T1M1/2003-039 R3
July 9, 2003

T1M1: Management Plane Security Standard (T1.276)

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Note: This presentation is for general information sharing purposed only – refer to T1.276 American National Standard (and/or latest draft proposed ANS) for details and clarifications.

Outline

- Why Care?
- T1M1 Overview
- OAM&P Simplified Reference Model
- T1M1 History in Security
- Management Plane Security:
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  - Network Mgt Security Reference Model
  - Summary/Status, Challenges, Contributors

Why Care?

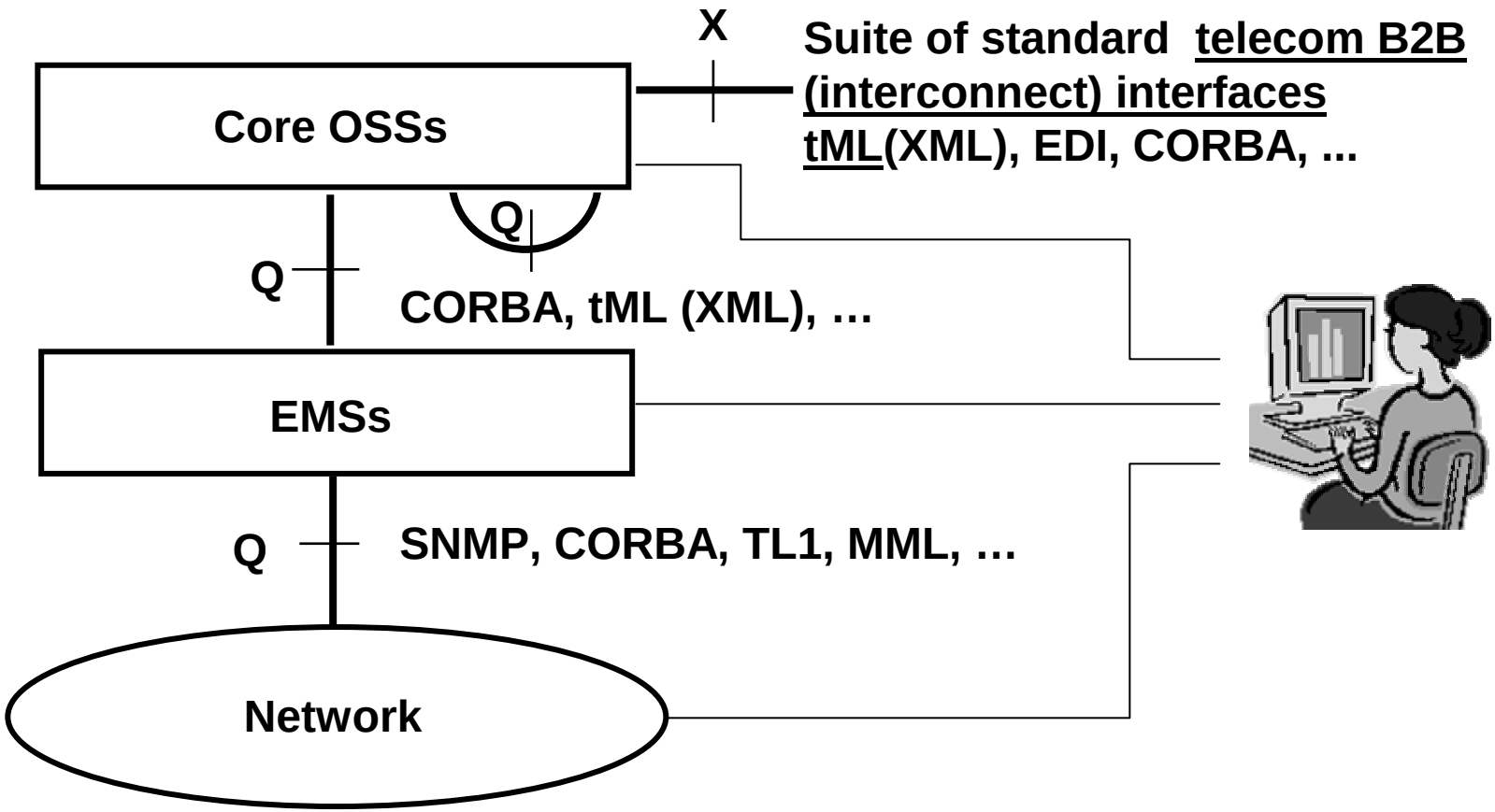
Network Management Security Risk

- From ATIS/T1 Press Release on T1M1 Security Work (http://www.atis.org/atis/press/pressreleases2002/100202.htm):
  - "A **security breach of a NE or OSS at the Management Plane** could include a major **incursion into the network** by an intruder, leading to **loss of integrity and service** of the elements and a **major network outage or disruption."**

T1M1 - Overview

- Telecom Network Management – Operations, Administration, Maintenance, and Provisioning (OAM&P); Technical Subcommittee of *Committee T1* – ANSI Accredited USA SDO
- Major Programs:
  - Common OAM&P Functionality and Technology
  - Inter-Administration OAM&P (OSS Interconnect)
  - Network Technology-Specific OAM&P
- **OAM&P Security: Part of each major program; bulk of work in Common OAM&P Functionality and Technology program**

OAM&P Simplified Systems Interface Reference Model



T1M1 History in Security

- Network Management Security Areas:
  - NEs and OSSs OAM&P interfaces
  - NS/EP, Emergency Telecom Services (ETS), Lawfully Authorized Electronic Surveillance
- 1980's to 2001: Many standards per above (see document *T1M1/2002-006* for history to 2001 ftp://ftp.t1.org/T1M1/M1.0/2002/2m100060.pdf)
- **2002/2003: *Management Plane Security Standard* – Collaboration with T1M1, NSTAC NSIE, Gov NSIE, + liaisons**

Mgt Plane Sec – Business Drivers

- Net Mgt Security Standard ***Business Drivers***:
  - ***Efficiency:*** **Reduced costs via commonality - economies of scale**
  - ***Effectiveness:*** **Common baseline for security functionality - reasonable risk management**
- Common baseline network management security requirements for NEs and OSSs to build network technology specific OAM&P security specifications and standards upon (e.g., optical network OAM&P security)

