Panel on SE Standards

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Discussion presented here is a general industry perspective from involvement in various efforts to develop SE standards and guides.

Role, Need, or Value of Standards

Role, Need, or Value of Standards

- Common technical reference model/framework
  - Common terminology, concepts, and processes
  - Built on proven experience and lessons learned
  - Easy to tailor to meet project/organization needs
- Full life cycle approach
  - Reduces risk across the life cycle
- Basis for improving:
  - Communication and integration
  - Quality of the product
  - Productivity
  - Customer satisfaction
- SC7 standards are part of an aligned set of standards

Work to a common vision, agreements, and general process concepts

State of Standards

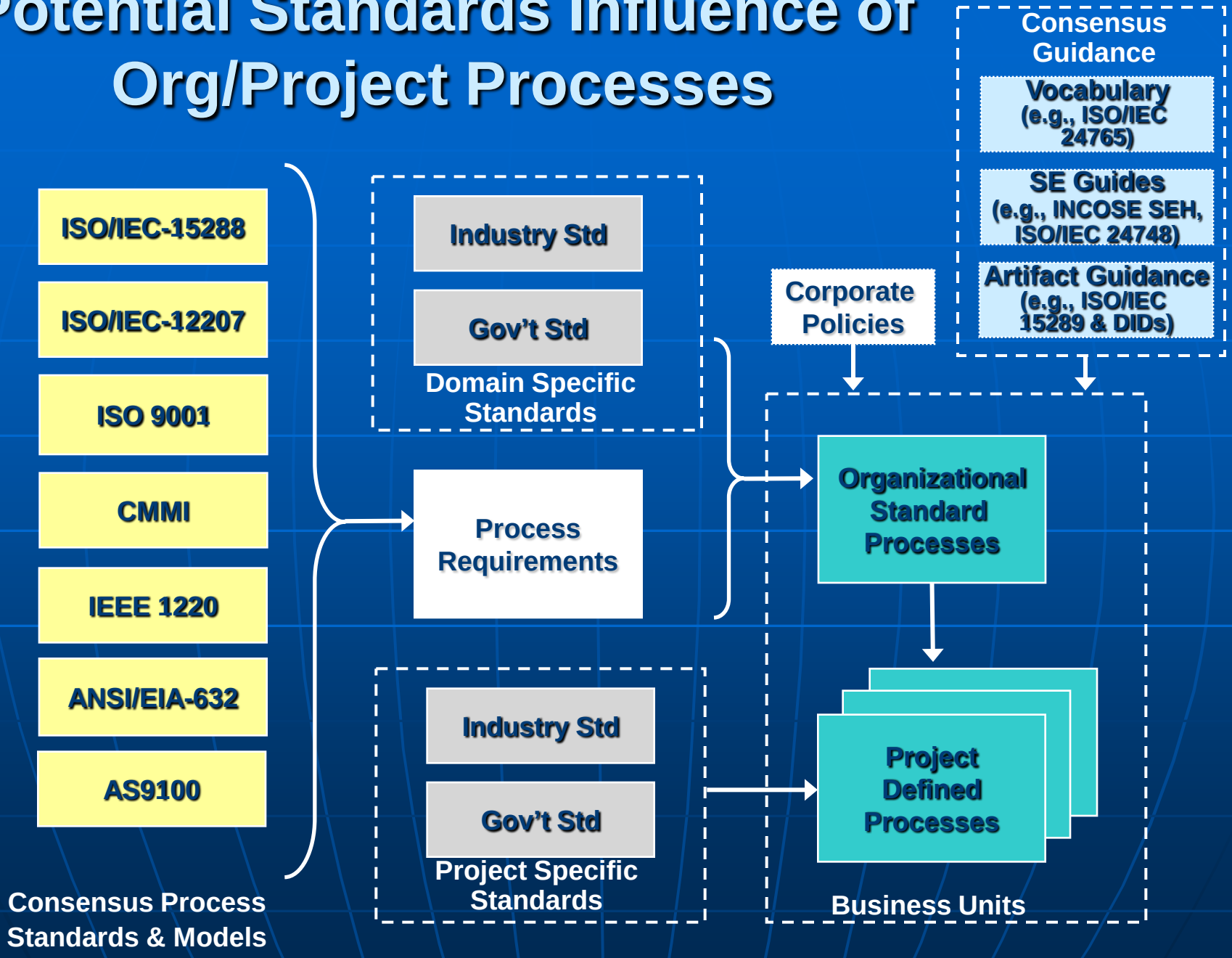
State of standards, guides, etc.

