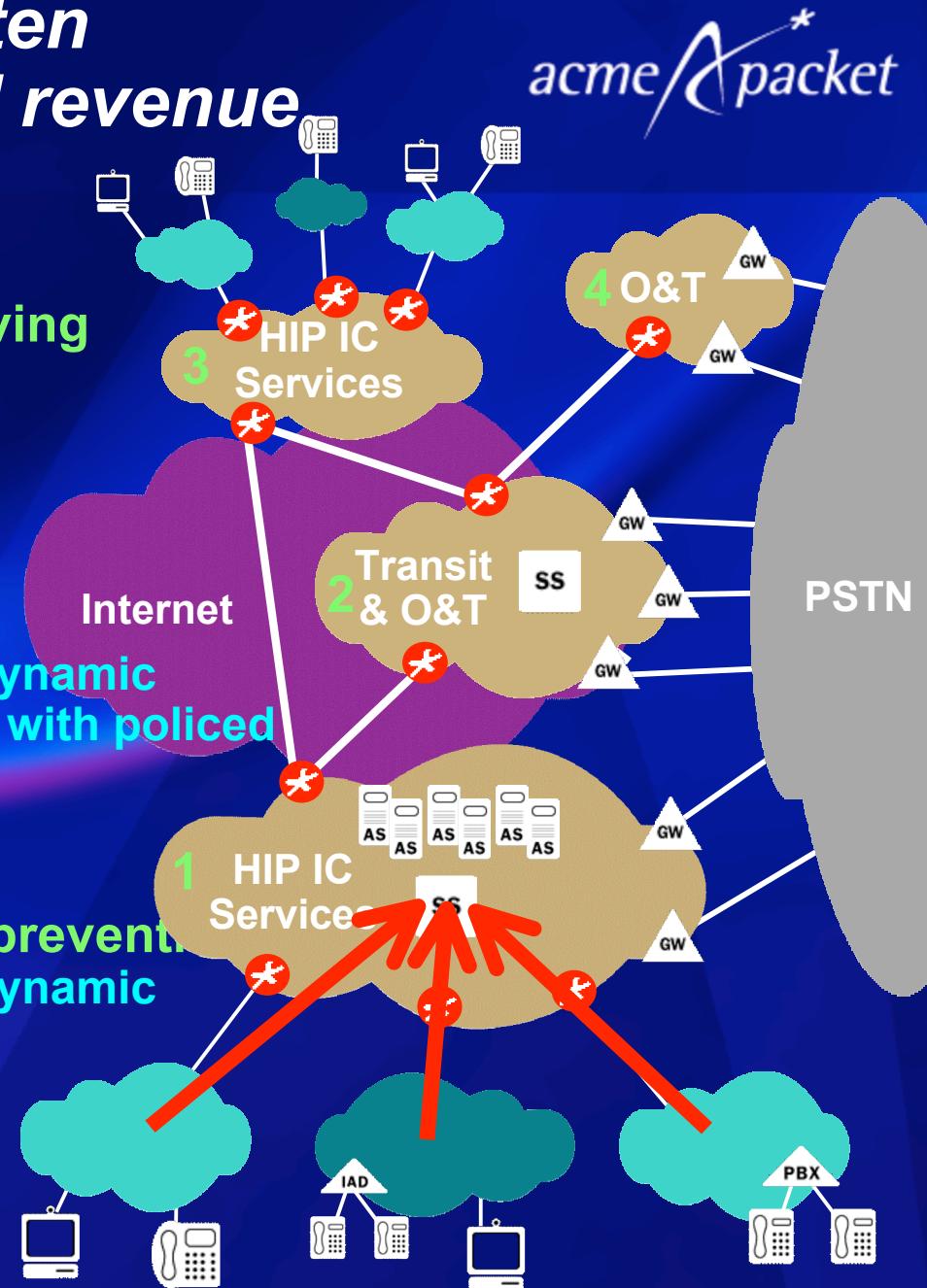
* Solution requirements

– SBC DoS self-protection

- Access control - static & dynamic
- Trusted & untrusted paths with policed queues
- IDS capabilities