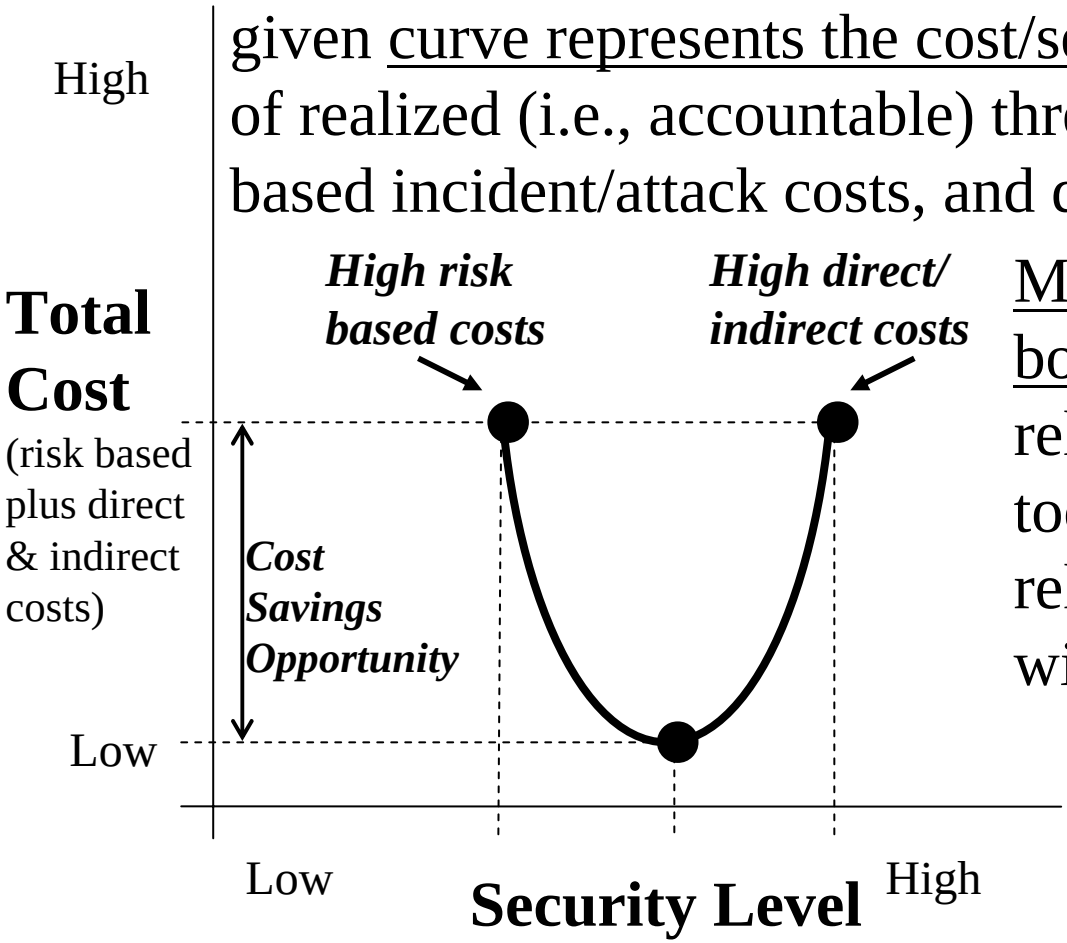
Mgt Plane Sec – Business Case

The general business rational to implement the Management Plane Security Standard is that it:

1. Raises the baseline OAM&P security requirements to meet the new (current) realized security risks and;
2. Provides for the new minimum cost zone between relatively too little security and too much security (with the relative high costs that come with these two extremes).