- Corporate adoption – general observations
  - Many corporations have adopted a few key standards, models, and frameworks for top-level process
    - Process requirements/guidance; not the process itself
    - Influence development of organizational standard processes
  - Potential for reasonable commonality, even after tailoring
    - Provides leverage of industry consensus and good practices
    - Common vocabulary, if adopted
  - Basis for desired certifications
  - Domain specific / product specific standards and specs adopted when standardization needed in supply chain
  - Lower-level documents adopted as they address needs

Typical SE related standards & guides

Document ID	Document Title	Comment
ISO/IEC/IEEE 15288	System Life Cycle Processes	Wide adoption including NATO, DoD, INCOSE, …
ISO/IEC/IEEE 12207	Software Life Cycle Processes	
ISO/IEC/IEEE 42010	Architecture Description	
ISO/IEC/IEEE 24765	Systems and Software Engineering Vocabulary	Includes terms and definitions from ISO/IEC, IEEE, PMI
ISO 9001	Quality Management System	Including AS9100 and other domain variants
CMMI	Capability Maturity Model – Integ.	
SEH	INCOSE SE Handbook	Basis for SE Cert.
DAG	Defense Acquisition Guidebook	
ISO/IEC/IEEE 26702	Management of the Systems Engineering Process	Aka IEEE Std 1220 – under revision – SEMP
EIA 632	Engineering of a System	Under revision
Various others	Subset of lower level process stds, document descriptions and guides	E.g., 15939, 29148, 24748, …