– Service infrastructure DoS prevention

- Access control - static & dynamic
- Topology hiding
- Signaling rate plicing
- Bandwidth policing



Viruses & malware can threaten IC endpoints and service infrastructure



- ★ SIP MIME attachments are powerful tool for richer call ID
 - vcard text, picture or video
- ★ Potential Trojan horse for viruses and worms to general-purpose server-based voice platforms
 - SIP softswitch, IMS CSCF, SIP servers, app servers
 - SIP PBX
 - SIP phones & PCs
- ★ New endpoint vulnerabilities
 - Embedded web servers - IP phones
 - Java apps – liability or asset?
- ★ Solution requirements
 - Authentication
 - SIP message & MIME attachment filtering
 - Secure OS environment

Code Red Sobig



Nimda



SQL

Slammer

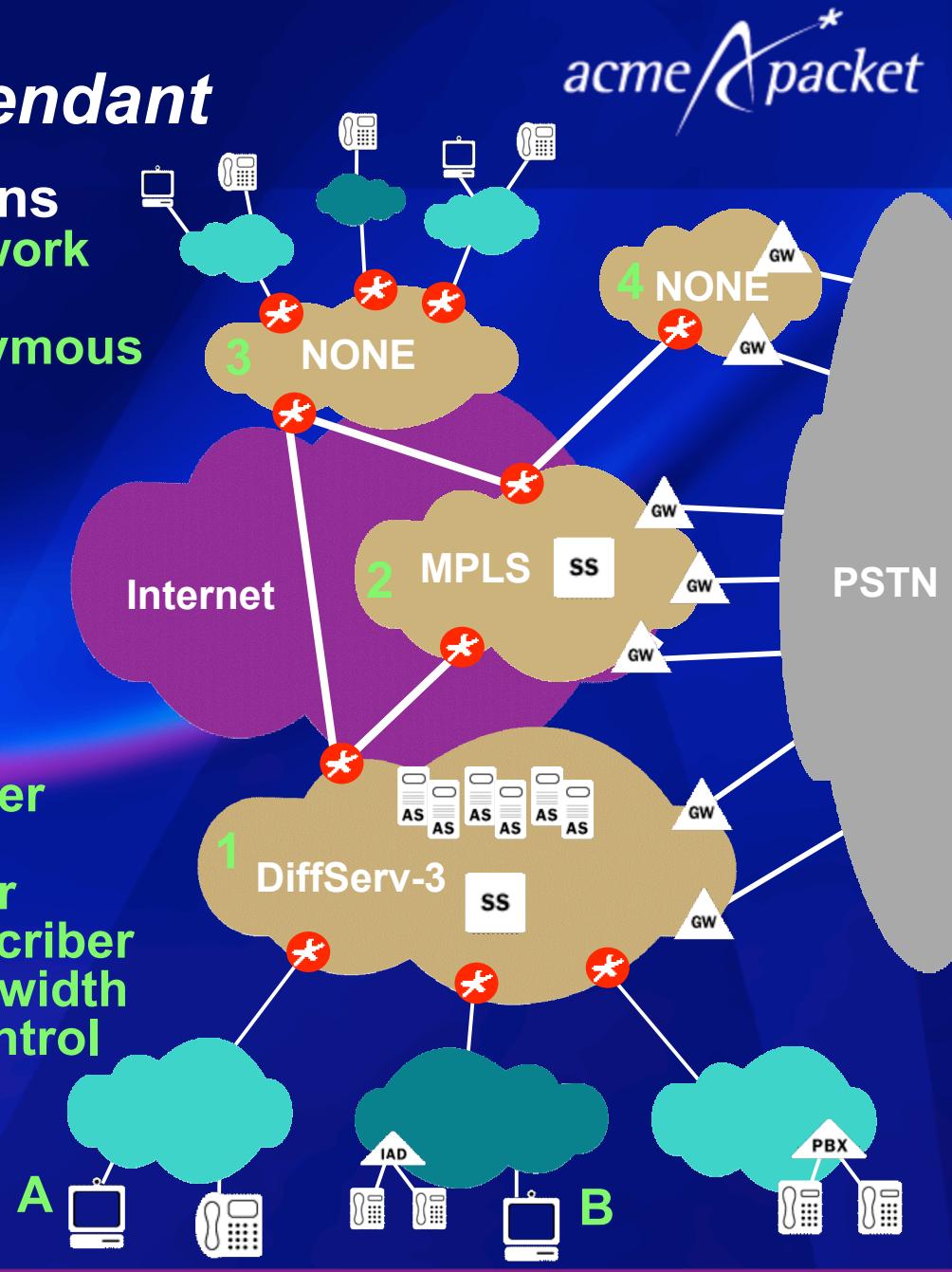
Michelangelo

Klez

Love Bug

Service fraud risk is business model dependant

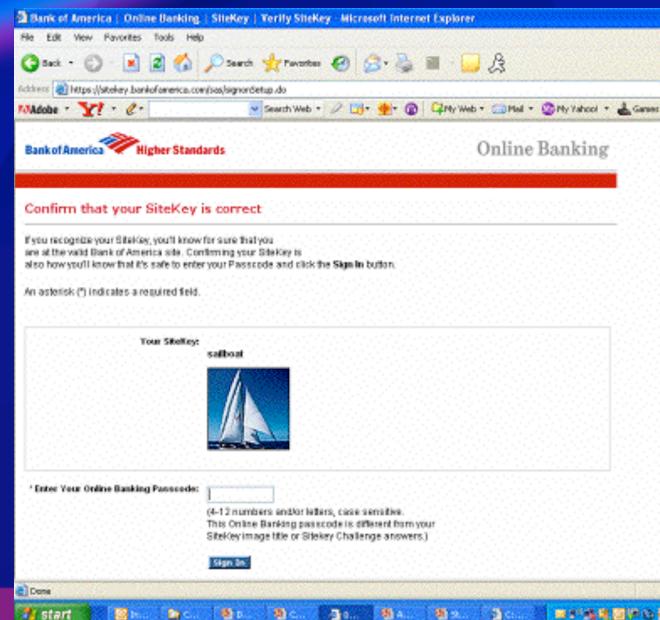