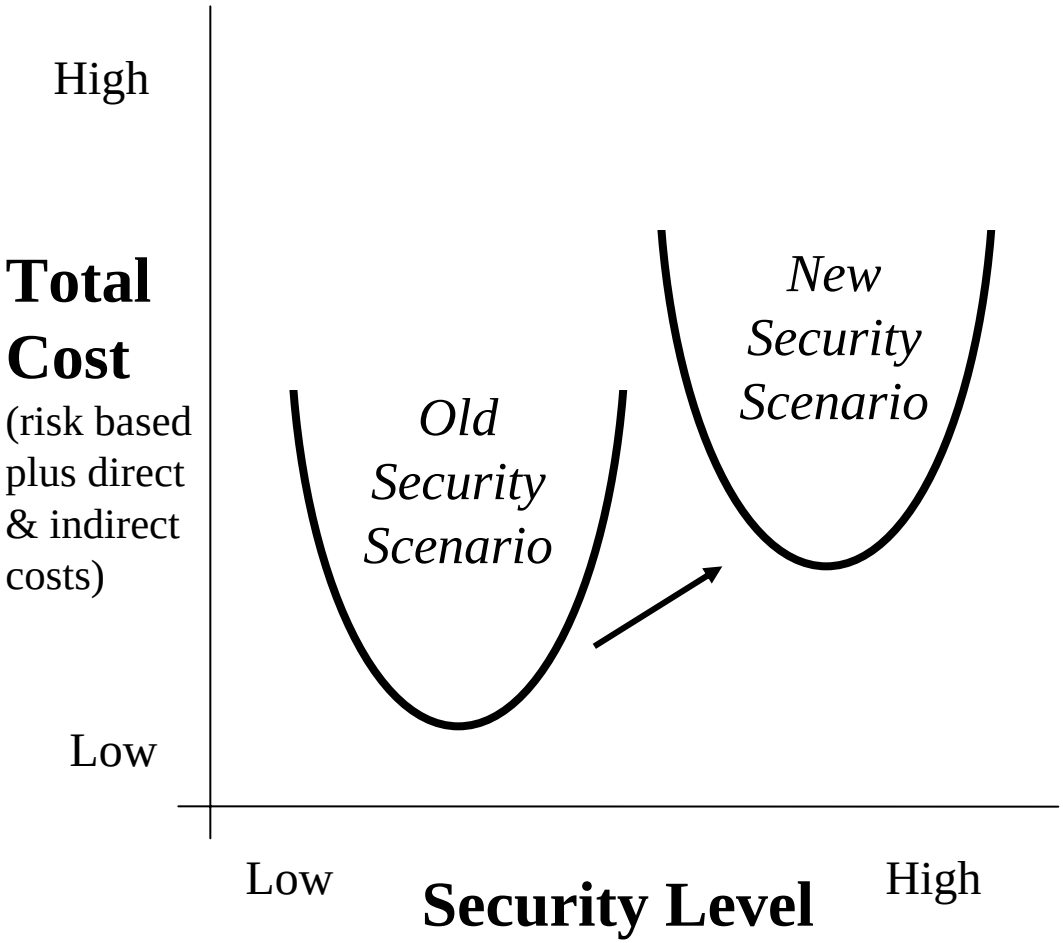
Mgt Plane Sec – Business Case Framework

Generic security business case is Risk Management based. A given curve represents the cost/security tradeoffs given a set of realized (i.e., accountable) threats, vulnerabilities, risk based incident/attack costs, and direct/indirect security costs.



