"The Future of Tango"

or

A light talk about control system evolution, trends, vision, common sense, philosophy and images ...
The talk should be honest ...

'I cannot tell a lie...'

George Washington

pom pom
scale 1-5
The Future of Tango Meeting

- A meeting on the *Future of Tango* was held in 2006 at Hotel des Skieurs in the French Alps.
The Future of Tango Participants

- The usual crowd plus some EXXXXS spies:
What is TANGO?

go to the TANGO home page

http://www.tango-controls.org
TANGO - A CORBA based control system

TANGO is an object oriented control system based on CORBA for Linux, Unix and Windows. It provides a framework in C++, Java and Python for implementing distributed control objects. TANGO has a full set of tools and hundreds of device servers. [Edit]

Download TANGO - A CORBA based control system

Project Admins: andy_gotz, jensmeyer, nleclercq, pivetta, taurel
Operating System: (None Listed)
License: (None Listed)
Category: (None Listed)
A fundamental part of the success of Tango is the choice of CORBA and its binary protocol IIOP.
CORBA

- A fundamental part of the success of Tango is the choice of CORBA and its binary protocol IIOP
Tango is simple!
hey, this is SOA!
Service Oriented Architecture

it is just a pity we forgot to patent it!
TANGO works!

100% TANGO

SOLEIL SYNCHROTRON
Tango Philosophy

- "build a modern control system which is constantly being improved based on user needs and technology trends"

- this is a nice idea but it needs resources and constant reflection to happen
Tango Onion Model

- "Tango is a layered system with new layers being added constantly, like an onion"
Tango Evolution

Tango Timeline

Major Version

Time

V1  V2  V3  V4  V5  V6

06/12/99  01/04/01  01/09/02  14/07/04  28/05/05  10/10/06  22/02/08
Sharing + Not Sharing

to share or not to share, that is the question ...

- the Tango community not only shares software
- it also does not share software
Mont Blanc effect

“look!”

XML

PYTHON

ECLIPSE
Mont Blanc effect

“wow!”

ECLIPSE/XML/PYTHON
Mont Blanc effect

“oo la la!”
Tango Collaboration

SHARES

- the CORBA protocol
- the device server model
- the database
- management tools
- navigation + test tools
- common device servers
- tool to generate device servers
- an archiving database
Tango Collaboration

DOES NOT SHARE

- device servers for institute specific hardware
- institute specific graphical user interfaces
- domain specific applications for accelerator physics, beamline control, online data analysis
The October 2006 meeting on the future of Tango decided that Tango should concentrate on the following areas:

- strengthen the collaboration
- stability, quality and packaging
- scalability and reliability
- new needs-driven features
- more and improved tools
- sharing of domain specific solutions

*Bible (John 16:5)*
In order to document, keep track of and follow up new features a system of Tango Feature Requests has been created.

- TFR's will be numbered
- consultable via the web
- followed up at meetings
Tango Feature Requests

- we currently have 21 TFR's
- read the PROCEEDINGS for the details
Collaboration

- is the key to the success of Tango

- *Tango Feature Request 1*:

  each institute must be responsible for one or more *Tango Feature Requests*
SCALABILITY

- exchange of information between clients and device server is totally distributed. The event system allows efficient asynchronous communication between a client and hundreds of servers.

- however Tango has scaling problems when thousands of servers are started simultaneously e.g. at the ESRF, Soleil, ILC, ...

