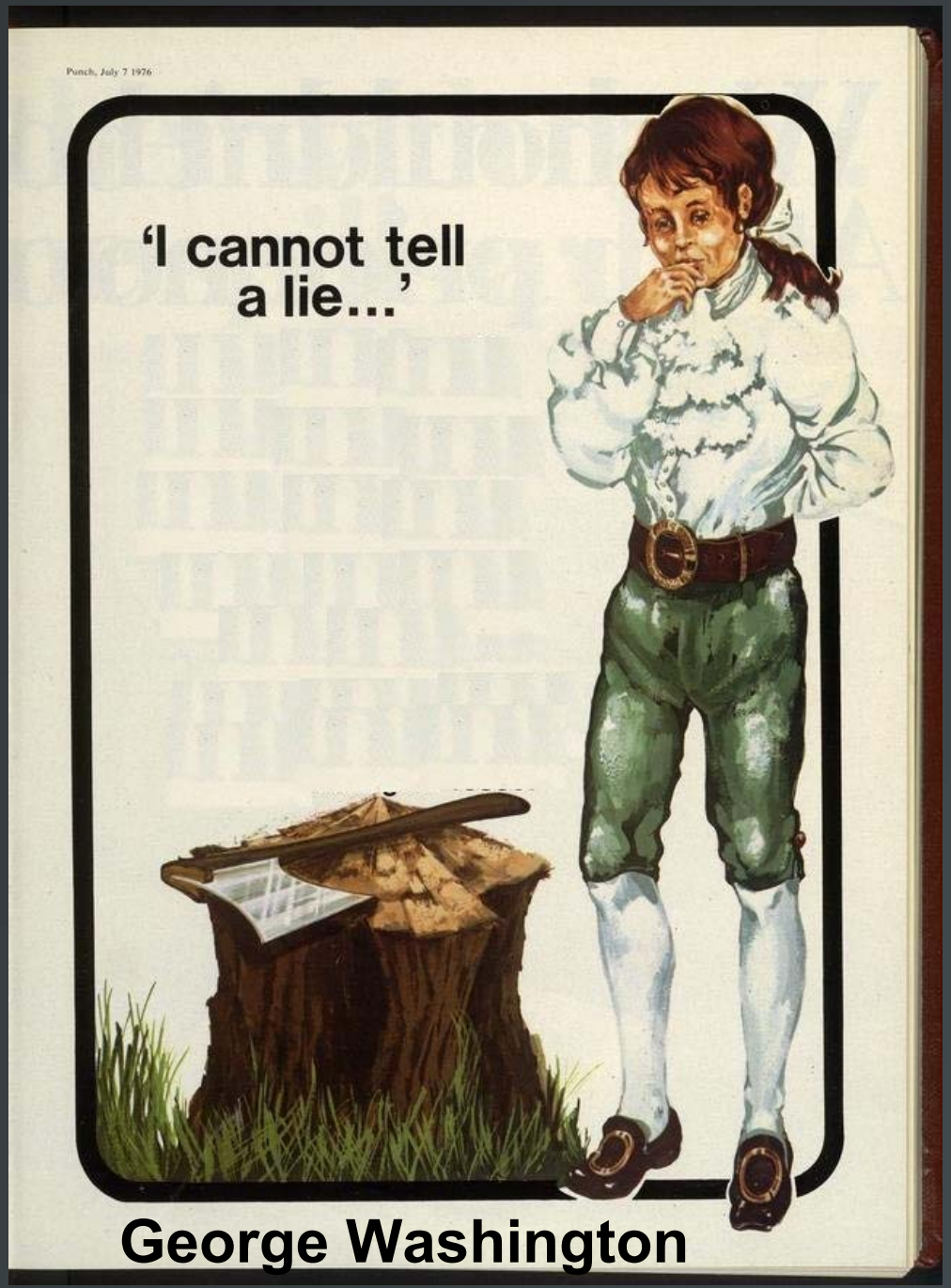
”The Future of Tango”

or

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

The talk should be honest ...



