

Real-time Information Technology Standards: The Good, the Sad, and the Ugly

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**National Committee for
Information Technology Standards**

**Chair, NCITS TC R1,
Real-time Computing Systems**

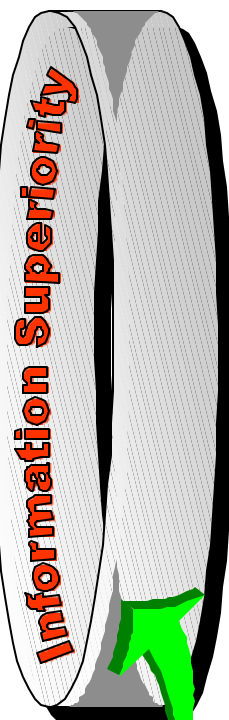


Information Sharing for the Virtual Enterprise

Requires

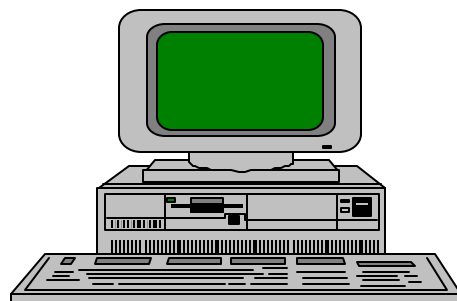
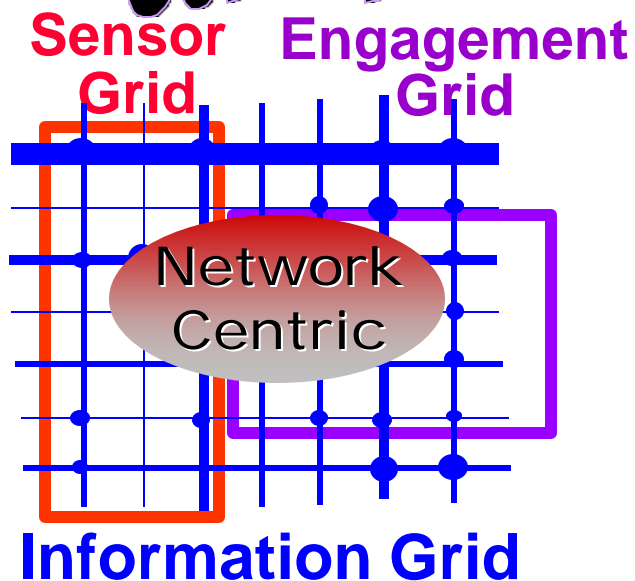
- Seamless Architecture & Systems Integration
- Responsive Information Collection, Processing & Dissemination
- Offensive & Defensive Information Warfare
- Real-time when it's needed

Others...



Enabling Concept

Concept



End States

- Common operational picture
- Collaborative planning systems
- Networked sensors
- Enhanced C2 systems
- Precise battlespace knowledge
- Metal on Target

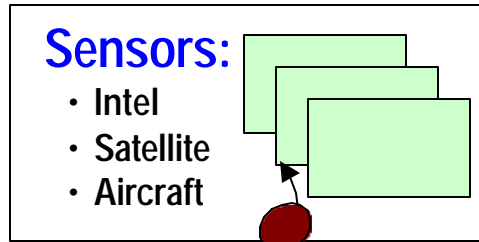
Information Superiority



**Real-time Standards
Are Key Enablers**



Sensors-to-shooters: Standards Chain of Responsibility to Achieve Interoperability

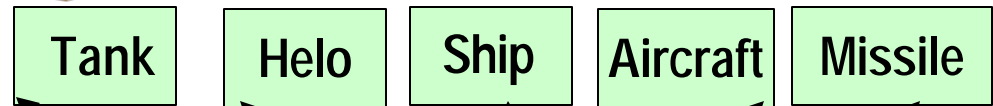
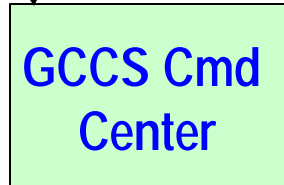
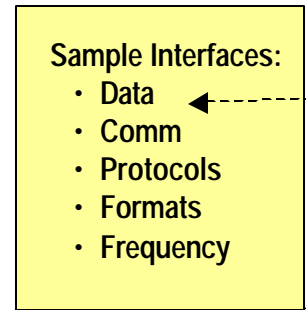


DoD TRM
provides planners & designers a tool to identify IT services & interfaces required to achieve ...

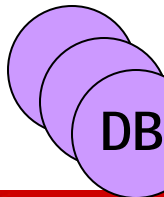
DoD JTA
provides the minimal set of standards jointly adopted for services and interfaces to achieve ...

DII COE
selects the products for standards-supported & unique services & interfaces to achieve ...