- **Tango Request Feature 5**: distribute the load of the tango naming service to be able to support tens of thousands of servers and clients starting simultaneously
one way of increasing reliability is by means of redundancy. Tango supports redundancy for the central database but not for device servers

**Tango Request Feature 6:**

Add redundancy for device servers which will enable multiple copies of the same device to be running with automatic switchover in the event of failure
MORE FEATURE REQUESTS

- **TFR 7**: update the Java server implementation
- **TFR 8**: implement a multi-channel device class in the Tango device library
- **TFR 9**: extend security service to C++ clients
- **TFR 10**: cache device properties in the database server
- **TFR 13**: extend polling thread to one per device
COOKED DATA TYPES (TFR 11)

- transfer pre-defined data types as a byte stream with an identifier e.g. JPEG, HDF
- TANGO transfers up to 256 MB per packet
Jive and Astor are the standard system tools. These should be constantly enhanced by for example:

- **TFR 16**: monitoring and plotting metrics for all devices

- **TFR 15**: displaying dependancies dynamically between device servers
TANGO is an object oriented control system and therefore allows hierarchies of devices to be built:

- **TFR 17**: improve the dynamic configuration of device hierarchies
STANDARD INTERFACES

- another name for Abstract Classes

- IS THE ONLY WAY TO GUARANTEE THE SHARING OF APPLICATIONS!

- encourages sharing of device servers and hardware e.g. detectors, ccds, motors, video cameras, measuring devices etc.

- Tango standard interfaces could become de facto standards
Service Oriented Architecture (SOA) is the practice of grouping core functions into independent services that don’t change frequently.

Tango already has a service – security.

Others: alarms, data analysis, storage, ...

TFR 14: add support services via a dedicated API.
the long term future of TANGO is to be a wrapper technology which supports multiple communication protocols

this will enable Tango to outlast CORBA and other products i.e. we decide when the “expire by” date should be
TANGO GOOGLE TRENDS

- TIP: choose a good name for your system!
CORBA GOOGLE TRENDS

Tip: You can compare searches by separating with commas.
the second most wanted feature in the Tango community is to raise the level of sharing to the domain specific areas e.g. beamlines, accelerator physics, ...

sharing beamline solutions e.g.

- HKL library
- device servers for detectors
- fast scanning techniques
- Python, Spectra, SPEC bindings
- even frameworks like Device Pool
- even online data analysis?
- a Python based framework for doing beamline control
INTEGRATED WORKBENCH

- Eclipse but don't forget about Netbeans

- “best-of-breed” for enhancing the Tango user experience by integrating Jive, Astor, Device Tree and even Pogo into one Workbench

- CSS is already doing it, why not join forces with them?

- we will try to join the CSS collaboration
ECLIPSE
RICH AJAX PLATFORM (RAP)

this is hot – check it out!
ECLIPSE WORKSHOP?

- Eclipse has a steep learning curve
- Eclipse is being used in controls + scientific programming
- Why not share our experiences around a plate of cheese + wine?
WHY WE DON'T USE EPICS / DOOCS / TINE ...

- the answer is obvious - BIODIVERSITY
CROSS-POLLINATION

- **Biodiversity** also means cross pollination is possible.
- **Tango** is planning to support multiple protocols in the future.
- We will seriously look at integrating **Tine**'s multicast protocol.
MULTI-PROTOCOLS

- **TFR 21**: add support for new protocols to Tango e.g.
  - Soleil's web protocol
  - TINE, DOOCS, DAL, ...
  - SNMP, multi-cast, CORBA's DDS
  - Web Services, XML-RPC
COMMONS

- A public area where we share technologies of common interest e.g.
  - FPGA's
  - Libera
  - Detectors
GIS

- Geographical Information Systems - GIS is a system for creating, storing, analyzing and managing spatial data and associated attributes.

- Tango will integrate GIS information into every device so we can display live information like temperatures overlayed on a map.

- We will try to copy the work by SPRING8.
UBIQUITOUS COMPUTING
TANGO EVERYWARE

- Ubicomp is the third wave in computing
- We are exploring Tango everywhere
Tango has adopted the approach of “constant evolution” i.e. there is no revolution!

- we share a common toolkit where we can implement common solutions

- the Tango collaboration is a success
UNOFFICIAL CONCLUSIONS

- the big challenge in the future is how to share domain specific applications

- if we can just manage to compromise on our favourite technology (Mont Blanc effect) we will achieve the holy grail of sharing applications

- Tango is not the best system in the world but we think Tango has some good features
TANGO IS A PASSION!