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 EXXXS spies :**

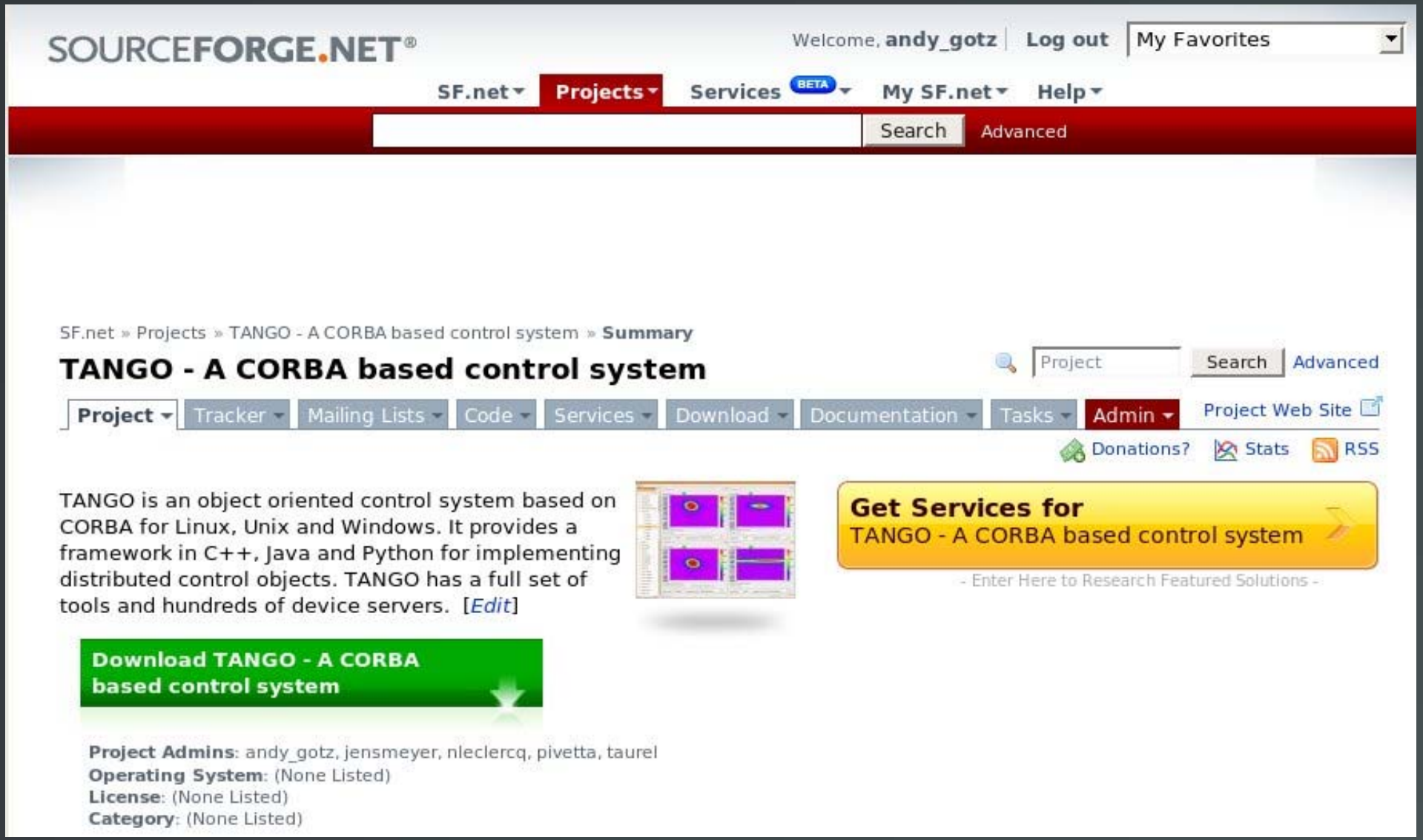
What is TANGO ?