Real-time Interoperability for Warfighters

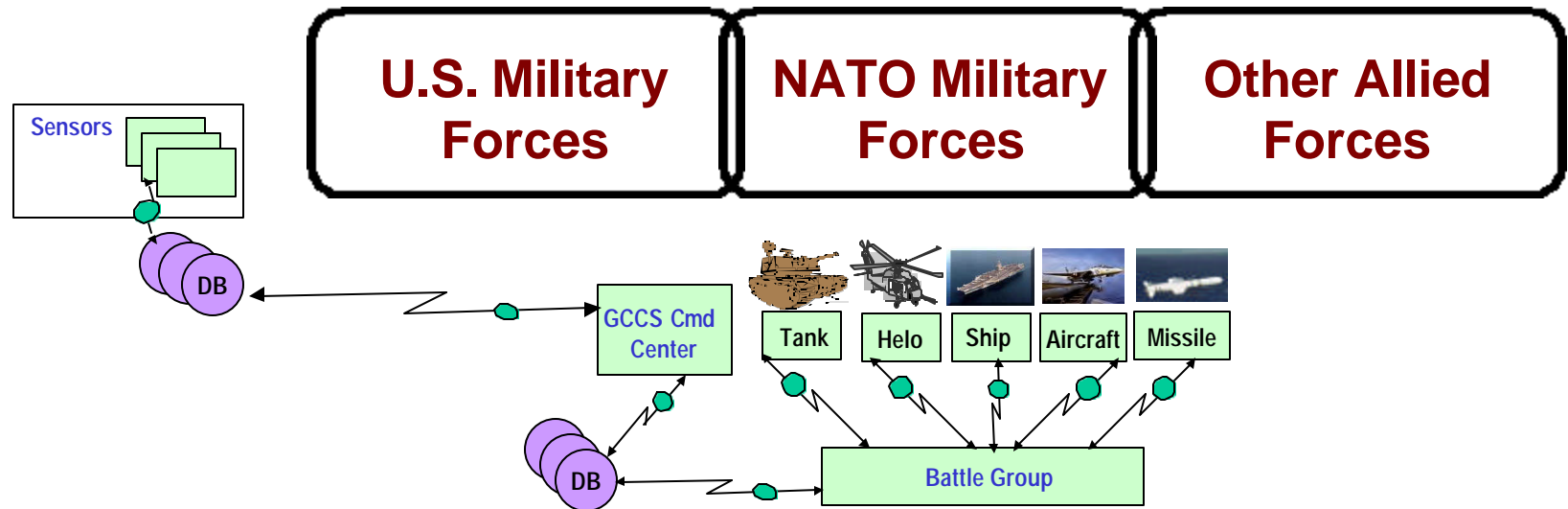


e.g. JOPES





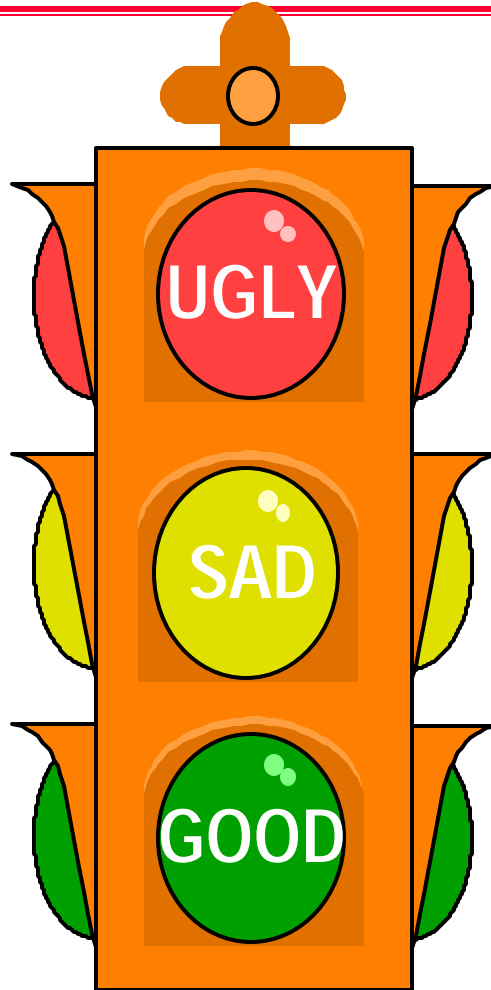
Joint Operations Also Require Real-time Interoperability for Multi-national Forces



- Multi-national Joint interoperability depends on:
 - QSTAGs
 - ACPs
 - STANAGs
- DISA tests the real-time performance results in Joint Warrior Interoperability Demonstrations (JWIDs)