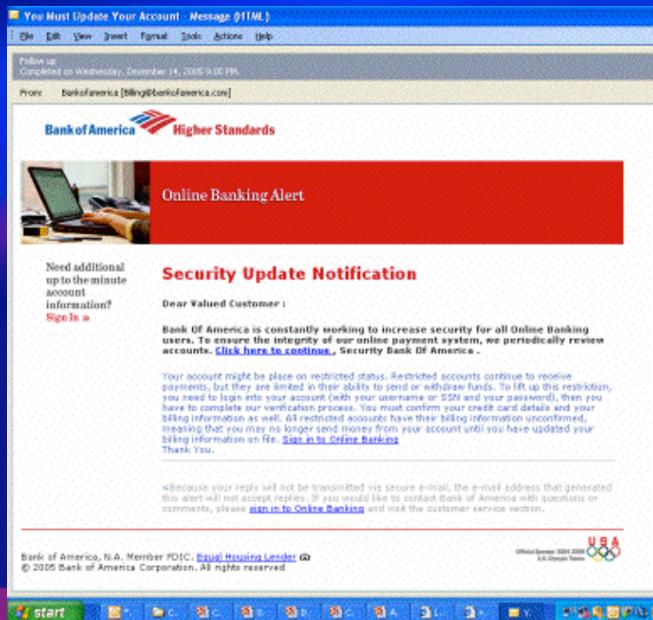
- * Business model dimensions
 - Internet vs. managed network
 - Free vs. fee based
 - Anonymous vs. not anonymous
- * Types of fraud
 - Service theft
 - QoS theft
 - Bandwidth theft
- * Solution requirements
 - Access control
 - Authentication – subscriber & SIP signaling elements
 - Authorization – subscriber
 - Admission control – subscriber limits - # sessions & bandwidth
 - QoS marking/mapping control
 - Bandwidth policing



Identity theft can't be prevented entirely by technology



- * How do you know you are talking to Bank of America?
- * Web site techniques don't work for IC
 - work for many-one, not many-many
- * Solution requirements
 - Authentication, access control
 - Trust chains - pre-established technical & business relationships



Eavesdropping threat is over hyped



* Less risk than email, who encrypts email?