go to the TANGO home page

http://www.tango-controls.org

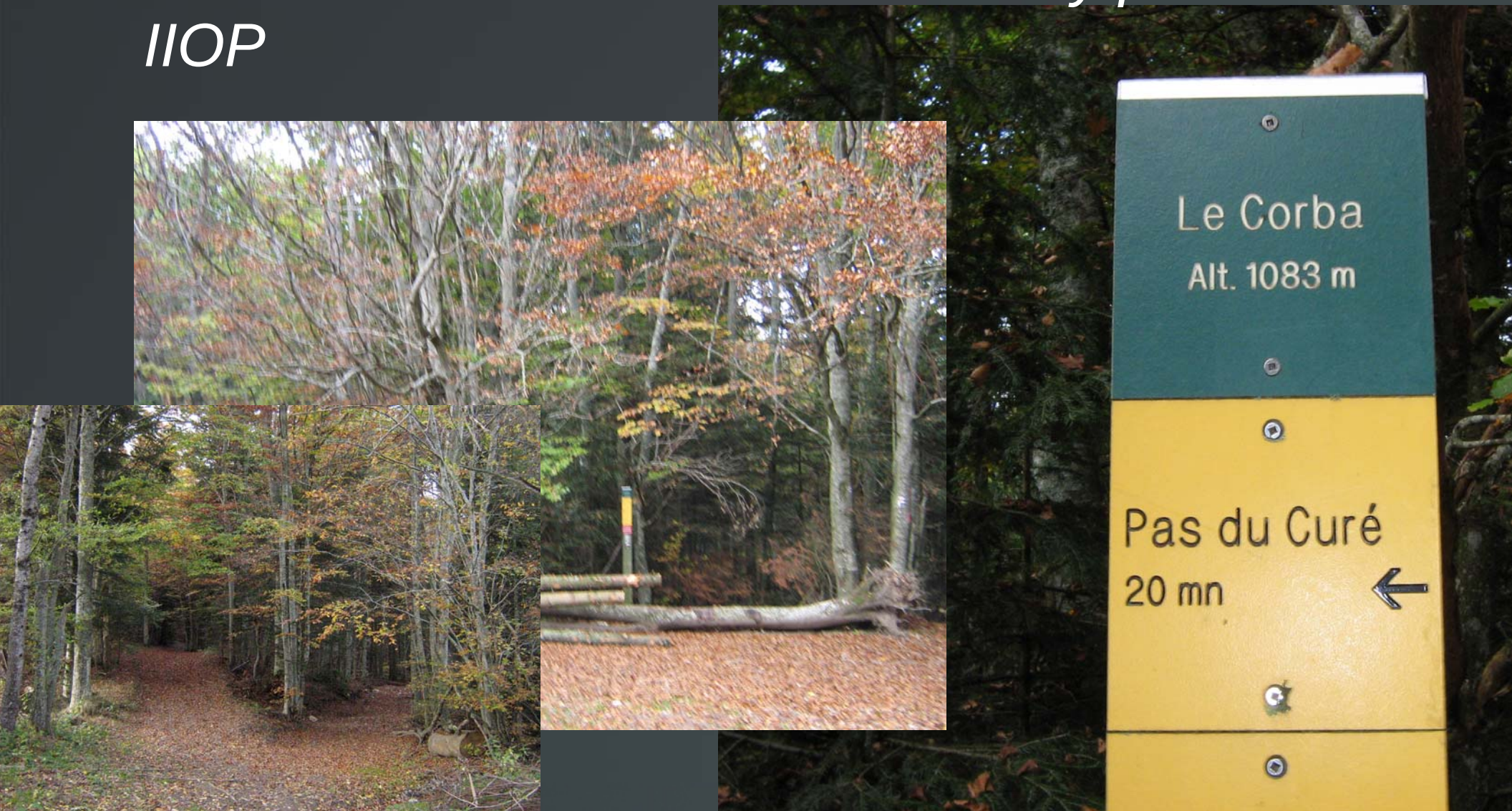
TANGO @ SourceForge

http://www.sf.net/projects/tango-cs



CORBA

- *A fundamental part of the success of Tango is the choice of CORBA and its binary protocol IIOP*