Minimum cost zone is at the bottom of the curve - between relatively too little security and too much security (with the relative high costs that come with these two extremes).

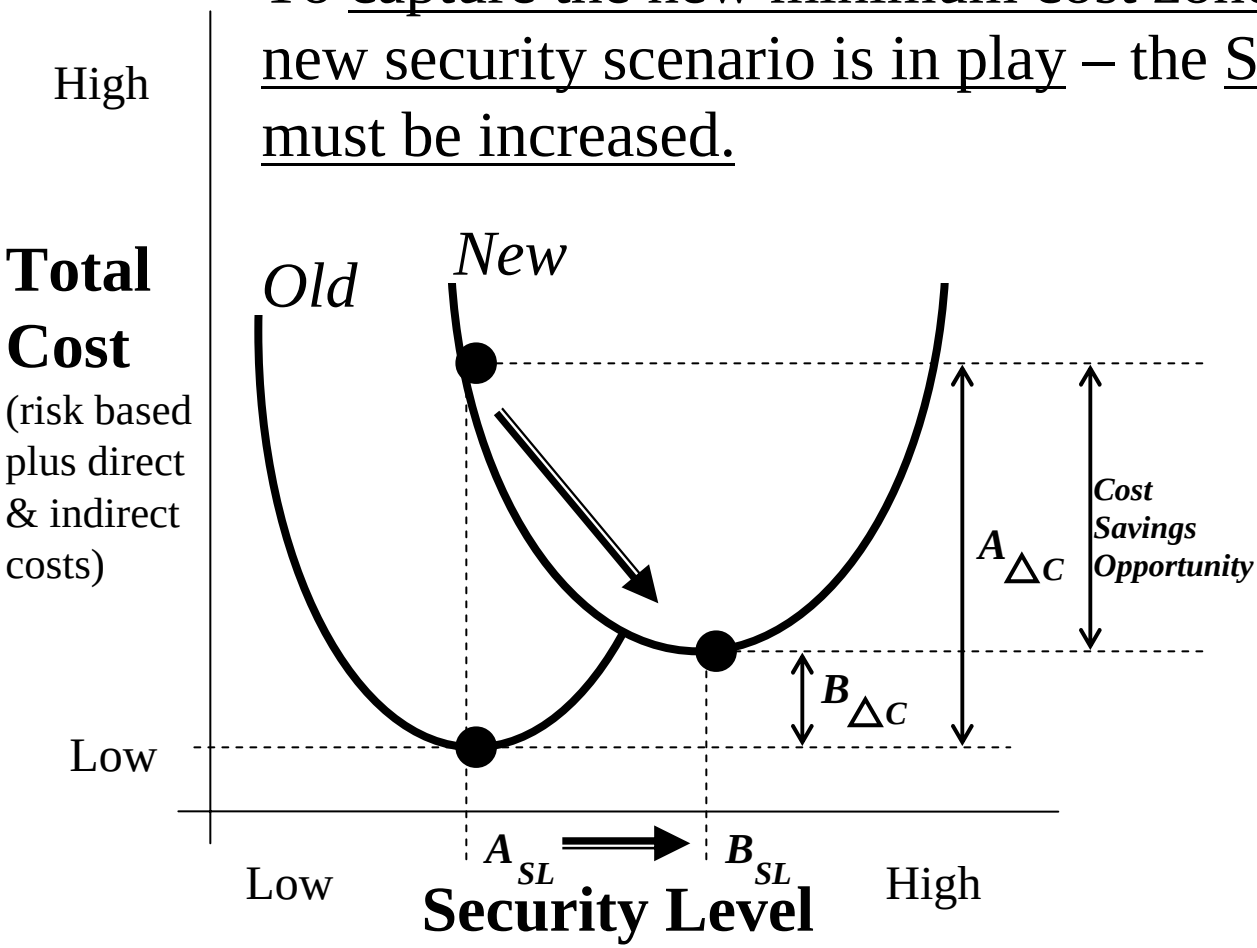
Mgt Plane Sec – Business Case with Increased Security Risks