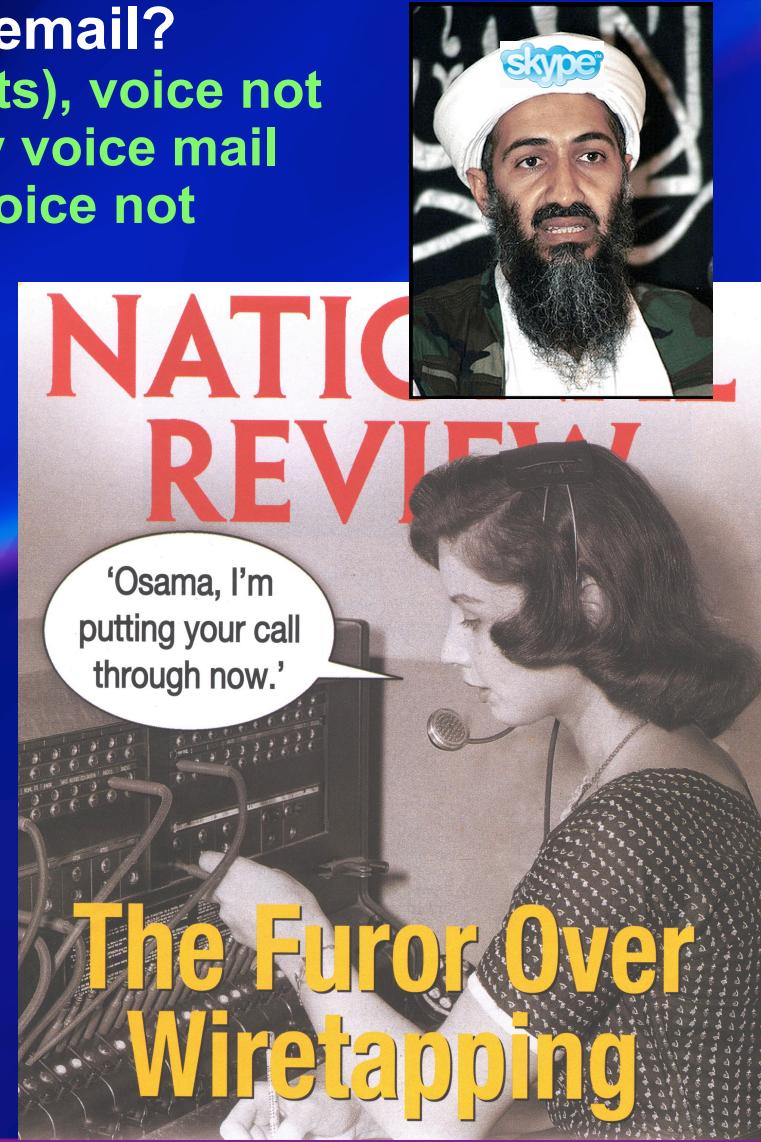
- _ Email is information rich (attachments), voice not
- _ Email always stored on servers, only voice mail
- _ Email always stored on endpoints, voice not

* Who is at risk?