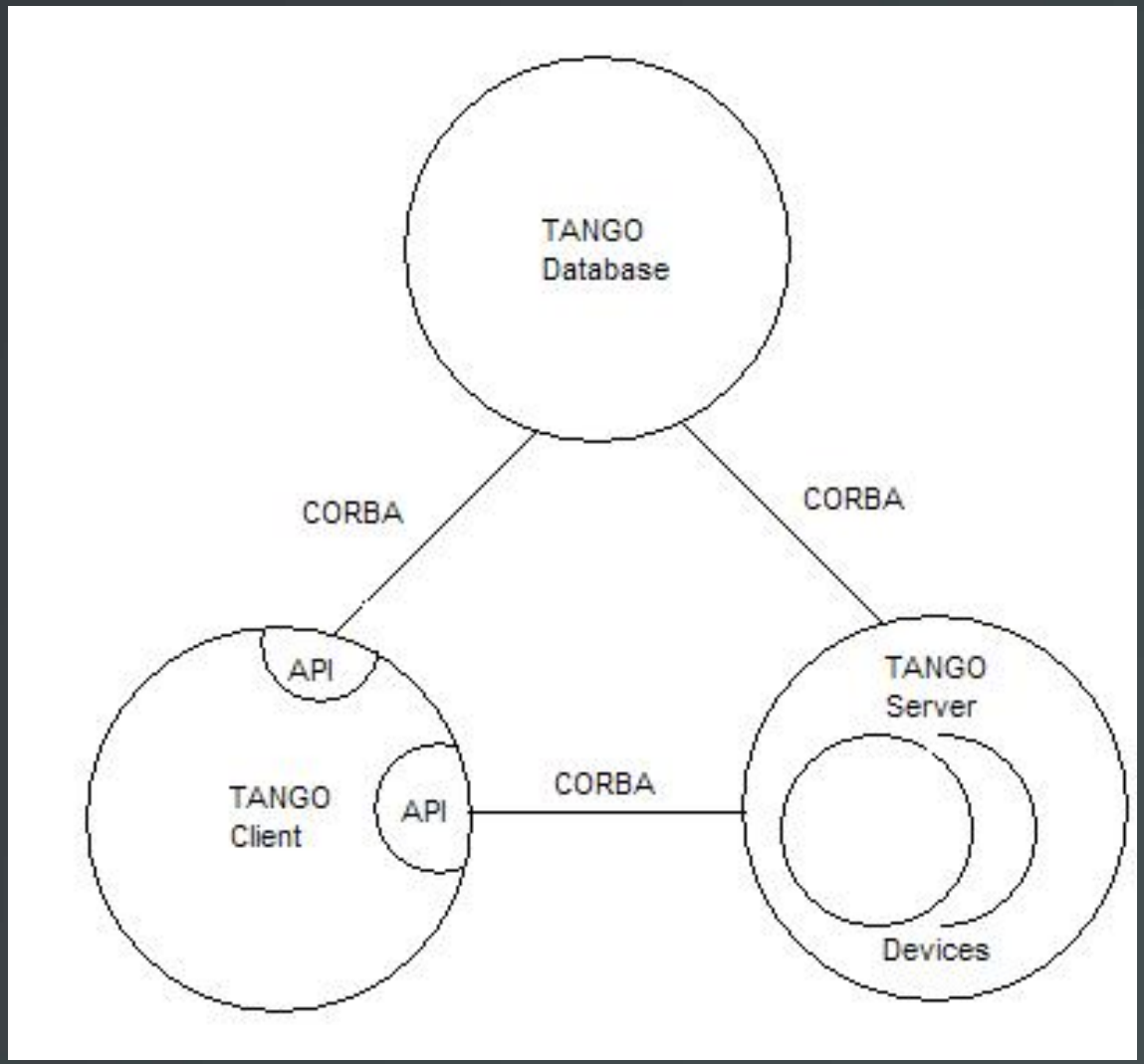


CORBA

- *A fundamental part of the success of Tango is the choice of CORBA and its binary protocol IIOP*

Tango is simple !

