Strategies for Successful Component-based Development

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Agenda

- Background on a New Approach
- Challenges We Faced
- Discovered Strategies
- Lessons Learned
- On-going Work

Background on New Approach

- Conducted a feasibility study that identified significant functional overlap in CC domain **(reported GSAW98)**
- We felt reusable component-based development approach could save time and money
- Sought an open reusable component toolkit for Command and Control Domain
  - Reference architecture
  - Reusable components
  - Documentation

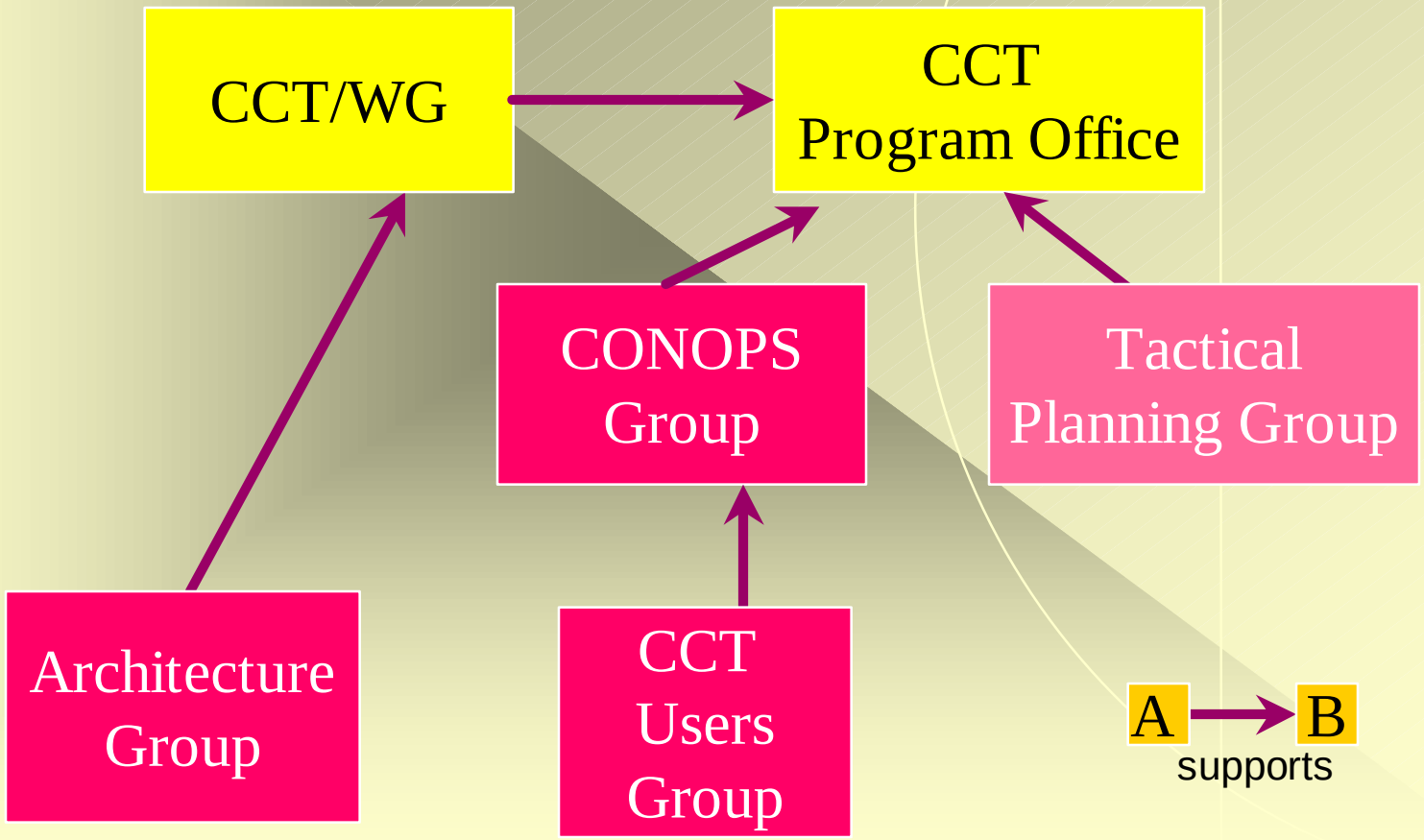
Challenges we faced

- Programmatics geared toward classic “point-solutions”
- Concerns that the reuse artifacts would not be sufficient for independent development
- Schedule was challenge
- Balancing long-term reference architecture needs vs short-term development progress
- Need to not only develop for current customer, but promote reuse within our organization

Discovered Strategies:
Introduction

- Strategies grew out of concerns and challenges in developing a product-line approach
- We needed some way to manage our new technical and organizational goals.
- Result was creation of Program Office working groups...
- …and a plan to monitor their effectiveness

Working Groups



Discovered Strategies:
Develop an architectural group to manage technical evolution

- **Symptoms:**
  - **Certain architectural issues were found to be outside the contractors scope**
  - **Architectural problems were often revisited/delayed/revisited**
- **Results:**
  - **Forum established to look at problems in depth**
  - **Consensus-based architectural agreements for classes of problems are being addressed and documented**
  - **Recommendations are structured to facilitate management**
  - **Better ability to address major concerns vs minor defects**
  - **Subgroups work key (hot) issues**

Discovered Strategies:
Develop short-term (tactical) plan to promote component-based reuse beyond current customer

- **Tactical Plan Strategies:**
  - Launch another system using our artifacts
  - Coordinate with NRO strategic goals
  - Mature our assets
  - Increase our exposure
- **To carry these strategies out successfully:**
  - Define metrics to monitor progress
  - Work with others to gain better perspective of their needs and concerns
  - Recognize we are part of a larger picture in which our reference architecture for CC provides an important part
  - To encourage progress in other domains need to address long-term issues of business-case needs and contractor buy-in

Discovered Strategies:
Develop a Program CONOPS to foster continued success

- Interoperability
  - Provide guidelines for conformance to reference architecture
- Provide high level roadmap for the program
- Identify reuse processes

Lessons Learned

- Reference architecture is alive
  - Decoupling the reference architecture from target “design” architectures implies an organizational ownership that will manage its evolution
  - Incremental releases worked well
  - Needed to revisit our reference architecture representation
  - Schedule exacerbated weak areas
- Evolution of artifacts for reuse takes time and thought
  - Distinguish between near-term and long-term issues helpful to focus efforts

Lessons Learned

- Architectural reviews started late in our process
  - A tool to help architecture development should start early
- Definition of technical concepts essential
  - Avoid misunderstandings between commonly used terms
- Verification of system level performance
  - Physical models
- Architectural conformance
  - What does it mean

On-going Work

- **Technical:**
  - **Continuing incremental releases**
  - **Independent "vertical slice" approach to assess artifact completeness and navigability**
  - **Performance assessment methodology using components in different scenarios**
  - **Managing interfaces and component deployment**
- **Organizational:**
  - **Implementation of the Tactical Plan**
  - **Interaction with others**
    - **SOTG**