

MUCHAS GRACIAS - DESY !



# Future of Tango

- invited talk at ICALEPCS 07 (Knoxville)
- input to this talk :
  - *Tango Future* session held in 2006 at Hotel des Skieurs (Le Sappey en Chartreuse)
  - answers I got to my email request
- I am expecting your feedback - please wake up !

# Talk should be honest ...

Punch, July 7 1976

'I cannot tell  
a lie...'



George Washington

# Abstract of Talk

- Tango is a control system based on the device server concept. It is currently being actively developed by 4 (soon 5) institutes, 3 of which are new institutes.
- In October 2006 the Tango community met in the French Alps to discuss the future evolution of Tango. This paper summarizes the fruits of this meeting.
- It presents the different areas Tango will concentrate on for the next 5 years. Some of the main topics concern services, beamline control, embedded systems on FPGA, 64-bit support, scalability for large systems, faster boot performance, enhanced Python and Java support for servers, more model-driven development, and integrated workbench-like applications.
- The aim is to keep on adding batteries to Tango so that it remains a modern, powerful control system that satisfies not only the needs of light-source facilities but other communities too.

# Tango Philosophy

- ***“build a modern control system which is constantly evolving based on on user needs and technology trends”***
- this is a nice idea but it needs resources and constant reflection to happen
- this talk demonstrates this philosophy with a list of
  - ***Tango Feature Requests***

# Tango - Quo Vadis ?

- *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

# Collaboration

- is the key to the success of Tango
- Tango Request Feature 1 :

***each institute should actively work on a part of the Tango core or alternatively the collaboration should finance one or two system developers***

# Collaboration - sharing

- the CORBA protocol
- the device server model
- the database
- management tools
- navigation + test tools
- common device servers
- tool to generate device servers
- the ATK Java graphical toolkit
- an archiving database

# Collaboration - not sharing

- device servers for institute specific hardware
- institute specific graphical user interfaces
- domain specific applications for accelerator physics, beamline control, online data analysis

# Stability, quality + packaging

- most wanted feature of Tango
- Tango Request Feature 2 :  
***automatically generate unit tests for device servers***
- Tango Request Feature 4 :  
***reorganise and update (rewrite ?) the Tango book***

# 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***

# REDUNDANCY

- 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 NEW FEATURES

- *update the Java server implementation*
- *implement a multi-channel device class in the Tango device library*
- *extend security service to C++ clients*
- *add cooked data types to Tango*
- *cache device properties in the database server*
- *extend polling thread to one per device*

# SYSTEM TOOLS

- Jive and Astor are the standard system tools. These should be constantly enhanced by for example

- Tango Feature Requests :

***monitoring and plotting metrics for all devices***

***displaying dynamic dependancies between device servers***

# 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
- Tango standard interfaces could become *de facto* standards

# PROTOCOLS

- A fundamental part of the success of Tango is the choice of CORBA and its binary protocol IIOP
- CORBA as a standard has matured and is not evolving anymore
- ***TFR : add support for new protocols to Tango e.g.***
  - Soleil's web protocol
  - Web Services
  - XML-RPC