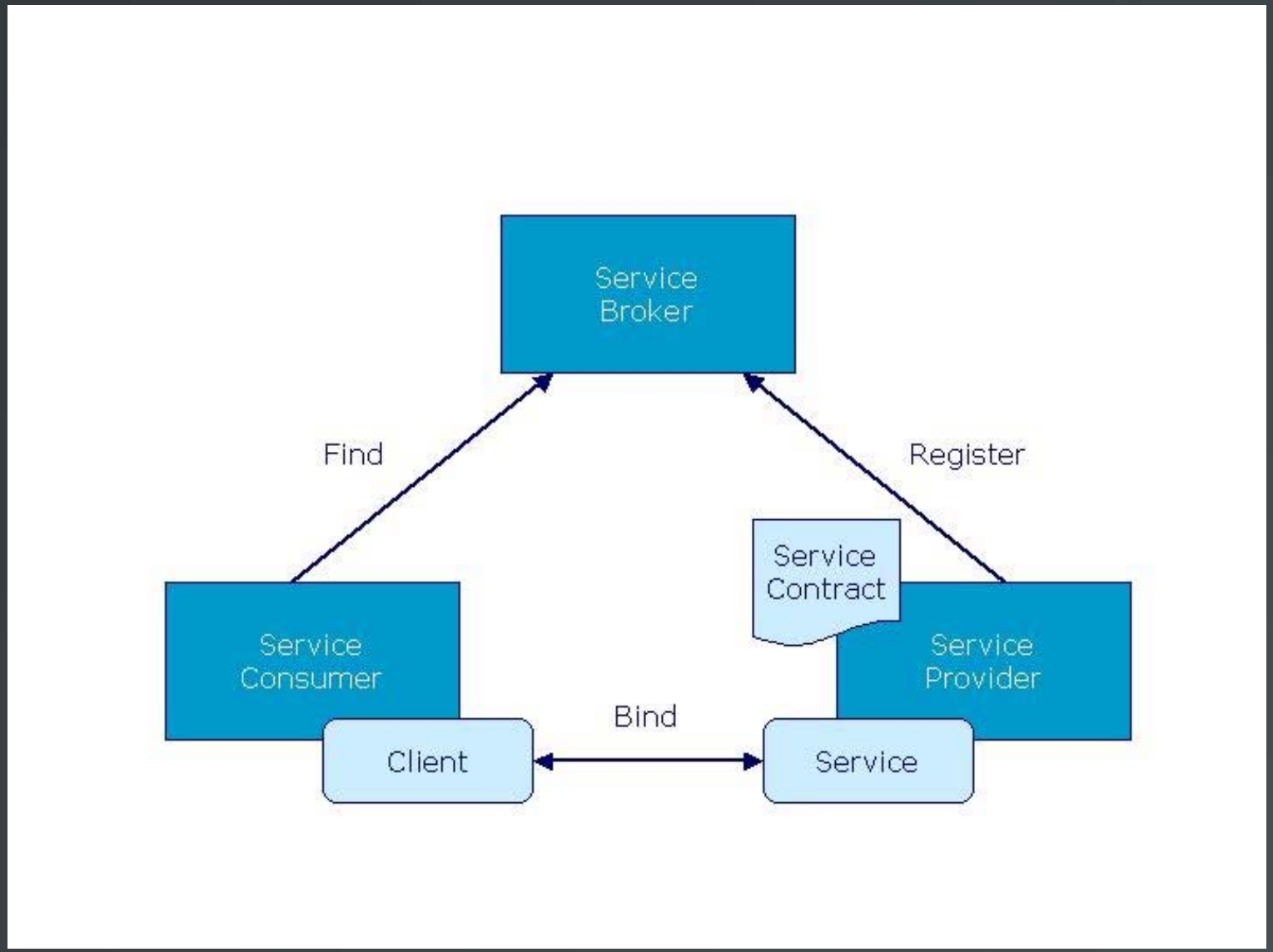
C++
Java
Igor
Python
Matlab
Labview



since TACO 1991

C++
Java
Python

hey , this is SOA !
Service Oriented Architecture



it is just a pity we forgot to patent it !