- _ Bad guys - Osama, drug cartels, pedophiles, etc.
- _ Law enforcement
- _ Money, love, & health-related
 - insider trading, adultery, ID theft,

* Solution requirements

- _ Authentication – subscriber
- _ End-to-end encryption (**EXPENSIVE**)
 - Signaling (TLS, IPsec)
 - Media (SRTP, IPsec)



SPIT will be annoying, & possible tool for ID theft



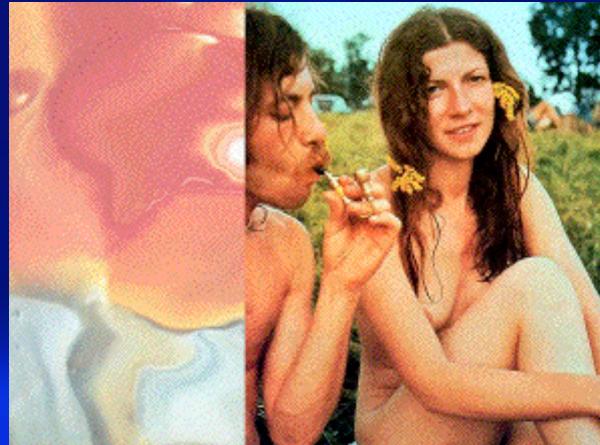
- * Will anonymous, cheap Yahoo subscriber (aka SPITTER) be able to call money-paying Verizon subscriber to solicit
 - phone sex, penis enlargement, Viagra pill purchase?
- * Techniques that won't work
 - Access control – static
 - Content filtering
 - Charging - \$/call
 - Regulation
- * Solution requirements
 - Access control
 - dynamic, IDS-like
 - Authentication
 - Admission control
 - subscriber limits (#)
 - Trust chains - pre-established
 - technical & business relationships



Who is responsible for security?