Standards for real-time should be key enablers



Ugly

Java Real-time Specification Wars

Sad

Progress on RT Distributed Processing/Security

Good

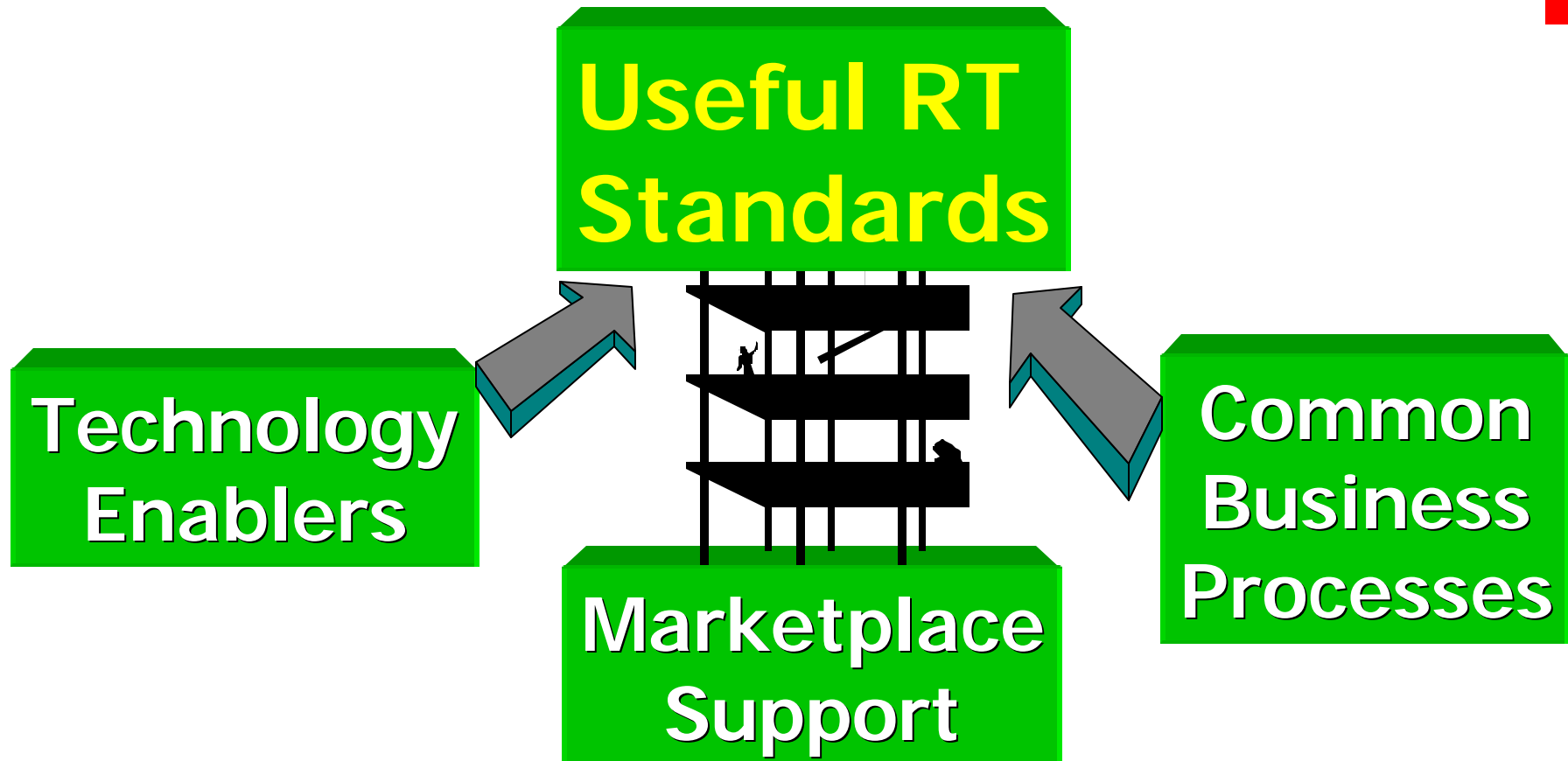
IEEE 1003.1, 1003.13 (POSIX), UNIX[®]98



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Drivers



Standards Reform: Government must participate in commercial consensus standards bodies to ensure that both public and private sector needs are met. (—OMB Circular A-119 and PL 104-113)



Assumptions about DOD Real-time Requirements

- DOD is required by PL 104-113 and OMB Circular A-119 to participate in the development of consensus standards to ***ensure that public and private sector needs are satisfied.***
- Consequently, when the words “needs” or “requirements” are used in this briefing the assumptions are:
 - The examples, though DOD-based, can and are extensible to the private sector.
 - Cost savings anticipated by such standards efforts will inure to the benefit of both the public and private sector.



Real-time Requirements: Development Assumptions

- **NEEDS:** There are a broad number of needs for real-time standards in both language-specific and non-language-specific environments
- **Vendors (and to some extent intellectual property rights) must be considered in many of the projects identified**
 - **Defining the nature of the work to avoid IPR issues can and should be accomplished prior to formal project proposals and subsequent standards work.**
 - **Vendors are generally willing to work with consensus standards bodies to resolve issues and define meaningful work for the standards bodies.**
- **Demonstration project and requirements documents are often available as a foundation for standards work.**
- **Community of interest buy-in to standards projects is essential**



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History of NCITS and Real-time Standards

- National Institute for Standards and Technology (NIST) hosted a series of open workshops to chronicle Java real-time requirements [Summer 1998]
- A separate group, Real-time Java Working Group, formed to begin developing a proposed specification to satisfy the NIST Real-time Java Workshop requirements.
- The group approached NIST (Nov 1998) to propose a standards development project and the formation of a Technical Committee to support it (ala R1):
 - Sun Microsystems claimed the project would infringe upon Intellectual Property Rights
 - NIST recognized the general need for a Real-time computing standards committee and formed it in Dec 1998
 - Balloted the proposed real-time Java Project [failed]
 - DoD proposed 13 real-time projects; 4 were selected
- Real-time Java went two directions (J Consortium & JCP)