TANGO works !

100% TANGO

Tango Philosophy

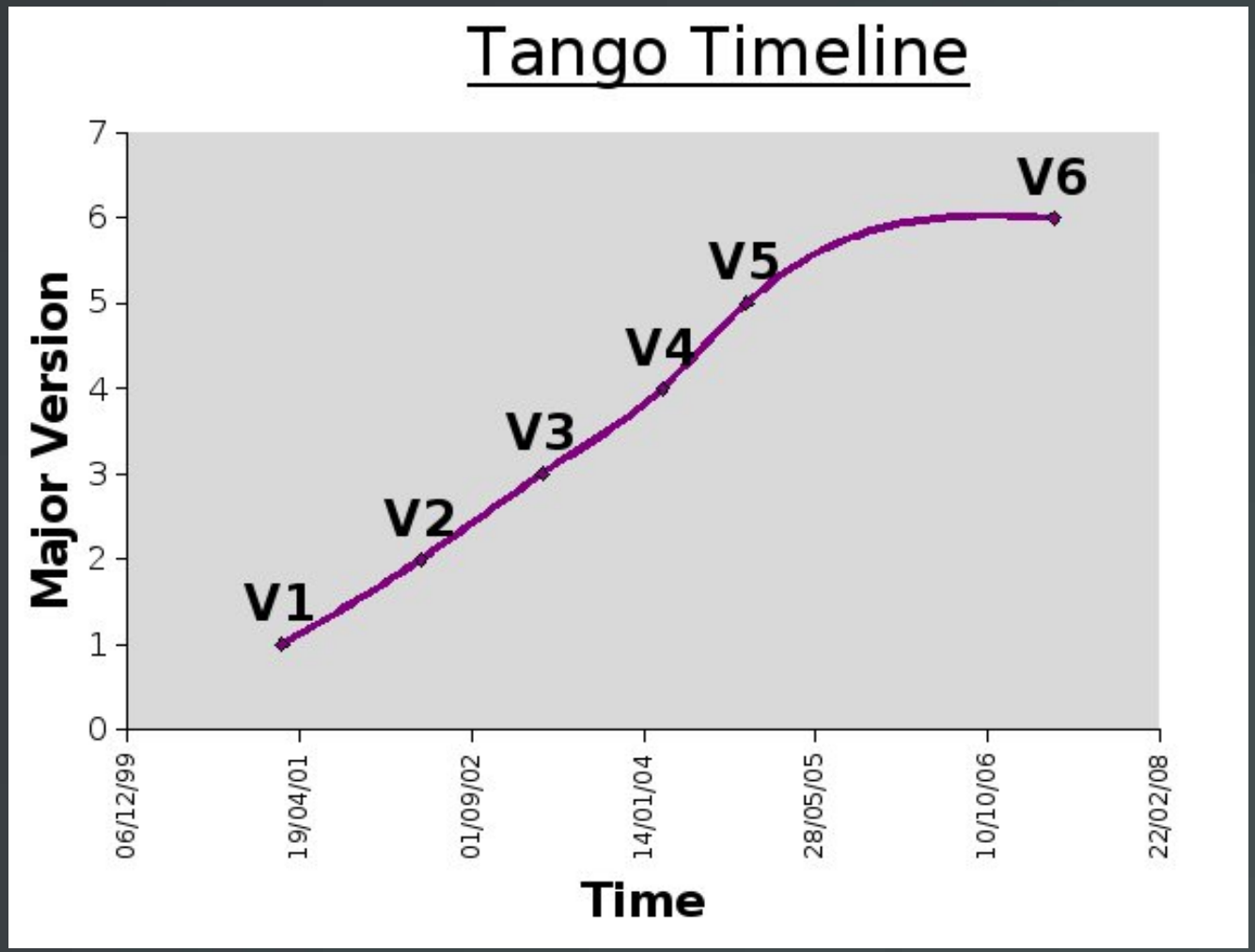
- ***”build a modern control system which is constantly being improved based on user needs and technology trends”***