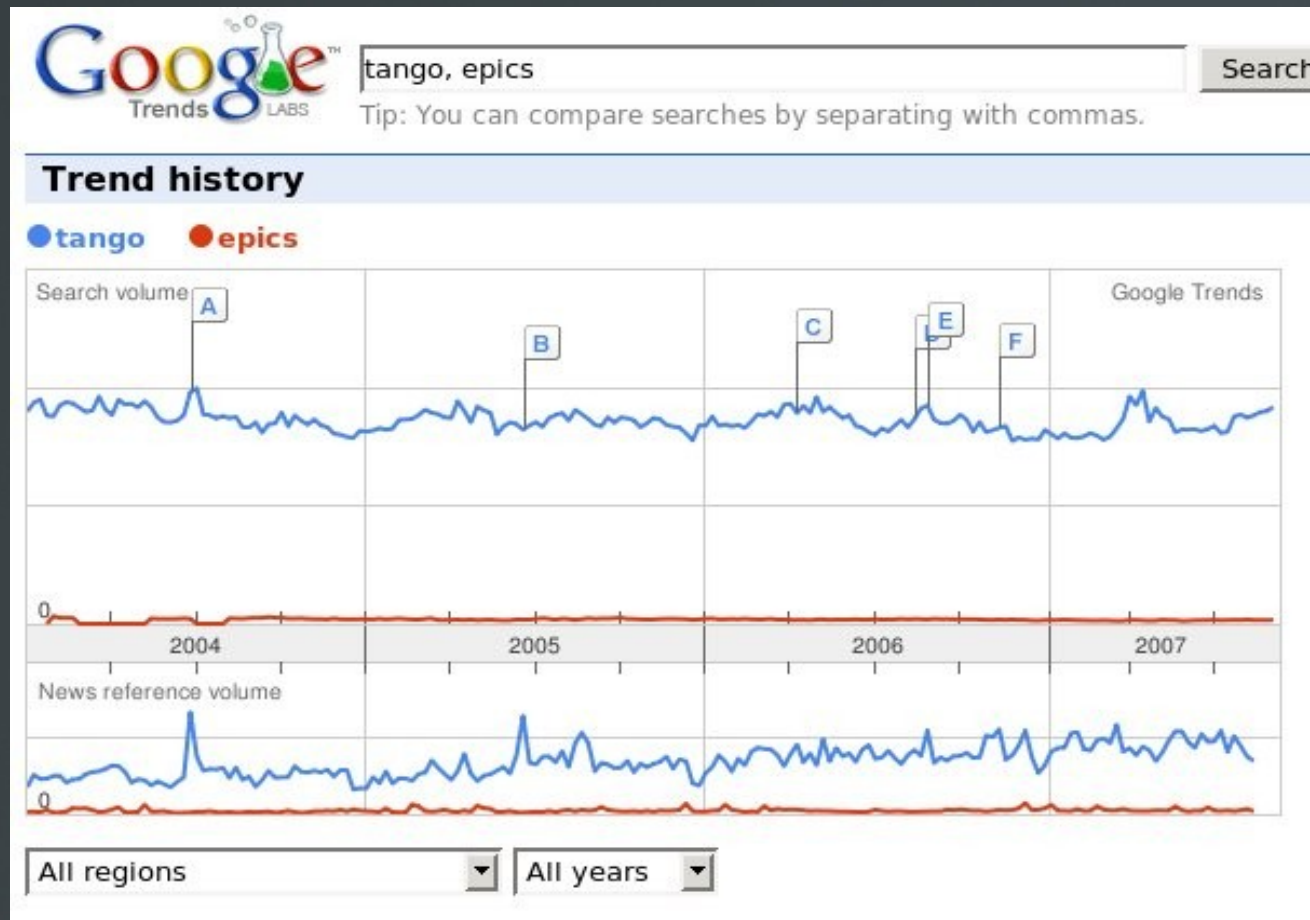
# SERVICES

- *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 : add support services via a dedicated API***

