NIST Standard in Trade Workshop on
Transportation Management Systems (TMS) and
Intelligent Transportation Systems (ITS) Standards

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Consensus Standards Development, Adoption and Implementation in the United States

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Consensus Standards Development, Adoption and Implementation in the United States

Background

NTCIP and ATC Standards Development

Challenges of the Development Process

Improving the Development Process

Methods for Establishing Standards

- Only one product of its kind available
- Market selects the preferred product or concept
- Governmental stipulation
- Industry collaboration

History of Standards Development in Transportation

- Transportation standards can be traced to ancient Rome
- Modern transportation standards started soon after the invention of the automobile
- Standards established by local municipalities, states and professional organizations as early as the 1920s and 1930s
- Standards are still being established in similar ways today

Modern Standards Development Finds Strength in Diversity

- Diverse professional organizations serving different primary objectives but with overlapping “interests” in Transportation
- Multi-discipline technical skills available
- Standards Development Organizations (SDOs) to support and maintain standards
- US Department of Transportation (USDOT) financial support and focus of work (Note: Not always available)

US ITS Standards Development Organizations Use Consensus-Based Processes

- Institute of Electrical and Electronics Engineers (IEEE) http://www.ieee.org/
- American Public Transit Association (APTA) http://www.apta.com/
- Society of Automotive Engineers (SAE) http://www.sae.org/

US ITS Standards Development Organizations Use Consensus-Based Processes

- American Association of State Highway and Transportation Officials (AASHTO) http://www.aashto.org/
- Institute of Transportation Engineers (ITE) http://www.ite.org/
- National Electrical Manufacturers Association (NEMA) http://www.nema.org/

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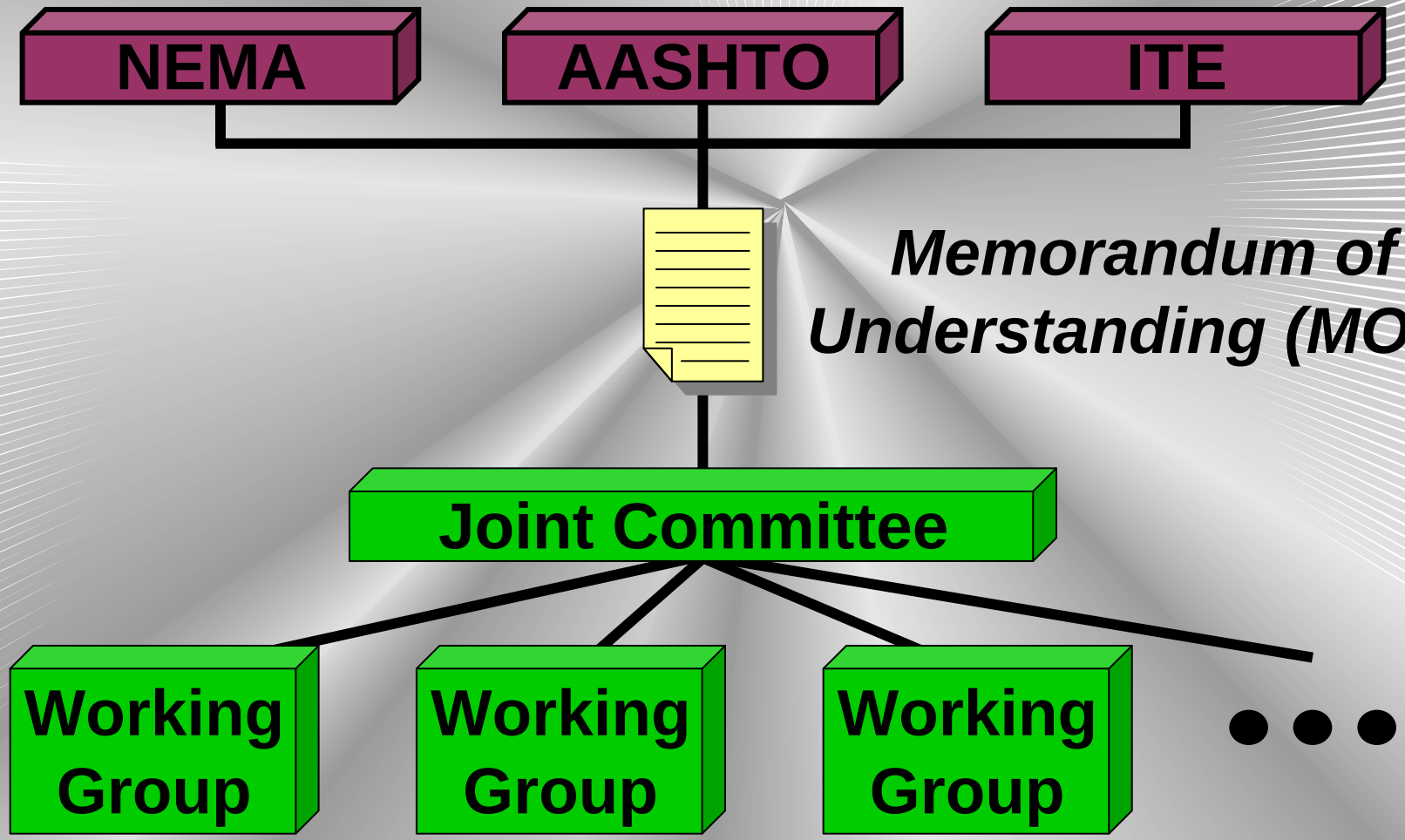
National Transportation Communications for ITS Protocol (NTCIP) Standards