acme  packet

The individual



The organization

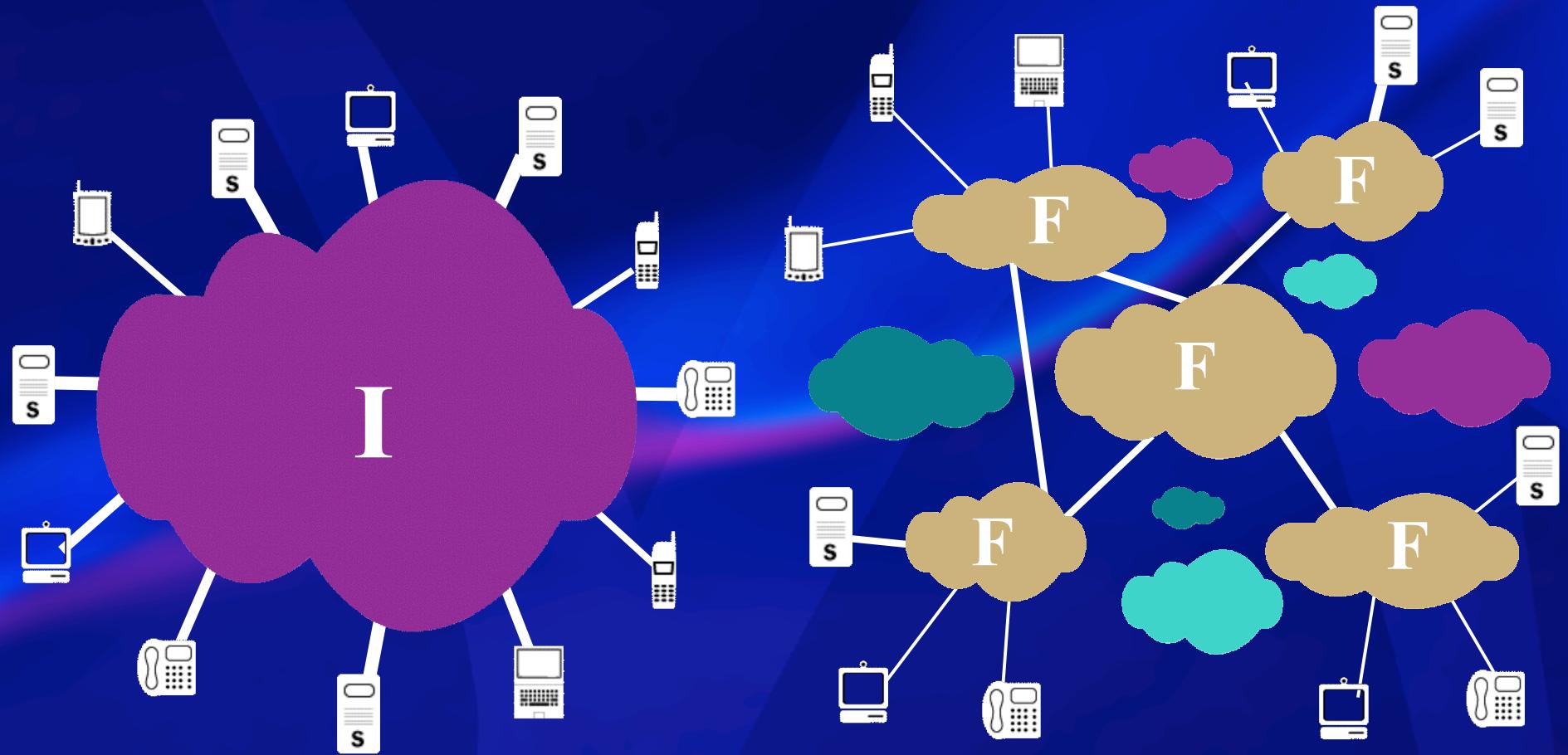


The future IC net?

The Internet

acme / packet

The Federnet



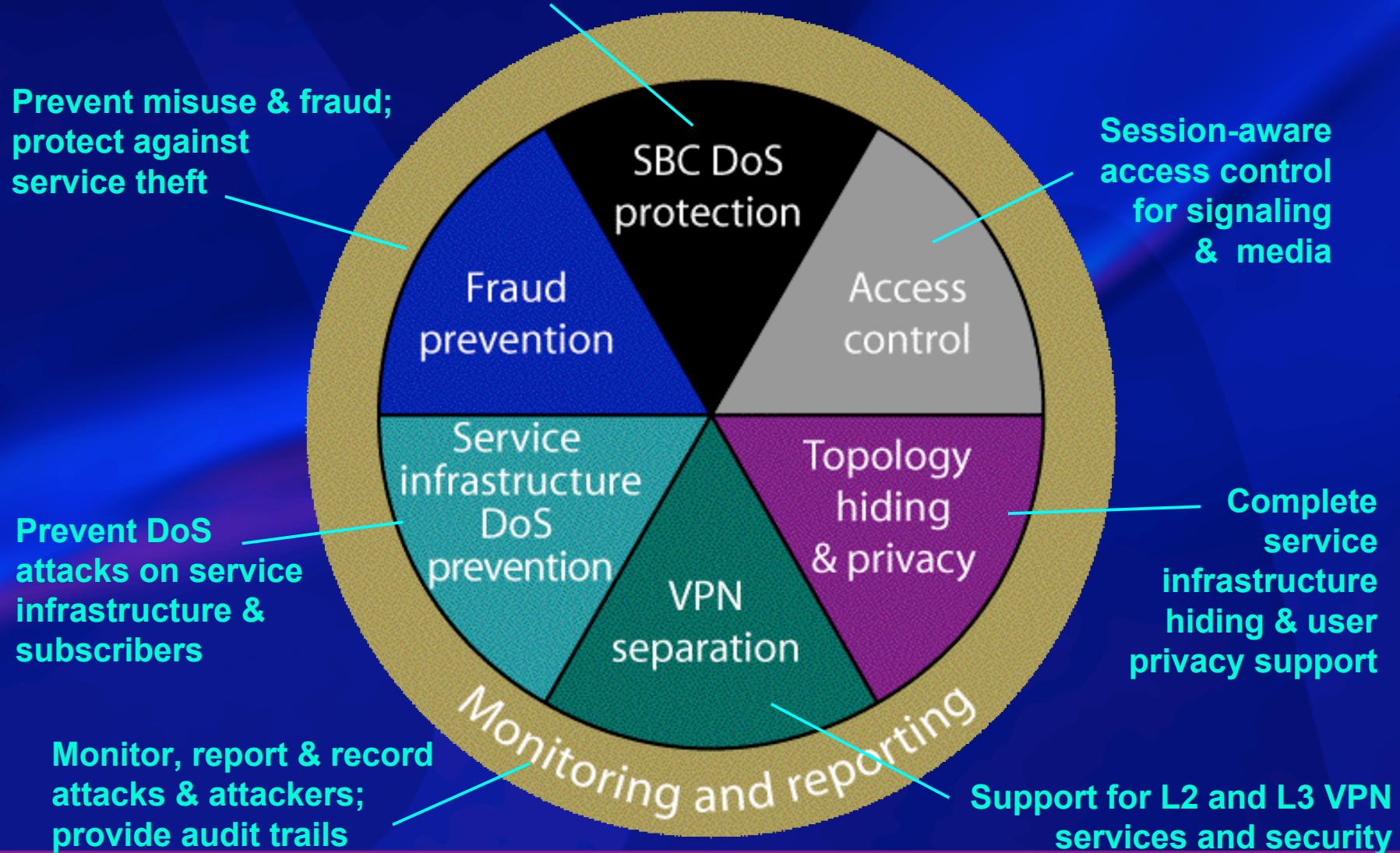
- ★ Security issues are very complex and multi-dimensional
- ★ Security investments are business insurance decisions
 - _ Life – DoS attack protection
 - _ Health – SLA assurance
 - _ Property – service theft protection
 - _ Liability – SPIT & virus protection
- ★ Degrees of risk
 - _ Internet-connected ITSP
 - _ Facilities-based HIP residential services
 - _ Facilities-based HIP business services
 - _ Peering
 - _ NEVER forget disgruntled Malcom, OfficeSpace
- ★ Session border controllers enable service providers to insure their success