Potential Standards Influence of Org/Project Processes

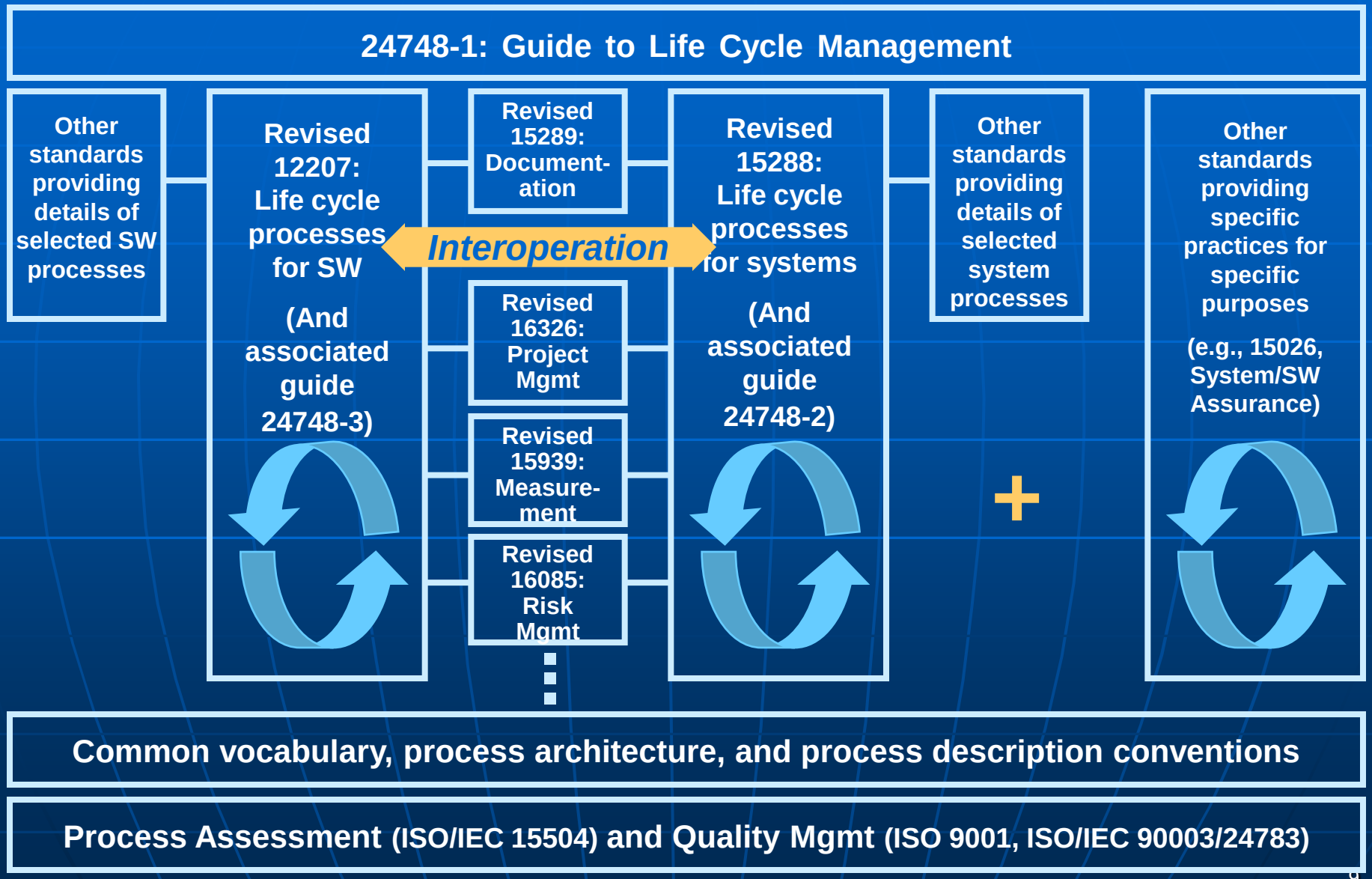


Top needs/gaps

- Focus areas for standards
  - Architecture process and guidance
    - Enterprise
    - System
  - Requirements engineering
  - System Integration
  - Verification and validation
  - Assurance and security
  - Life cycle support
  - Service life cycle