- Field Device Communication Standards
- Center-to-Center Communications Standards
- Profile Standards
- Policy Documents
- More than 55 standards and documents overall

Advanced Transportation Controller (ATC) Standards

- **Physical device standards for traffic controllers and cabinets**
- **Hardware & Software**
  – Not communication standards
- **Currently have 4 standards**

NTCIP and ATC Development Organization



Role of Standard Development Organizations

- Develop new standards
- Coordinate with other SDOs
- Provide standards development framework
- Provide training and outreach
- Maintain standards
- Encourage the deployment of ITS services through the use of ITS standards
- Approve and rescind standards through a ballot process within the SDO

Composition of the Joint Committee

- Established by a Memorandum of Understanding of AASHTO, ITE and NEMA
- 18 voting members (6 from each SDO)
- Chairperson selected by its members
- 3 Liaisons from each SDO (non voting)
- USDOT representatives (non voting)

Role of Joint Committee

- 2-3 year strategic outlook
- Determines work items to be developed
- Initiates and oversees Working Groups (WGs)
- Accepts (or rejects) User Comment Drafts and Proposed Recommended Standards sent from the WGs
- Refers/Recommends documents to the SDOs
- Recommends outreach activities

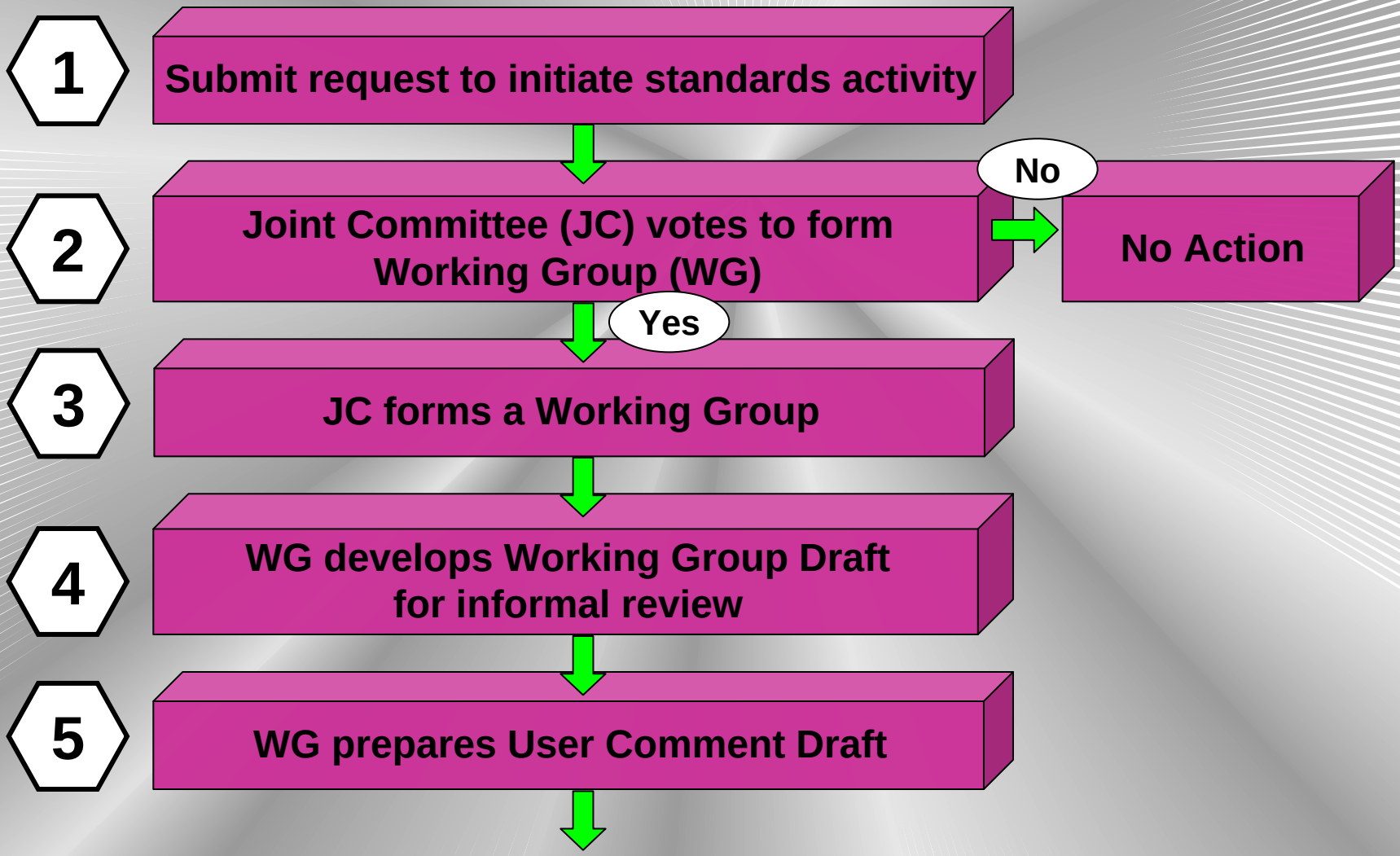
Composition of the Working Group

- **Chairperson of the WG appointed by JC**
- **Made up of subject matter experts including those from public agencies, manufacturers, software developers, and consultants**
- **Typically about 10 members**
- **Voluntary participation unless the JC has determined that financial support can be made available**