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Outline of Real-time Requirements Presented to SDOs

Non-language Specific

- Architecture description language
- Device driver portability
- Portability testing
- Standard test suite structure
- Fault management
- Security for Real Time
- Plugable Protocols
- POSIX and Windows NT
- CORBA

Language Specific

- C++
- Ada
- Java



Projects Initially Selected by NCITS R1

RT Technical Reference Model (GOA) [Report]

Non-language Specific

- Architecture description language
- Device driver portability [Standard]
- Portability testing [Report]
- Standard test suite structure [Standard]
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- Java





Scope and “Volunteership”

- Many of the initial members of NCITS TC R-1 joined and paid dues based on the potential that R1 would propose the development of real-time extensions to Java as a project.
- When that proposal did not materialize, many dropped out.
- R1, however, has a much broader technology purview than extensions to a single programming language:
 - Some substantive real-time standards projects have been approved.
 - Many more are available to pursue as “volunteership” increases.
- Consequently, it is hoped that we can win back those who have been absent and add many more companies and organizations to the list of volunteers.



Bottom Line on Real-time Standards...

Enterprises need commercially available products that seamlessly work together and can be integrated into existing business process and manufacturing and distribution systems.



Bottom Line

Scalability & Interoperability!!!



We Need More Than Standards



DoD: "Interoperability...has been impeded by the absence of defined, coordinated, and enforced standards."

-- Vice Chairman, Joint Chiefs of Staff, 14 Nov 1990



Evolution of DoD Approach

DoD used to build its own standards and products that were:

- “Ruggedized”
- Militarized but . . .
- Too costly
- Too long to build and . . .
- Too far behind the technology power curve

DoD changed its strategy to capitalize on industry

- Innovation and speed
- Experience
- Open Systems initiatives
- Market savvy and affordable solutions
- Rapid employment of advances in technology



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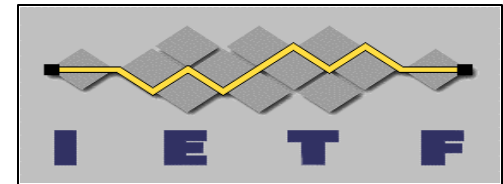


eCommerce Example: Using Commercial Standards

Participating in the development of commercial standards and replicating industry business solutions in DoD's Electronic Business

- XML
- TCP/IP
- IDEF
- CAD/CAM (STEP)
- CGM
- HTTP
- SMTP

- FTP
- SNMP
- URL
- UDP
- 802.3 (802.3u and 803.3z)
- Web-based technologies



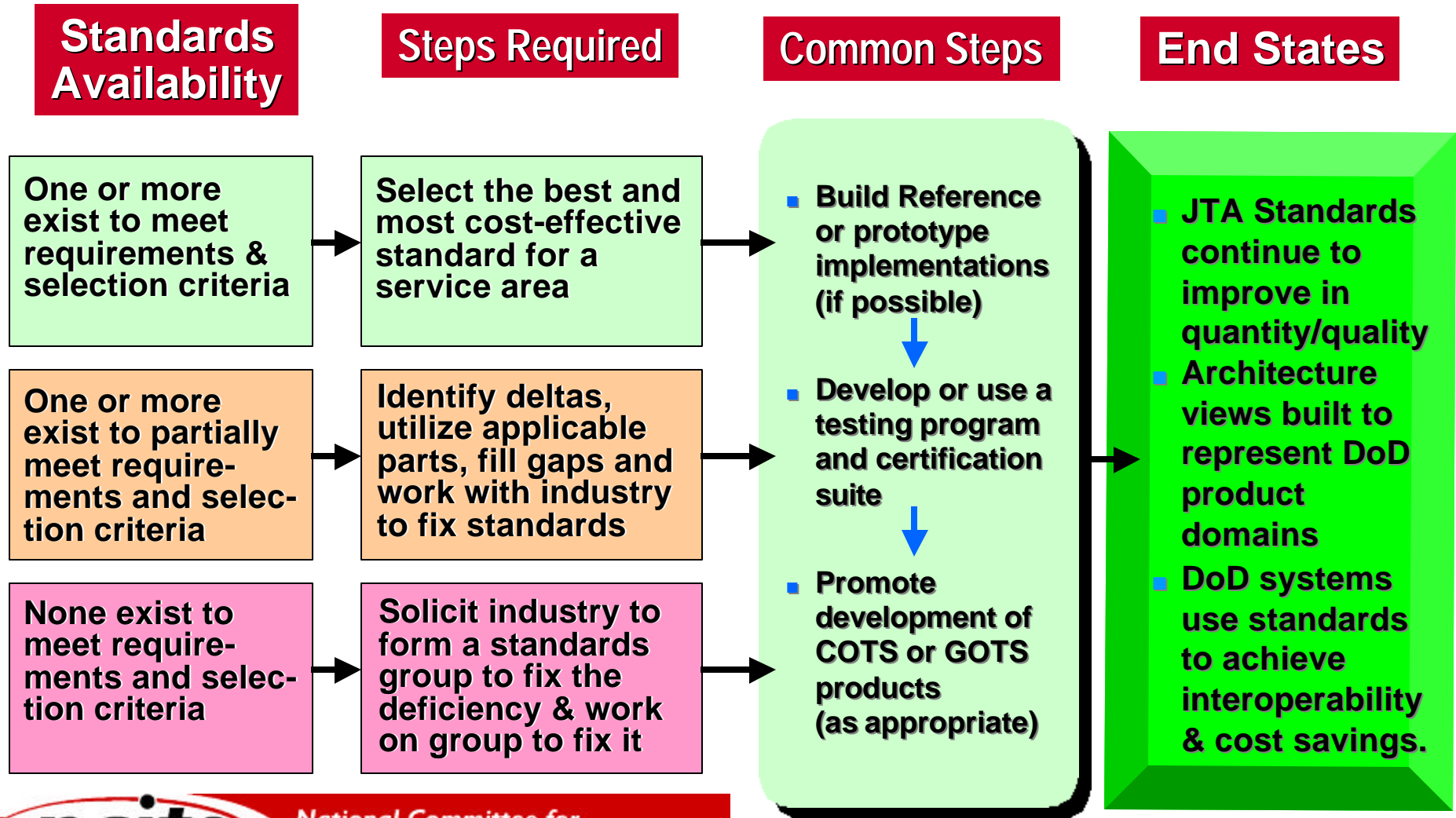
Examples of the "good"