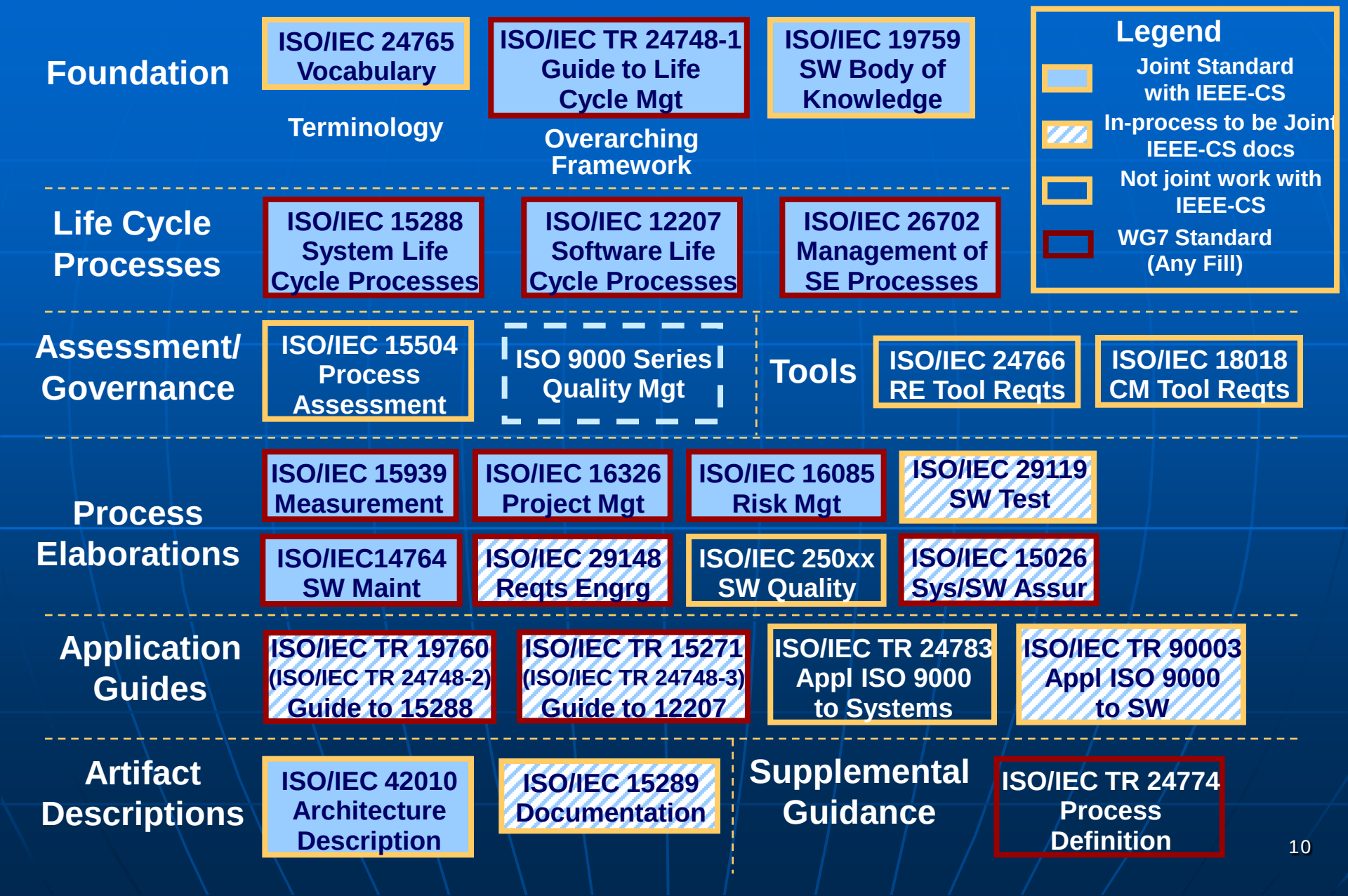
- And most of all …
  - A set of integrated standards
    - Common vocabulary
    - Single, integrated process set
    - Single process structure
    - Jointly planned level of prescription
    - Suitable across the audiences
    - Accounts for considerations in wide range of domains and applications

Intended Relationships of Key System & Software Engineering Process Standards After Alignment in SC7



Source: Adapted from chart of James Moore, MITRE Corp. by Garry Roedler, Lockheed Martin. .

Current Alignment/Integration Status for SC7



Towards Full Integration in SC7

- Study Group established
  - Investigate scope and content of Integration Phase
  - Objective to achieve a fully harmonized view of the system and software life cycle processes
- Integration to consider:
  - Common purpose and outcomes
  - Architecture of the standards
  - Level of prescription of activities and tasks
  - Life cycle treatments
  - Application to services and operations
  - Common verification and validation concepts
  - Common configuration management concepts
  - Alignment with other applicable standards
  - Rationalization of application guides

Source: ISO/IEC JTC1/SC7 WG7

DoD/MIL Standards versus Industry Standards

Pros and Cons of DoD/MIL Standards versus Industry Standards

	Consensus Standards	DoD/MIL Standards
Built on industry experience and consensus		
Widespread use, including internationally		
Cost to develop & maintain		
Availability or cost to access		
Time to develop/revise		
Focus on specific sector		
Validation within the sector		
Likelihood to drive cost-effective practices		
Likelihood to spur competition and affordability		
Drives certification, licensing, laws, or policy		
Integration with other related standards		