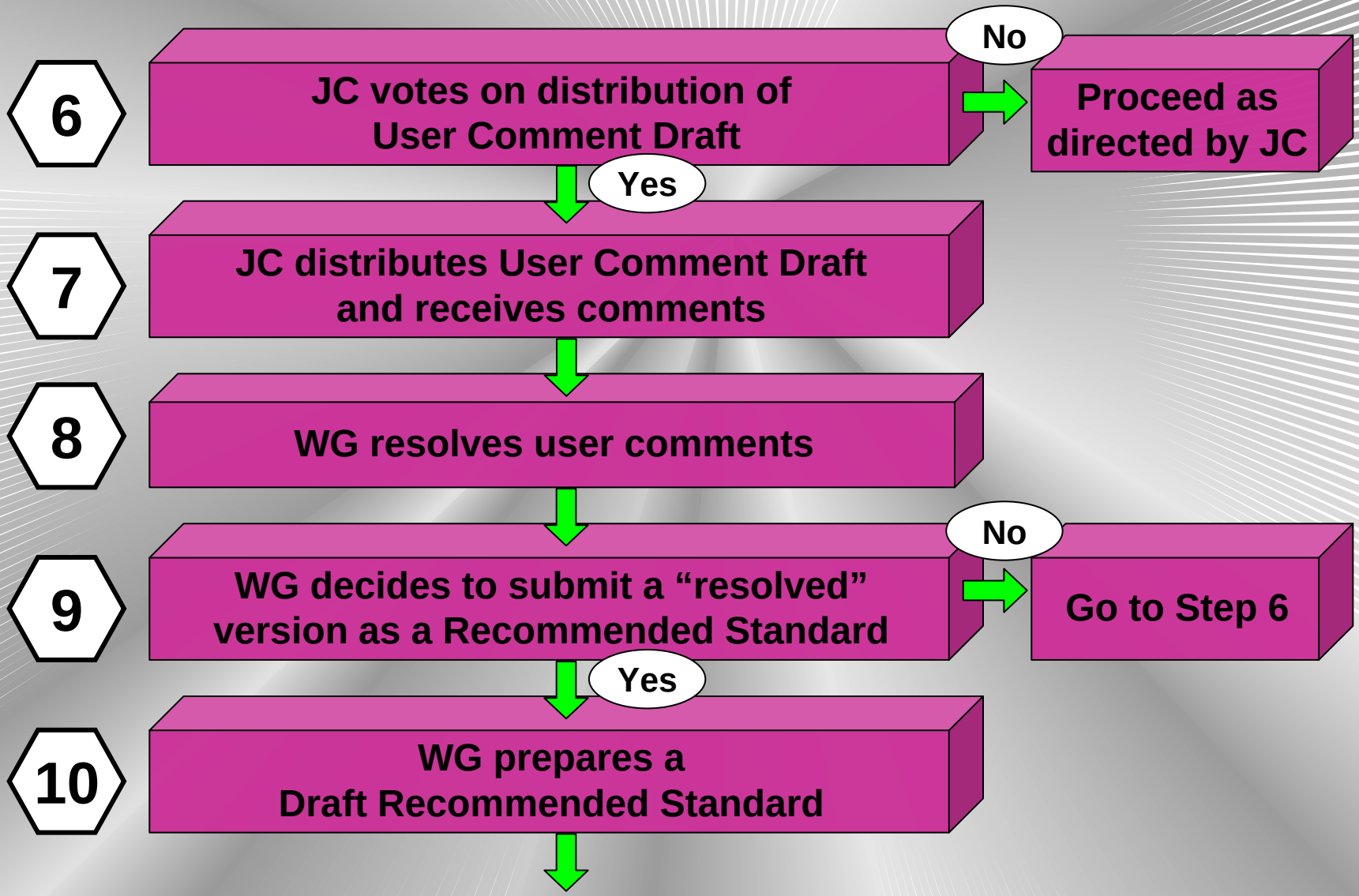
Role of Working Group

- **Responsible for creating standards documents**
  - **Internal Working Group Drafts**
  - **User Comment Drafts**
  - **Proposed Recommended Standard**
- **Resolves comments in response to User Comment Drafts**
- **Revises/corrects draft documents to gain consensus**
- **Responds to the direction of the JC**