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Process to Use Industry Standards





Use Standards As Building Codes for Architectures

- **Joint Technical Architecture (JTA)**
 - “ Minimal set of IT standards required to achieve interoperability.”
 - Information Processing Standards
 - Information Transfer Standards
 - Information Modeling, Metadata, and Information Exchange Standards
 - Human-Computer Interface Standards
 - Information Security Standards
 - Web site: <<http://www-jta.itsi.disa.mil>>



DoD Replicates Good Business Solutions from Industry







Especially with Standards Developers

Collaborative Activities

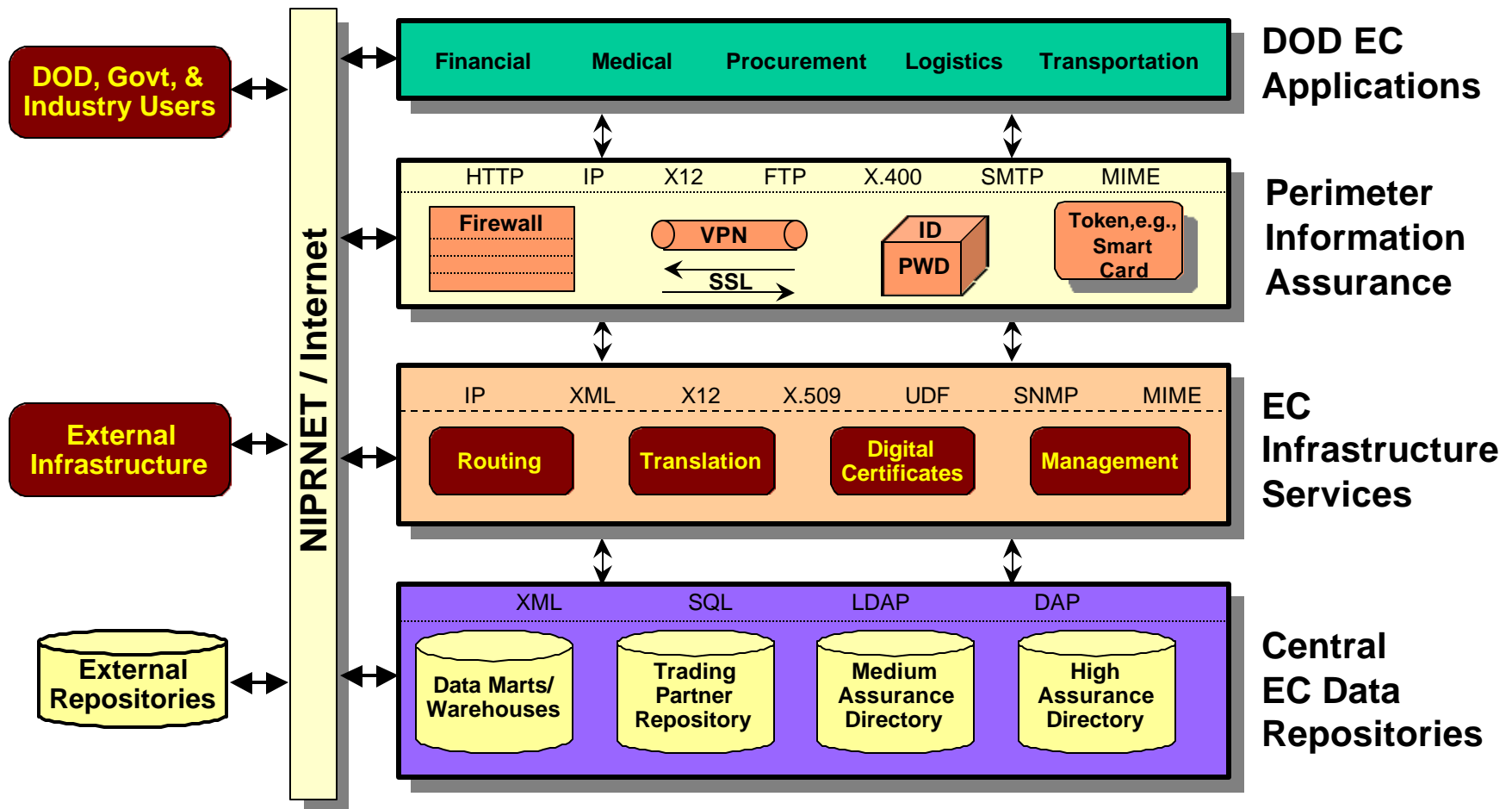
Are Key to the Future

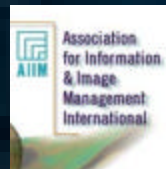
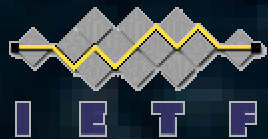


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EC Systems Architecture View Outline





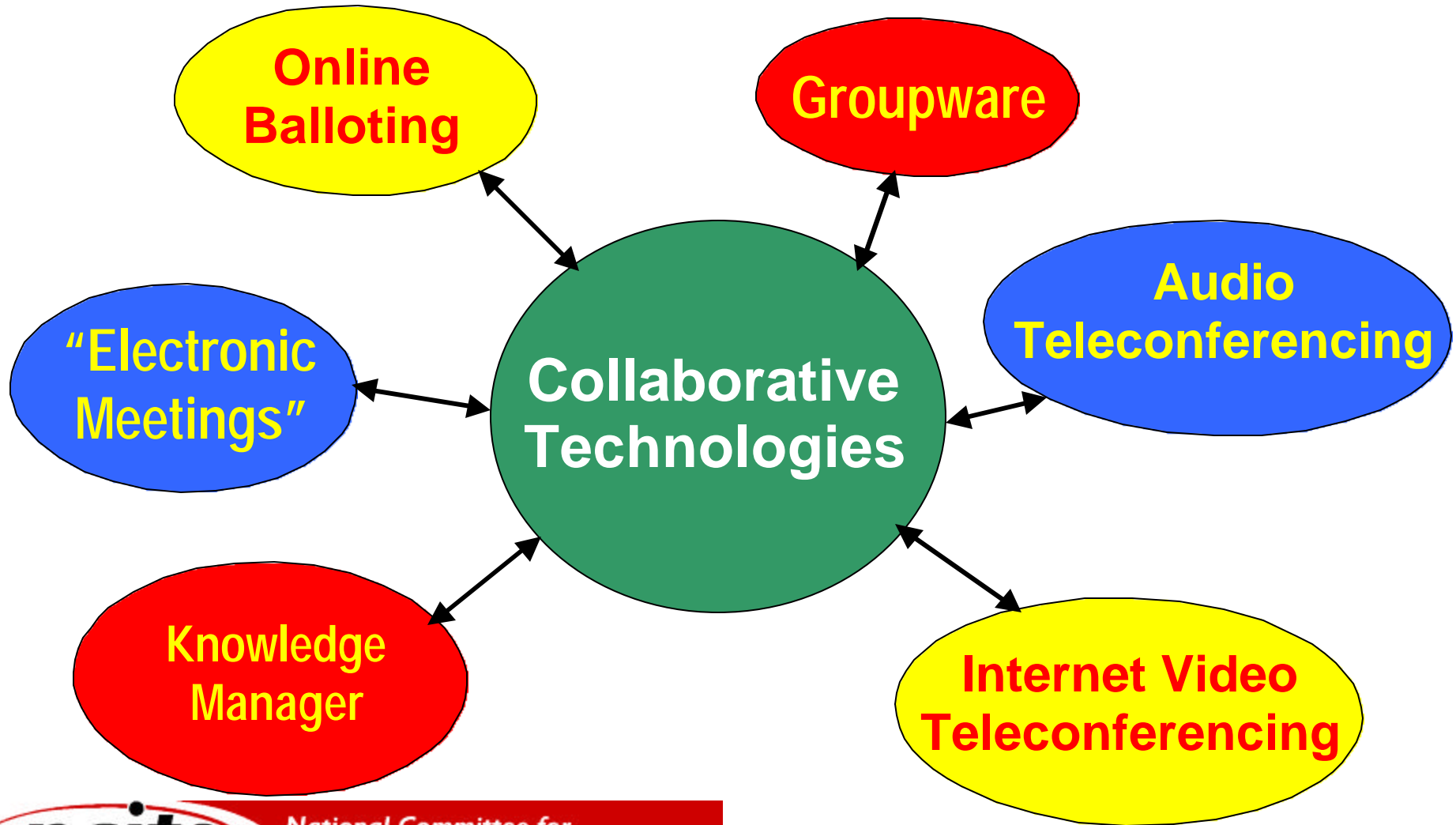


Title of an FCW Article: “Standards. Yeah, Right.”