- *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



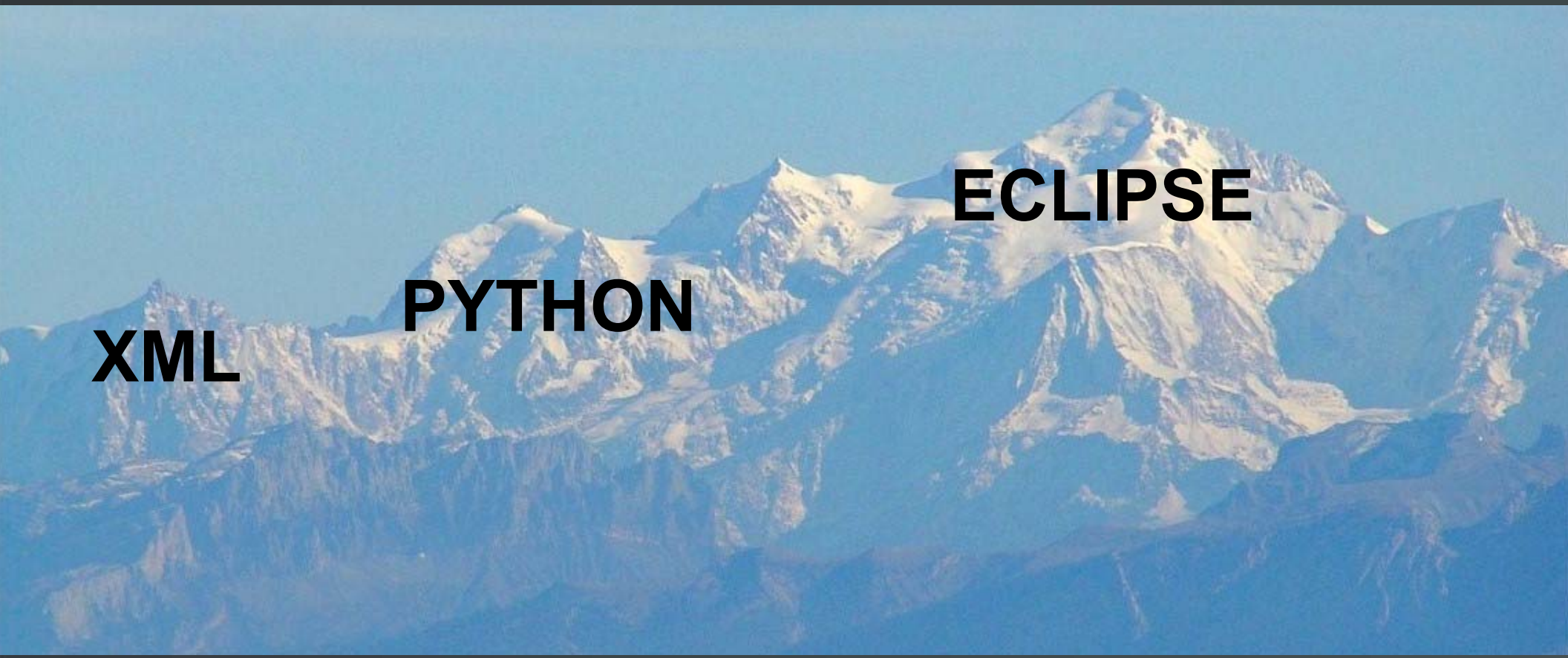
Sharing + Not Sharing

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 !*”



Mont Blanc effect

“*wow !*”

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

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

***Bible (John 16:5)**

Tango Feature Requests

- *In order to document, keep track of and followup 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

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* :