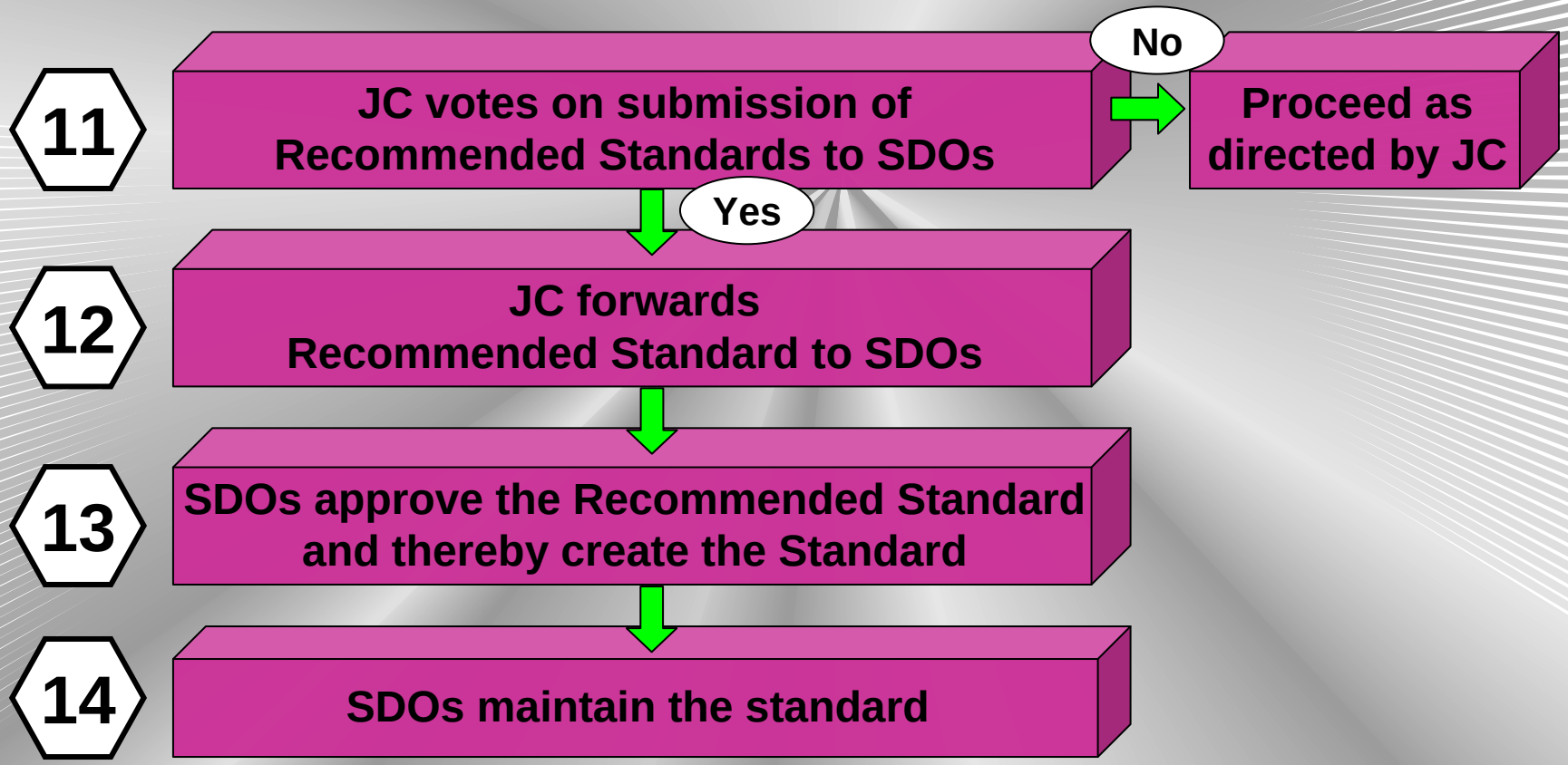
NTCIP and ATC Standards Development Process



NTCIP and ATC Standards Development Process



NTCIP and ATC Standards Development Process



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Improving the Development Process

Challenges of the Development Process

- Gaining consensus can be difficult
- Tendency to include too many features
- Most of the work is volunteer and WG member's activity may be interrupted
- Qualified working group members can be difficult to find in some cases
- Iterative design-build process not practical