Decision Criteria

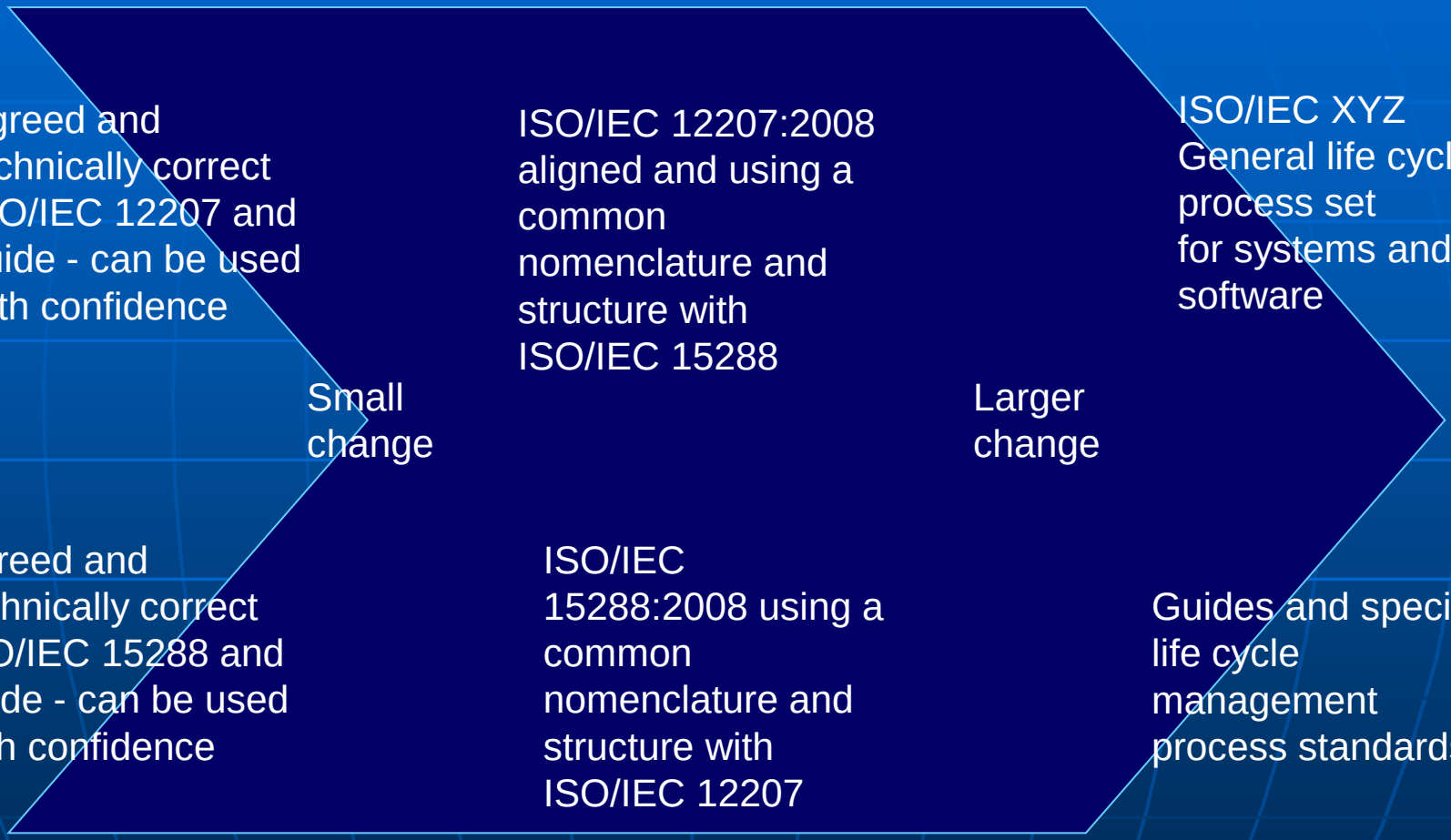
- Existence of relevant standard
- Adequacy for application
  - Ability to meet DoD needs for intended usage
- Acceptance within industry
  - Level of usage, validation, and incorporation into other guidance
- Consistency with other standards or body of knowledge
- Opportunities to influence direction
  - Both new documents and revisions
  - Feedback loop/mechanisms and schedule for maintenance

With respect to current policy

- Policy: "... wherever practical, and to make maximum use of non-Government standards and commercial technologies, products, and practices."
- Public law: "... use non-government standards in lieu of developing or maintaining government standards, IF the non-government standard satisfies the government's requirements ..."
- The existing policy and law (if adhered to) drives a useful and balanced approach
  - Requires evaluation/decision criteria for satisfaction of government needs to ensure consistency
  - Need to avoid "not invented here", personal preferences, and desire for perfection