New curve based on realization of new set of increased threats, vulnerabilities, incident/attack costs, and security costs – e.g., post 9/11

Mgt Plane Sec – Business Case: Cost Shifts w/ Increased Security Risks

To capture the new minimum cost zone while the new security scenario is in play – the Security Level must be increased.



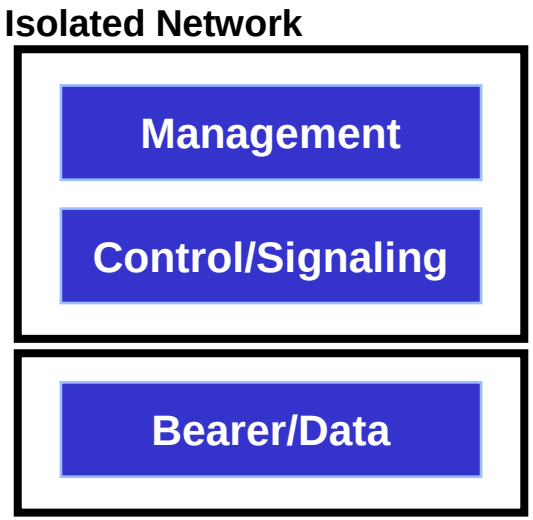
Being at the old minimum cost Security Level while the new security scenario is in play puts an organization in a relatively high Total Cost position.

Mgt Plane Sec – Motivation

- **A major concern to NSIE and T1M1 is that network infrastructure is a terrorist target, identified as part of National Critical Infrastructure.**
- **Our industry is transitioning to converged packet networks resulting in an increased sense of vulnerability.**
- **Service providers are specifying similar but different security requirements for products resulting in inconsistent vendor feature sets.**
- **System Integration and operations costs increase when dealing with vendors products that have differing security features and functionality.**
- **Infrastructure Security adds cost without generating additional revenue for both vendors and service providers alike.**

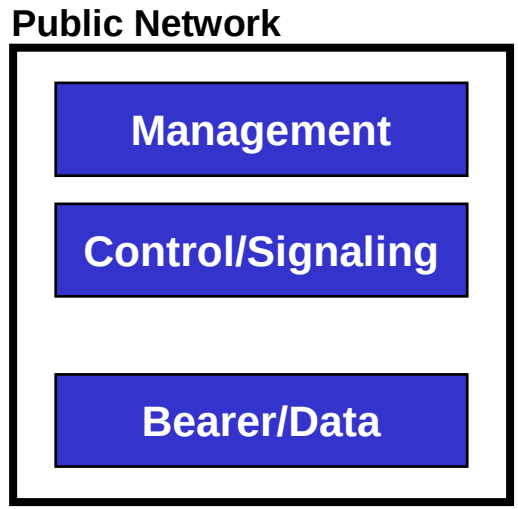
Mgt Plane Sec - Network (NGN) Security Challenges

Then



- Public traffic and management/control traffic were sent on separate networks.
- Threats in Public network were insulated from network management and control
- Management and Control network was easier to secure – e.g., known users.