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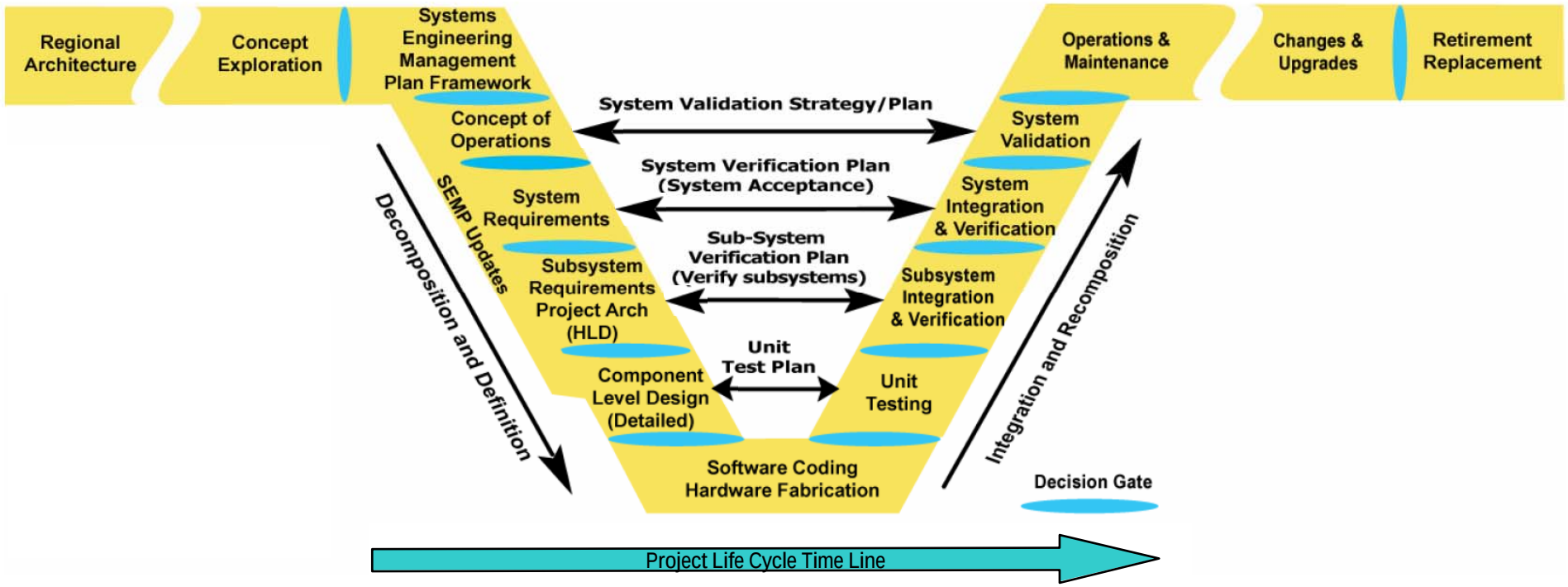
Improving the Development Process

- Project oriented budgeting
- On-line training
- Guide documents
- Identifying early adopters in the JC and WGs
- Systems Engineering Process
- Focus on testing
- Use of paid consultants
- Frequent use of teleconferences

System Life Cycle



System Life Cycle

- Illustrates the influence of the early phases of the project on the end of the project
- Emphasizes planning, stakeholder involvement, and validation of requirements/products
- Emphasizes need to begin verification planning when requirements are defined at every level
- Illustrates “top down” definition and decomposition

Typical Composition of Standards

- Introductory material
- User needs
- Requirements
- Design (may take various forms)
  - Interface specifications
  - Data specifications
  - Software specifications
  - Hardware specifications
- Appendices
  - Traceability Matrix

References

- National Transportation Communications for ITS Protocol (NTCIP) Standards
  www.ntcip.org

- Advanced Transportation Controller (ATC) Standards
  http://www.ite.org/standards/

- United States Department of Transportation
  http://www.dot.gov/