Net-SAFE – security requirements framework for session border control



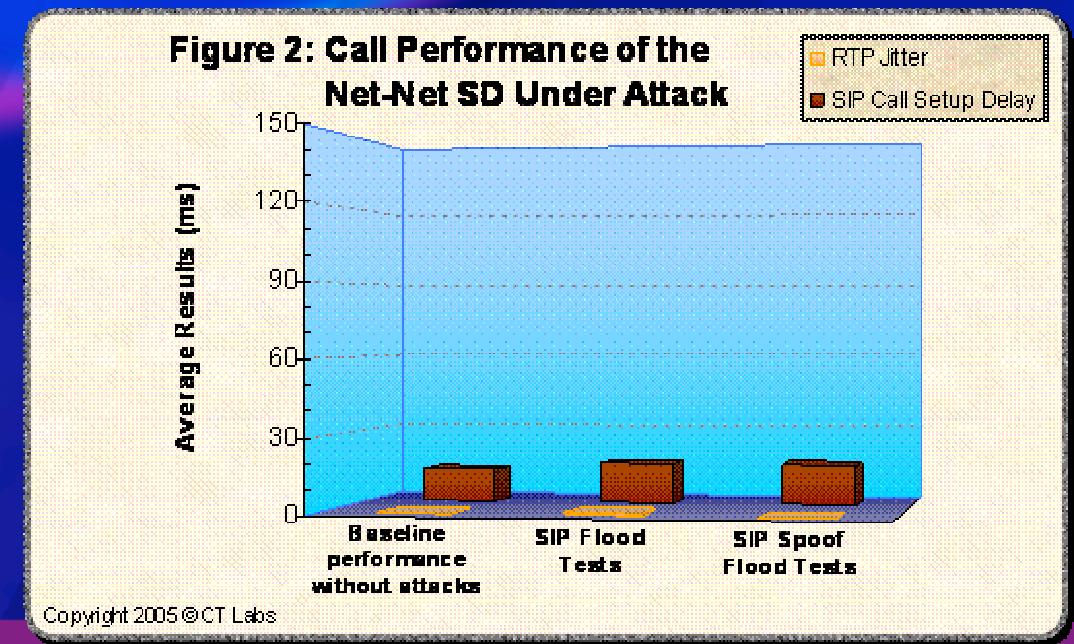
Protect against SBC DoS attacks & overloads
(malicious & non-malicious)