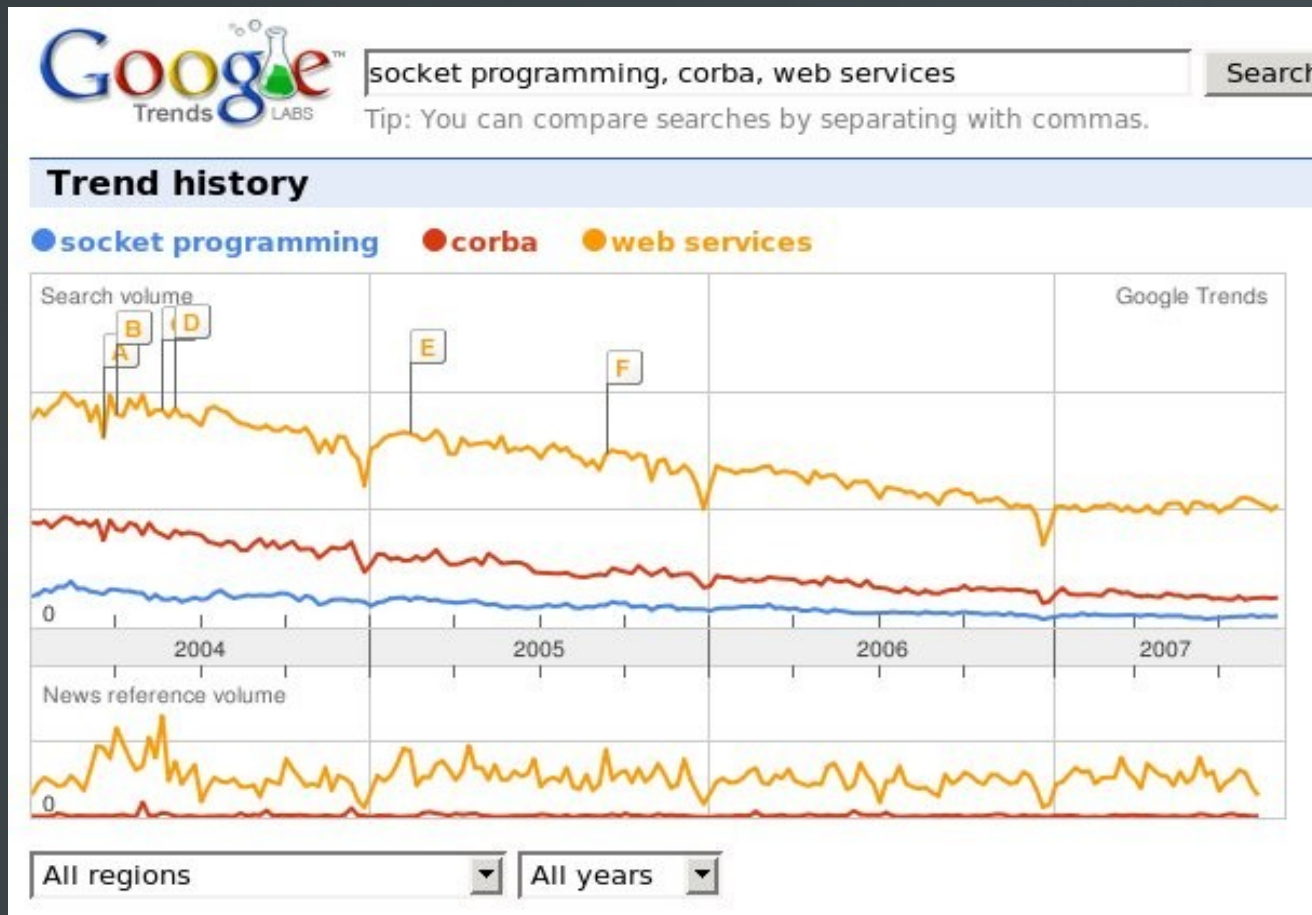
# TANGO COMPONENT MODEL

- the long term future of TANGO is to be a wrapper technology *par excellence* 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 and GOOGLE TRENDS