Now



- Public traffic and management/control traffic are sent on the same network.
- Threats in Public network are now threats to network management and control
- Management and Control network now needs higher security level, e.g., security level that is applied to secure Public traffic.

Mgt Plane Sec - Objective

Define a consistent and standardized set of baseline network element and network management security requirements.

Standardize this set of security requirements within standards organizations such as T1M1 and ITU-T (SG4).

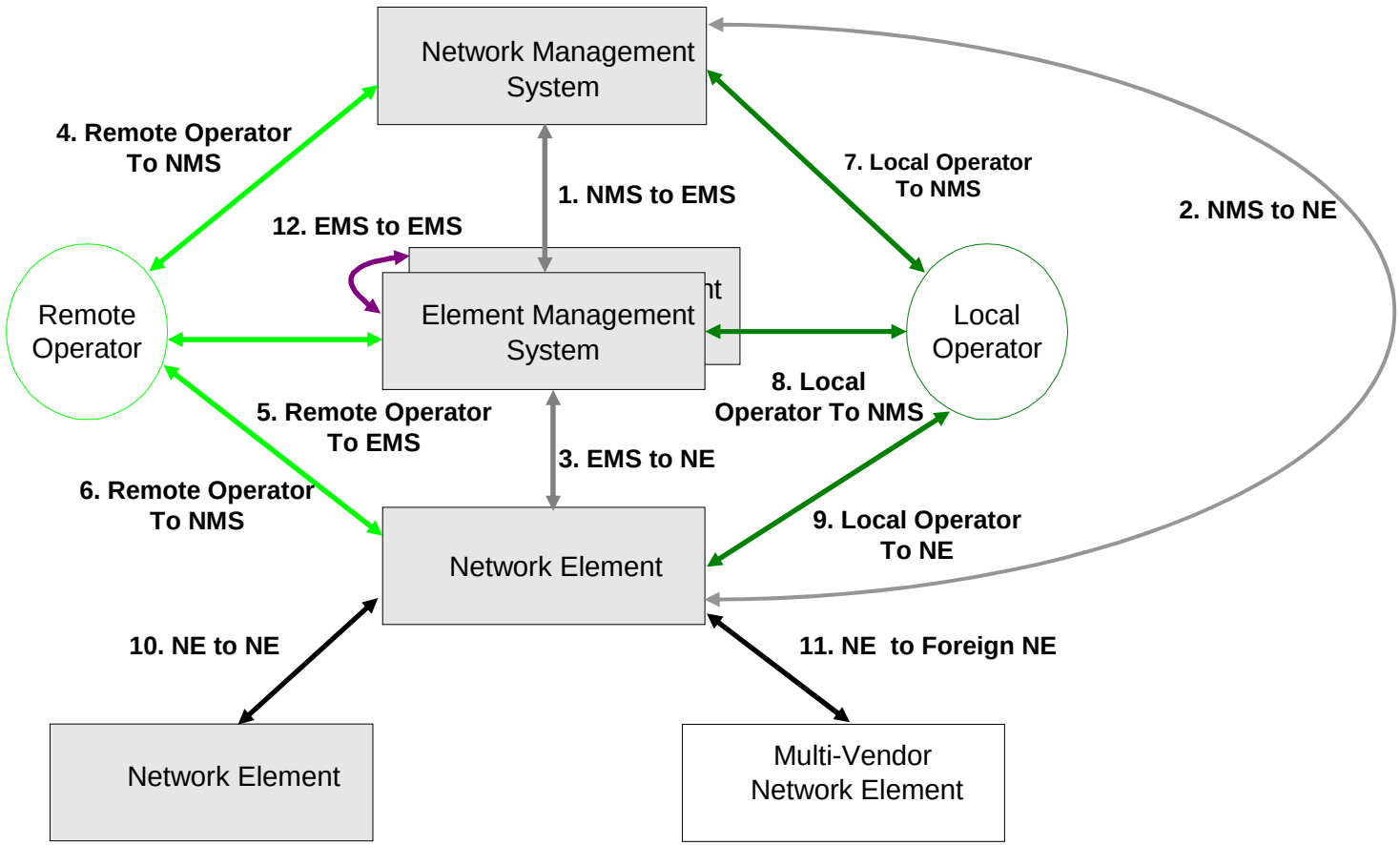
<u>These requirements will:</u>

- Ensure a minimal baseline of security throughout the industry.
- Provide vendors with a standard set of design objectives in relation to product and network security features.
- Make it easier for service providers to procure & build a secure infrastructure comprised of multiple vendor platforms.

Mgt Plane Sec - Key Principles

- **Secure management traffic with strong encryption and authentication.**
- **Authenticate and attribute all management actions.**
- **Maintain secure logs for all of the above.**

Network Management Security Reference Model



Mgt Plane Sec - Summary/Status

- Started work in NSIE with intent to make OAM&P security best practice recommendations public. NSIE and T1M1 agreed that T1M1 adoption was an effective means to make document public and standard.
  - **Status: Draft Standard (T1.276) Letter Ballot process <u>completed</u> - see document T1M1.5/2003-007R5 – Final (official) publication version should be available by end of July 2003.**
- Recommendations brought to the NRIC VI Workgroup 1B for inclusion in Cyber-security OAM Best Practices.
- Submitted to the ITU-T (SG4) for adoption as an International Standard (ITU-T Recommendation).

Mgt Plane Sec – Challenges

- To have the standard used and implemented - ASAP
  - There is evidence that this is happening.

