Building a Satellite Ground Application From Reusable Components: Lessons Learned

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Presentation Outline

- Program background
- Aerospace “vertical slice” reuse analysis
- Lessons learned / Conclusions

Program Background
Control Channel Toolkit (CCT)

- Government is developing CCT as reusable software for satellite ground control applications
  - Provides common reference architecture based on well established, component-based design patterns, user tunable “variation points”, standards and Common Object Request Broker Architecture (CORBA)
  - Goal is lower program maintenance costs and reduced development risk

The Aerospace "Vertical Slice" Evaluation of CCT

- Aerospace tasked to perform independent assessment of CCT usability
- Developed "vertical slice" evaluation process
  - Determine applicability of CCT components to a specific reuser ground application
  - Drill down through "slice" of CCT artifacts relevant to the application
    - Artifacts include reuse guide (RUG), software development files (SDFs), etc.

“Vertical Slice” Evaluation

- Review CCT documentation and artifacts
- Build telemetry alarm application using CCT architecture and components

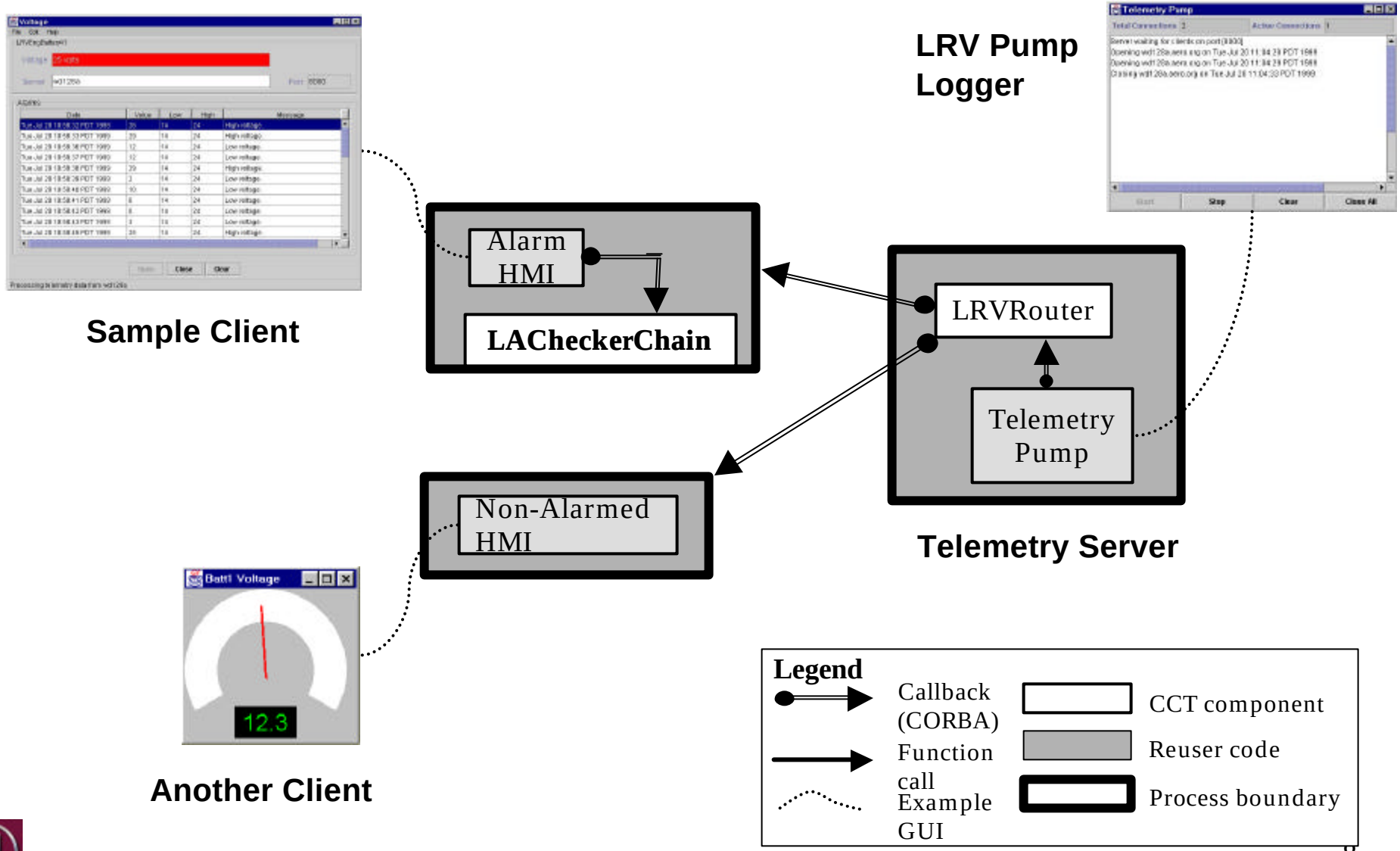
Evaluation: Document Review

- Reviewed relevant Contract Data Requirement List (CDRL) items
  - Including Reuse Guide, Test Architecture, and Domain Definition documents
- Received on-site training from contractor
- Developed baseline requirements and architecture for telemetry alarm capability
- Produced briefing with findings and sustainment phase recommendations

Evaluation: Application Build

- Built telemetry alarm capability specified in document review
  - Generated Last Received Values (LRVs) of telemetry
  - Registered interested clients with a telemetry router
  - Routed LRVs to registered clients
  - Performed limit alarm checking per client
- Documented, demonstrated and reported results to government

CCT Telemetry Alarm Demonstration: Architecture



Overall Impression of CCT

- Elegant, component-based architecture
- Complete domain coverage
- Flexibility through variation points

Lessons Learned / Conclusions

- CCT provided an excellent arhcitectural base and implementation.
  - Concerns that contractor base may not be sophisticated enough to employ component based architecture.
- COTS management a major issue
- Working with ORB-based architecture requires a huge amount of knowledge and experience.
  - ORB vendor dependencies are a barrier to interORB portability. Tie-Impl pattern specifically employed to isolate these dependencies.