# CORBA and GOOGLE TRENDS



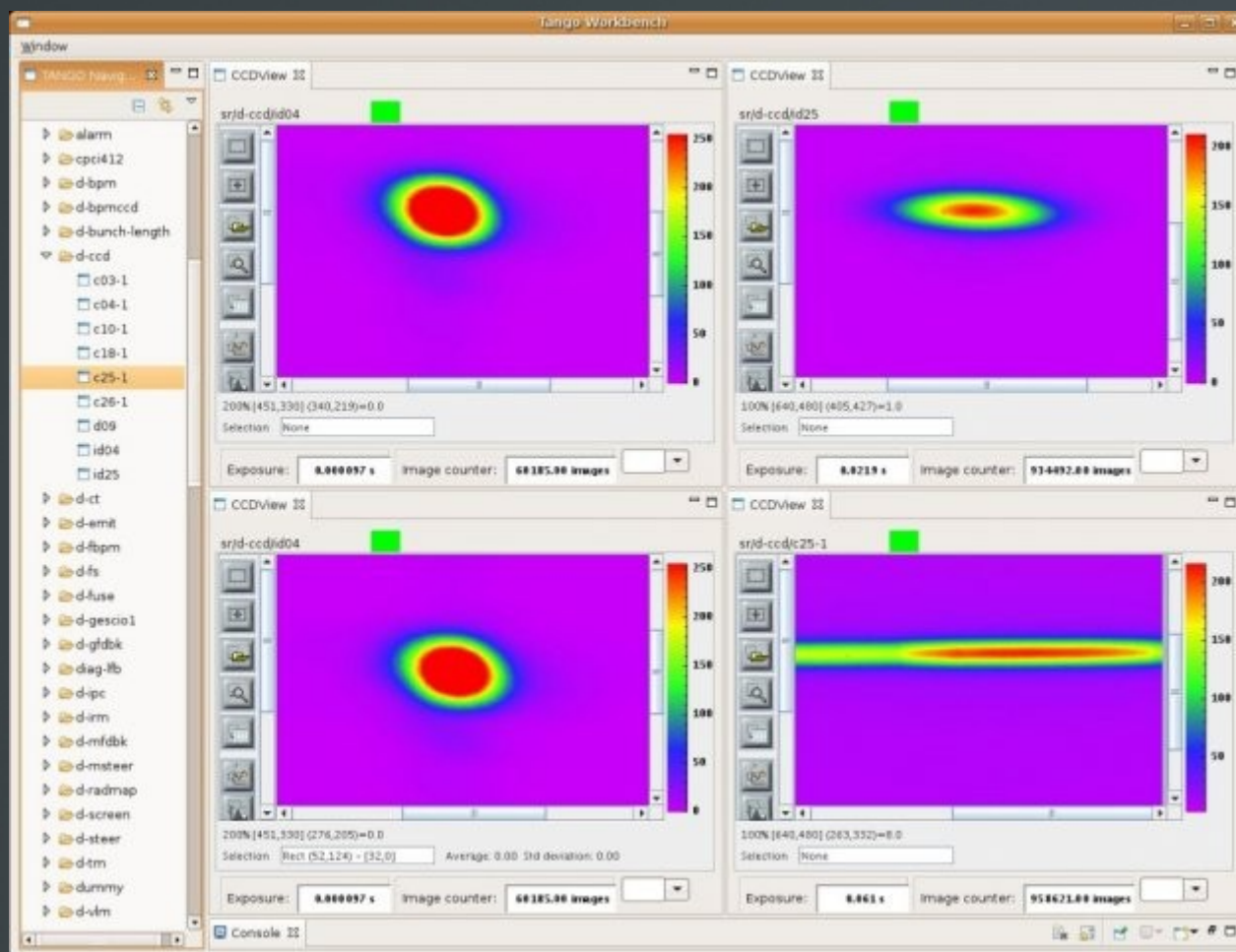
# SHARING DOMAIN SOLUTIONS

- 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 ?*

# INTEGRATED WORKBENCH

- *a la* Eclipse or Netbeans
- my favourite solution 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 ?

# TANGO WORKBENCH PROTOTYPE



# THE COMMONS

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

# FUTURE TRENDS

- *technologies we think could play a role in the future and which should be integrated if possible*
- *Geographical Information Systems - GIS is a system for creating, storing, analyzing and managing spatial data and associated attributes*
- *next generation Desktop applications e.g. Gears, AIR, Silverlight*
- *MOTES i.e. tiny sensors*

# GIS @ Spring8


http://smap - test - Mozilla Firefox

PHP/MapServer Round Watch for SPring-8 Control Gr

Map window size Small

Scale 1: 14789463 Zoom ±

X: 407826 Y: 295652



0 94 188 282 376 m

p\_mapper

- sr\_vme
- bl\_vme
- id\_vme
- plc
  - bl\_plc
  - bl\_fe
  - bl\_plc\_exit
  - bl\_plc\_gp
- other
  - Level
  - satellite
- schedule\_2006\_SUMMER
  - BL\_HARD\_mainte
  - PLC\_SOFT\_mainte
  - BL\_VME\_Desktop