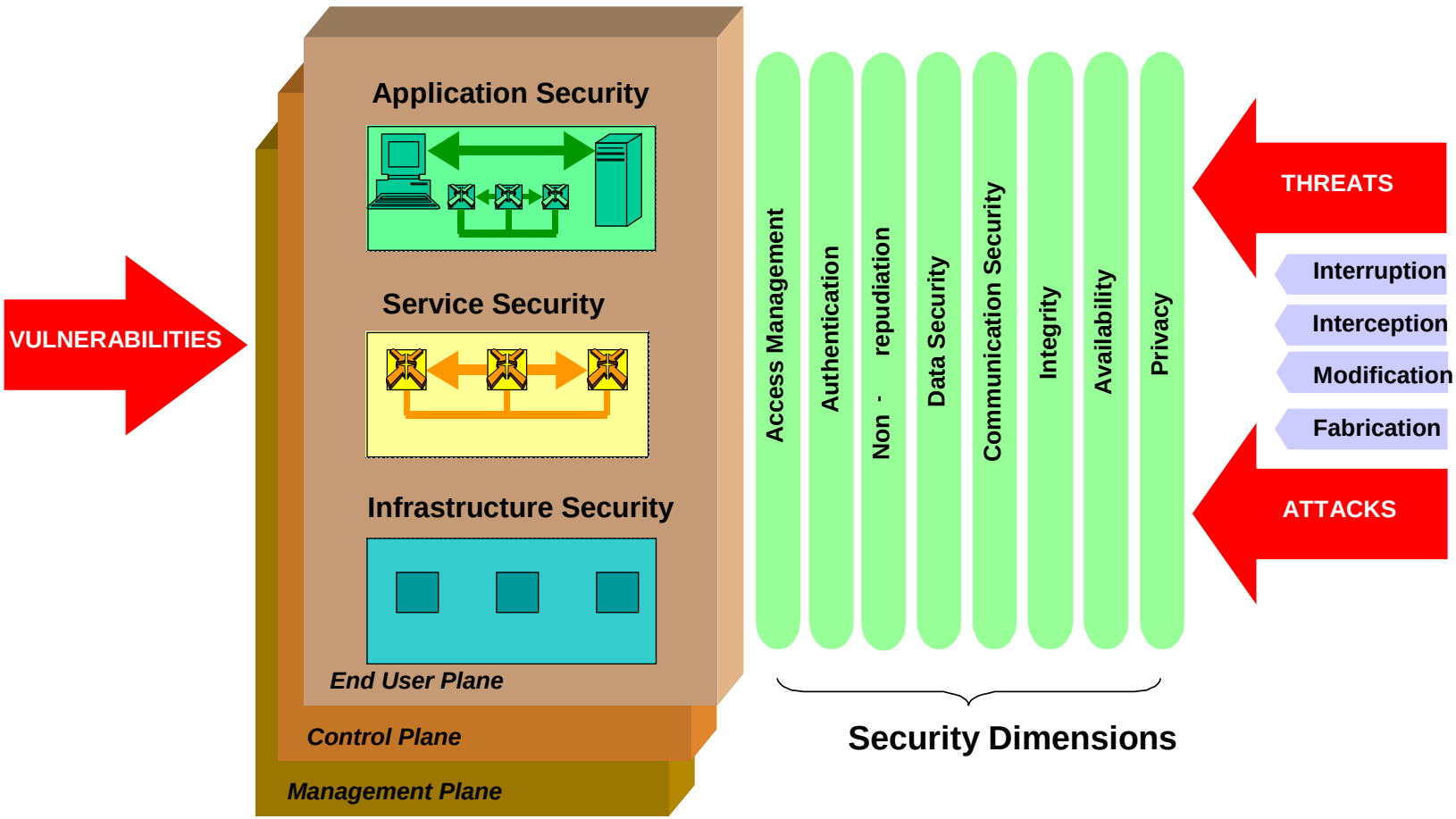
- Wide spread adoption of the standard.
  - Vendors and Service Provider contributors are working this now.

Mgt Plane Sec – Key Contributors

BellSouth	Booz-Allen Hamilton
BT	Cisco
DoD/NorAD	Harris
Lucent	Nortel Networks
Qwest	SBC
Siemens	Telcordia
Verizon	Worldcom

Management Plane Security
Appendix: Backup Slides

Security Framework Model



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Additional Security Considerations (Informational, outside the scope of the detailed security requirements)

Example Mandatory Requirements

Secure management traffic with STRONG ENCRYPTION and authentication:

M55: For each physical or logical interface that carries any MANAGEMENT TRAFFIC in an NE/MS, the NE/MS shall be configurable to secure MANAGEMENT TRAFFIC with STRONG AUTHENTICATION and symmetric or asymmetric encryption in order to provide confidentiality and integrity.

Authenticate and attribute all MANAGEMENT ACTIONS:

M12: Client AUTHENTICATION for logging in, logging, and auditing on each NE/MS shall be at least as strong as a User ID with a COMPLEX PASSWORD over a previously established TRUSTED PATH.

Manage security resources and configurations with integrity:

M25: On each NE/MS, a SYSTEM SECURITY ADMINISTRATOR shall be able to execute all of the CRITICAL SECURITY MANAGEMENT ACTIONS.

Maintain secure logs for all of the above:

M31: Each NE/MS shall be able to log each CRITICAL SECURITY ADMINISTRATION ACTION, each login attempt and its result, and each logout or SESSION termination.

Link to the Draft Standard (T1.276)

Final *Working* Document Number: T1M1.5/2003-007R5

Operations, Administration, Maintenance, and Provisioning Security Requirements for the Public Telecommunications Network: A Baseline of Security Requirements for the Management Plane

“New File” (pre-archived) at:

ftp://ftp.t1.org/T1M1/NEW-T1M1.5/3m150075.pdf

Or, moved to archive at:

ftp://ftp.t1.org/T1M1/M1.5/2003/3m150075.pdf