



# Tango Collaboration Meeting – Trip Report

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# Tango Control System

- Distributed object control system
  - **CORBA-based using IIOP**
    - Open source omniORB for C++ binding
    - Open source JacORB for Java binding
    - Derived language support for python, matlab,...
  - **Details of CORBA hidden using:**
    - Device server
      - Serves up named devices (ie. “bpm”, “power supply”)
        - » Devices have commands and attributes
      - Configuration initialized from and maintained in MySQL database
    - API (both Java and C++)
      - Access to commands and attributes of devices
      - Asynchronous events



# Tools

- Tools (all Java)
  - **Pogo**
    - Rapid development graphical tool for generating code for developing device classes.
  - **Astor**
    - Graphical tool for supervising device server startup/shutdown/restart across control system.
  - **ATK (Java Swing-based)**
    - Graphical application toolkit for building control screens
  - **Jive**
    - Graphical tool for viewing/modifying configuration database
  - **Others for archiving, etc...**



# The Collaboration

- Tango actively used and developed by:
  - ESRF (Andy Goetz & Jens Meyer)
  - Soleil (Majid Ounsy & Alain Buteau)
  - Alba (Jorg Klor)
  - Elettra (Claudio Scafuri)
  - Website: [www.esrf.fr/Infrastructure/Computing/tango](http://www.esrf.fr/Infrastructure/Computing/tango)
  - Merging 4 separate Tango web sites into one
- Meetings bi-annually
  - Approx 40 participants
  - Including “outside observers” who were made to feel very welcome
    - Ie. Dave Gurd, Matthias Clausen, Claude Saunders, Sharon Lackey, ...



# Various Observations

- Complex call interfaces not supported by API
  - **This is good – generic applications can be written that can introspect device attributes**
    - Similar to process variables, only namespace is “device.attribute” instead of “PV name”
  - **Commands allowed which take one argument, return one argument of a pre-defined set of types (can also be introspected)**
- Connection management
  - **Device lookup via IOR stored in database**
  - **Automatic reconnect if device server rebooted**
  - **Performance issues here being addressed**



# Various Observations

- Performance
  - **100 us latency to transfer (get) long value**
  - **Many other aspects to performance, but general impression is that use of CORBA IIOP (as implemented by omniORB and used by Tango) is not a performance problem.**
  - **Co-located objects avoid IIOP overhead**
    - le. One device calling another within server
- Compile-time and run-time class dependencies
  - **Common problem with distributed object architectures**
    - Change one class definition, everything must be rebuilt
  - **Actively designed to avoid this in Tango**
    - Versioned classes
    - Every client doesn't have to know about every class to build and run



# Various Observations

- Infrastructure is general-purpose
  - **Should a control point be implemented as a command or an attribute?**
  - **Agreement on representing important control system abstractions?**
    - Device classes that implement everything, or...
    - Devices classes for hardware
      - Or develop code library for hardware access?
    - Devices classes for analog i/o point, digital i/o point, etc.
      - Use abstract classes or just share
    - Device classes for BPMs and Power Supplies
    - Device classes for calculated (derived) data
    - Many of these critical patterns not agreed upon yet...
- **No device access security at this time**



# Conclusions

- Tango is modern, approachable distributed object control system
- Still “young” in terms of control system lifetime (first incarnation around year 2000)
  - **Motivated and energetic collaborators**
- Can serve as full control system, or to provide device abstraction and distributed object capability on top of channel-oriented control system (SCADA, EPICS, ...)