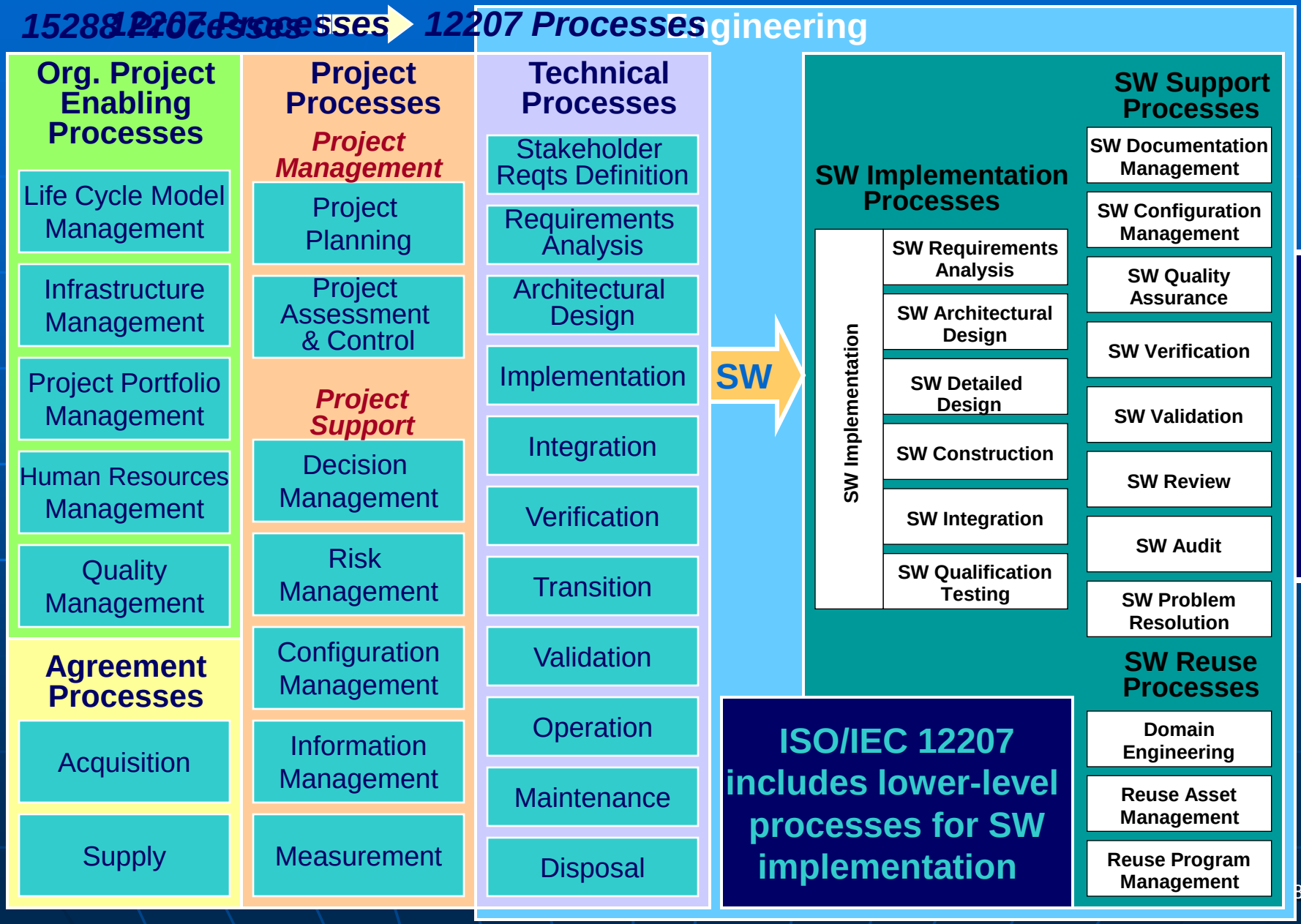
Back-up Charts

Original Approach for Harmonization

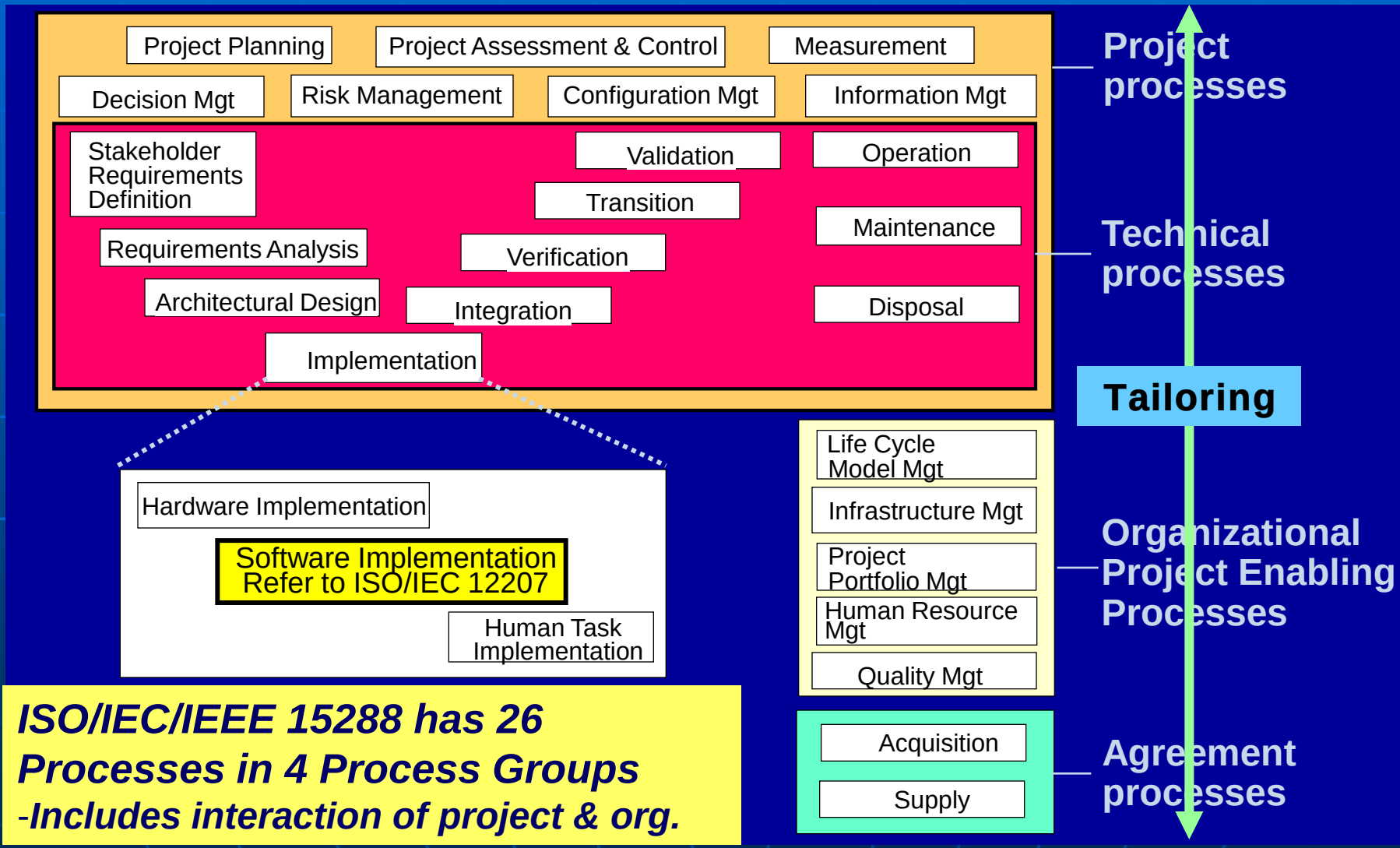


Source: ISO/IEC JTC1/SC7 WG7