Industry is having a hard time finding a DOD representative among the multitudes of commercial standards bodies that are charting the future course of the Internet and global communications. DOD can do more to be proactive in pushing for the standards it needs. But Dawn Hartley, the chief technology officer at the Defense Information Systems Agency, said, "We cannot possibly participate in every consortium out there."

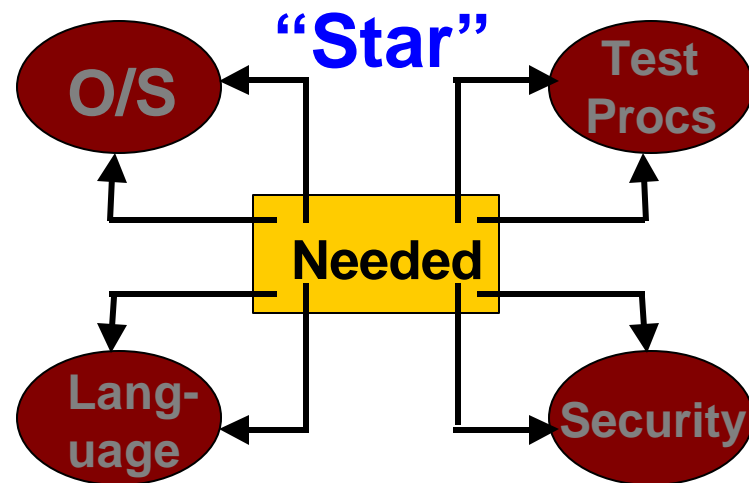
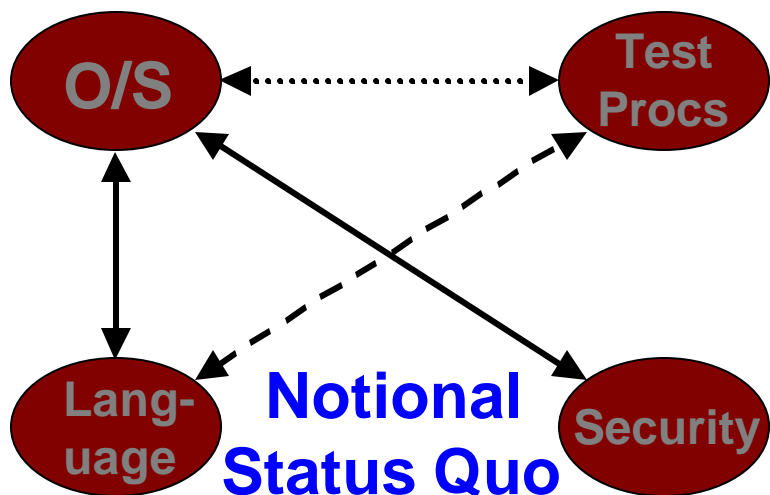
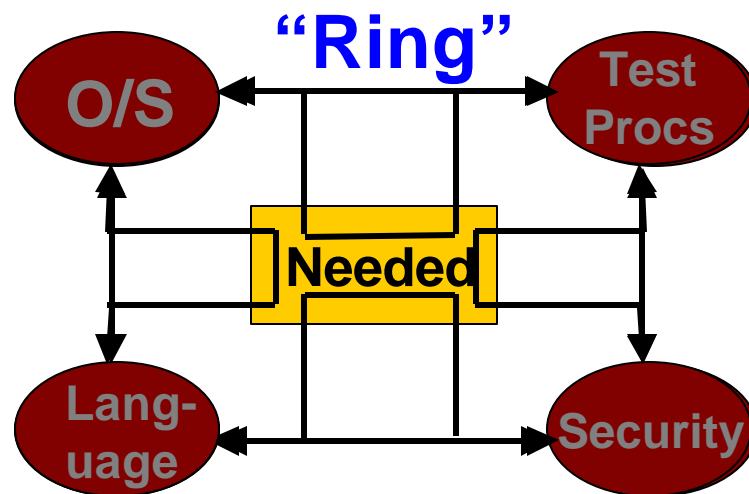
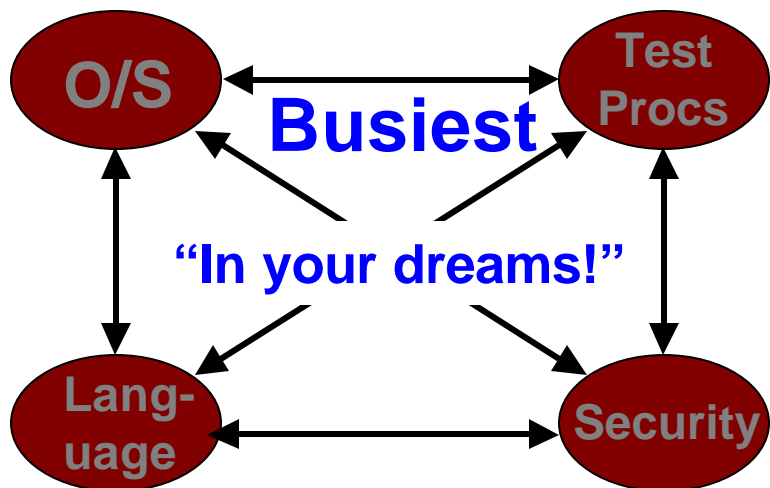