DL

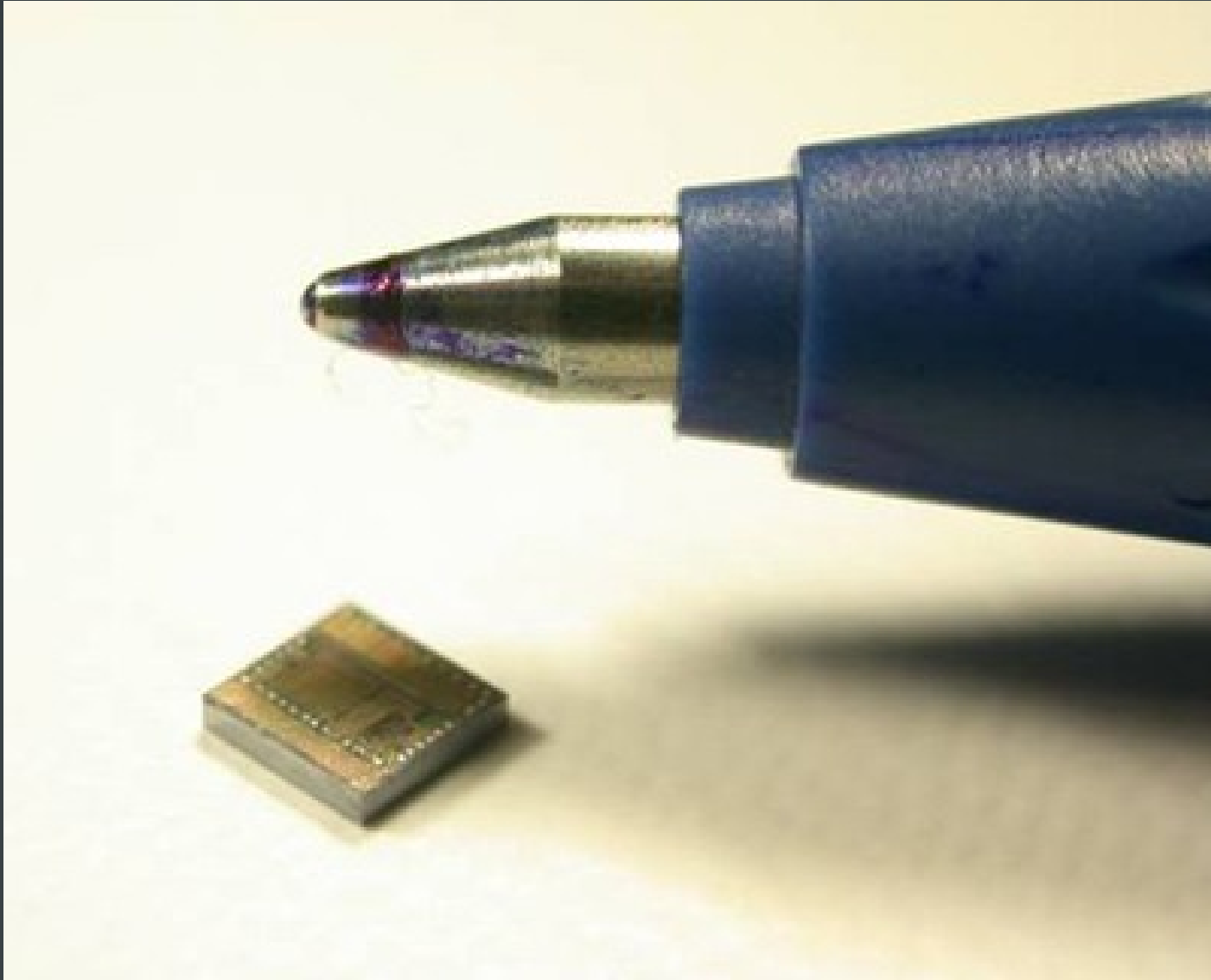
Search for

Geo-data source: DCW: geoTorrent

Map Server

Done

# MOTES



# OFFICIAL CONCLUSIONS

- **Tango has adopted the approach of “constant evolution” i.e. there is no revolution !**
- **with this approach Tango will stay a modern control system**
- **the big challenge in the future is how to share domain specific applications**
- **the Tango collaboration is the key to achieving success**

# MY PERSONAL CONCLUSIONS

- **we all share a common passion for software (and the Tango dance)**
- **we have a common software where we can implement our new ideas**
- **if we can just manage to compromise on our favourite technology we will achieve the holy grail of sharing applications**
- **but don't compromise on quality !**

# TANGO IS A PASSION !