Aligned Process Models for ISO/IEC 15288 & 12207



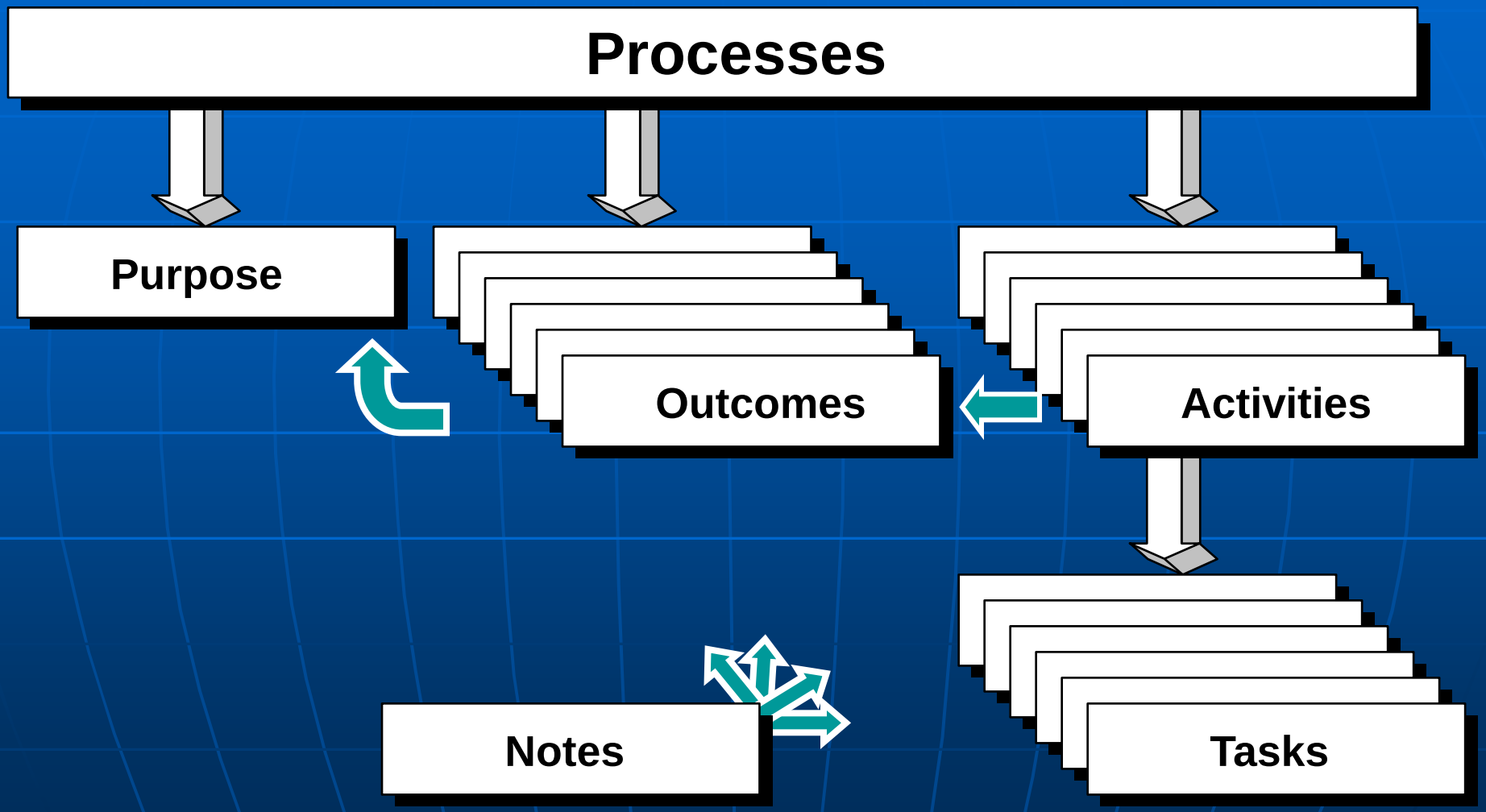
ISO/IEC/IEEE 15288 Processes and Relationship to ISO/IEC/IEEE 12207



ISO/IEC/IEEE 15288 has 26 Processes in 4 Process Groups
-Includes interaction of project & org.

Source: Adapted from ISO/IEC JTCI/SC7/WG7 presentation on ISO/IEC 15288.

ISO/IEC/IEEE 15288 Process Structure



Purposes and Outcomes are Normative