Collaborative Tools and Technologies

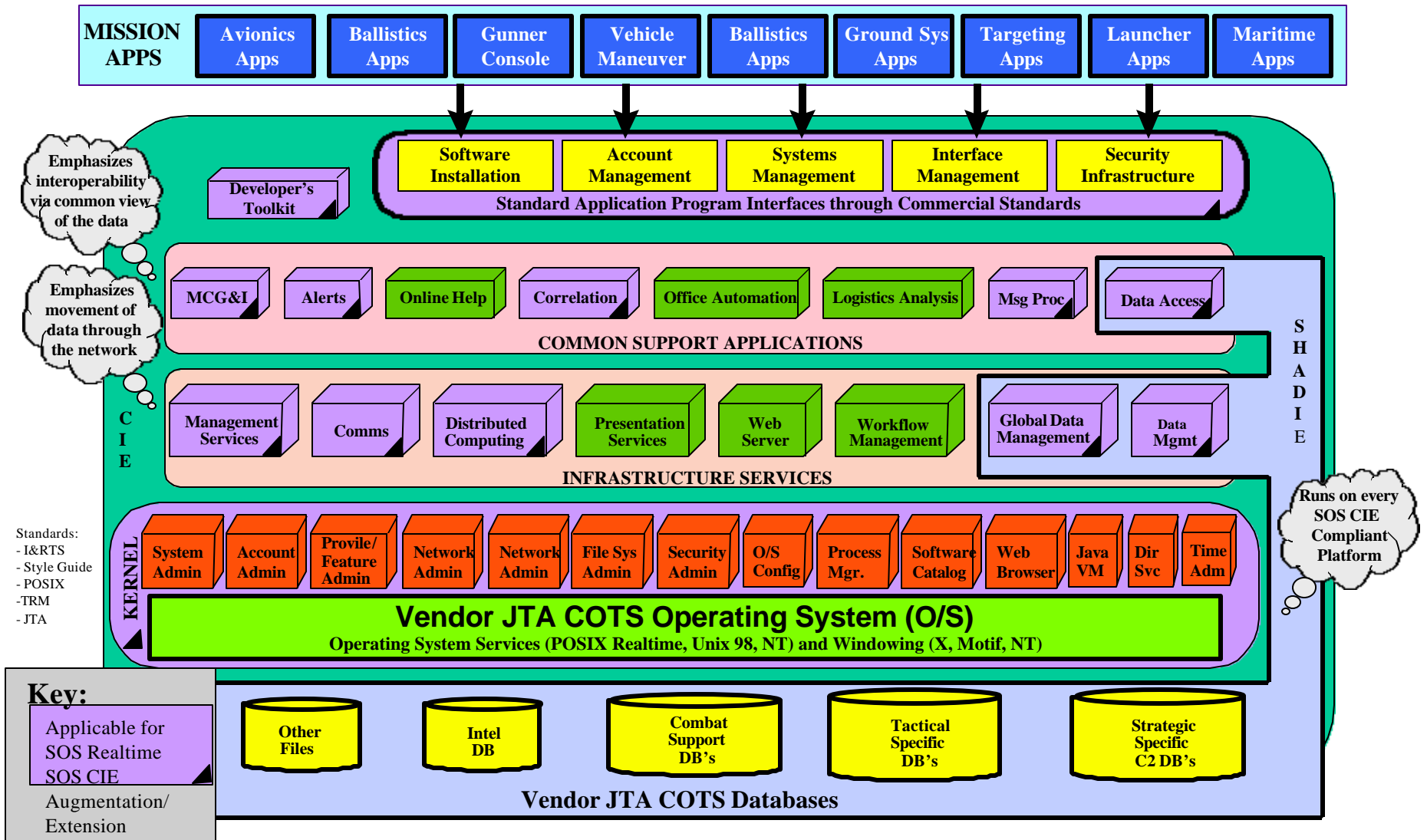




Cooperation among Standards Development Organizations



Example: The Systems View of the DOD Architecture - SoS Common Interoperability Environment Taxonomy





Highlights of SOSCIE

- **SOSCIE General Principle:** Implementation sites have choice of which services (promoted through COTS) to use as long as implementations use the kernel APIs.
- **Kernel Services are:**
 - Automatic
 - Scalable
 - Selectable
 - Configurable
- **Kernel Services must:**
 - Be a thin set of APIs.
 - Be provided for any SOSCIE platform
 - Delivered as a bundle.
 - Include required and optional components
 - Allow integrators to choose not to load optional components



World Class Approach

**Being a World Class
Enterprise
Means Compliance
With
Global Standards**



World Class Approach



**Fork in
the Road**

You either influence the standards:

- Good - You control/influence destiny**
- Sad - Short term costs with weak traceability on long term return**

Or you let others build them:

- Good - Cost avoidance for immediate improvement**
- Sad - Others determine your destiny**