Acme Packet Net-Net SD “flawlessly passed all of CT Labs’ grueling attack tests”



- ★ Total of 34 different test cases, using over 4600 test scripts
- ★ No failed or dropped calls, even for new calls made during attacks
- ★ No lost RTP packets during attacks
- ★ Protected the service provider equipment – did not allow flood attacks into core, stopped packets at edge
- ★ SD performance not impacted during attack
 - SD CPU utilization - only 10% increase
 - Signaling latency - only 2 ms average increase
 - RTP jitter – less than 1 ms increase (not measurable by test equipment)



Acme Packet SBC DoS/DDoS protection

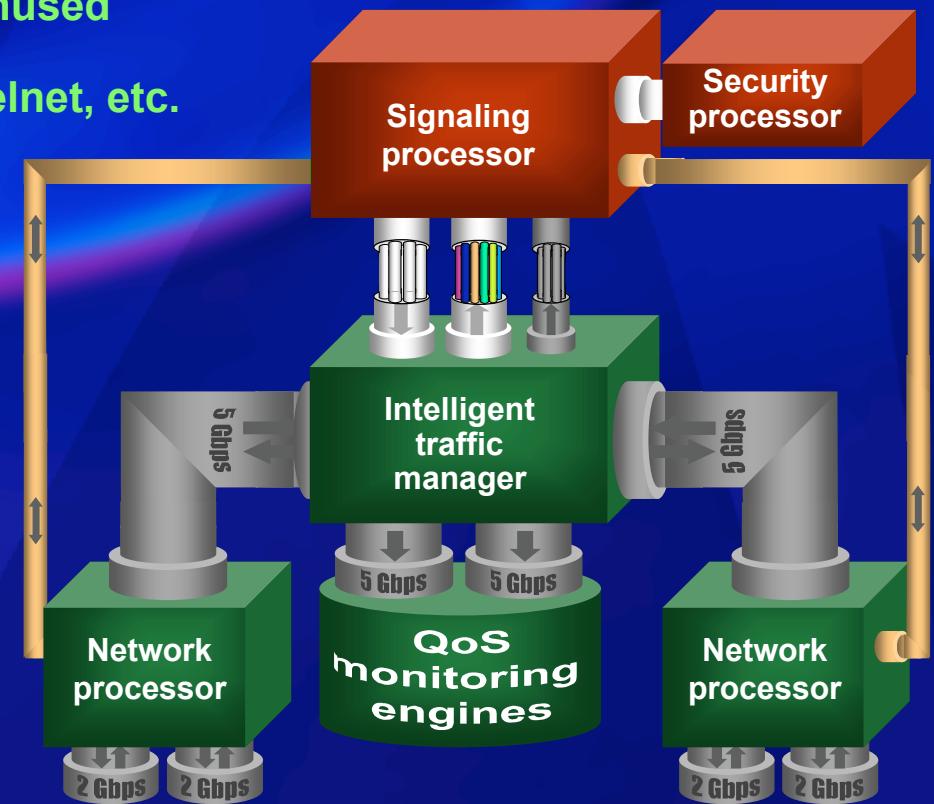


* Network processor (NPU) -based protection

- L3/4 (TCP, SYN, ICMP, etc.) & signaling attack detection & prevention -
- Dynamic & static ACLs (permit & deny) to SPU
- Trusted & untrusted paths to SPU w/configurable bandwidth allocation & bandwidth policing per session
- Trusted devices - guaranteed signaling rates & access fairness
- Untrusted devices – can access unused trusted bandwidth
- Separate queues for ICMP, ARP, telnet, etc.
- Reverse Path Forwarding (uRPF) detection - signaling & media
- Overload prevention - 10 Gbps NPUs > 8 Gbps network interfaces

* Signaling processor (SPU) -based protection

- Overload protection threshold (% SPU) w/graceful call rejection
- Per-device dynamic trust-binding promotes/demotes devices



*The leader
in session border control*



*for trusted, first class
interactive communications*