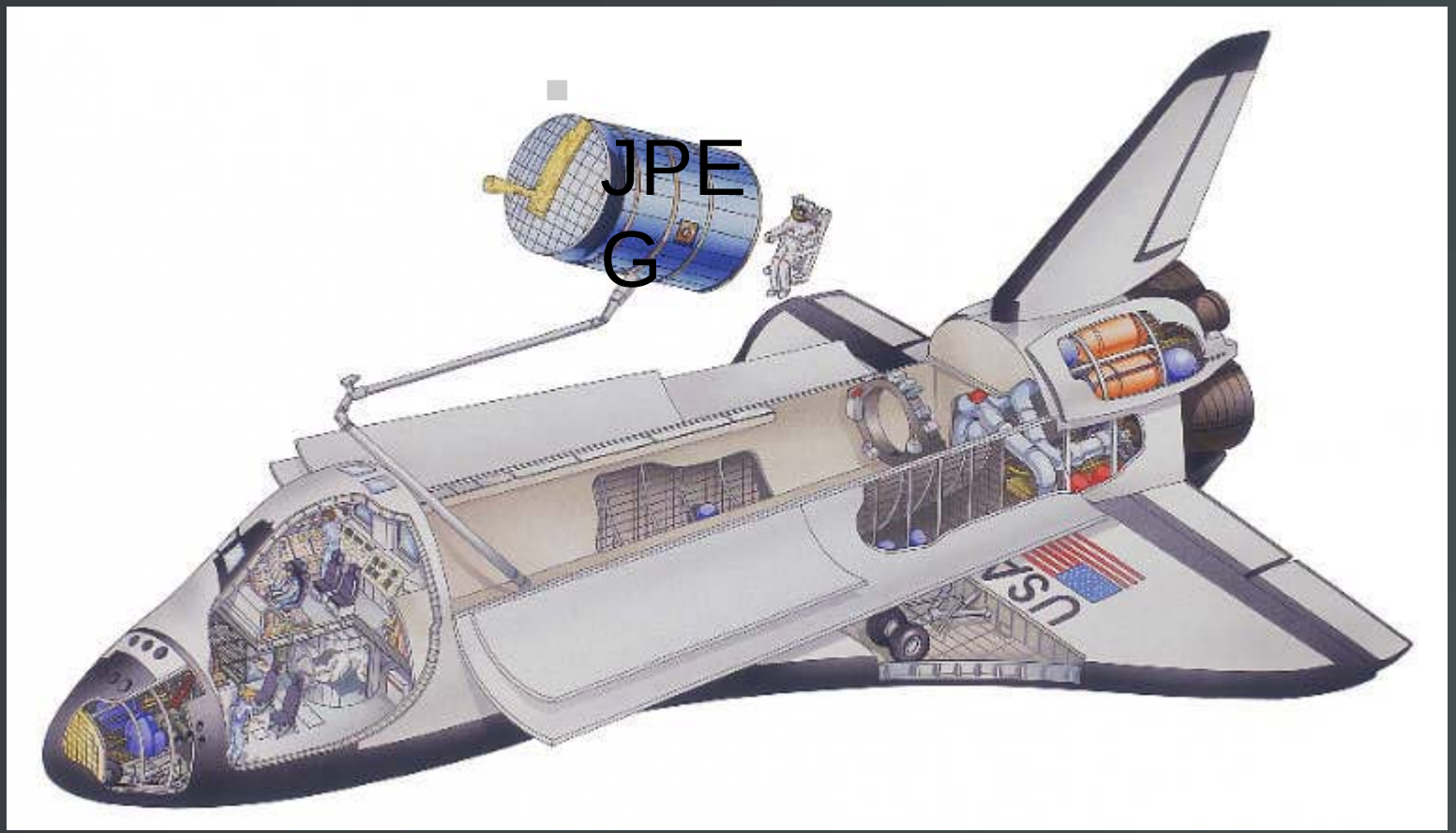
add redundancy for device servers which will enable multiple copies of the same device to be running with automatic switchover in the event of failure

MORE 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*



SYSTEM TOOLS

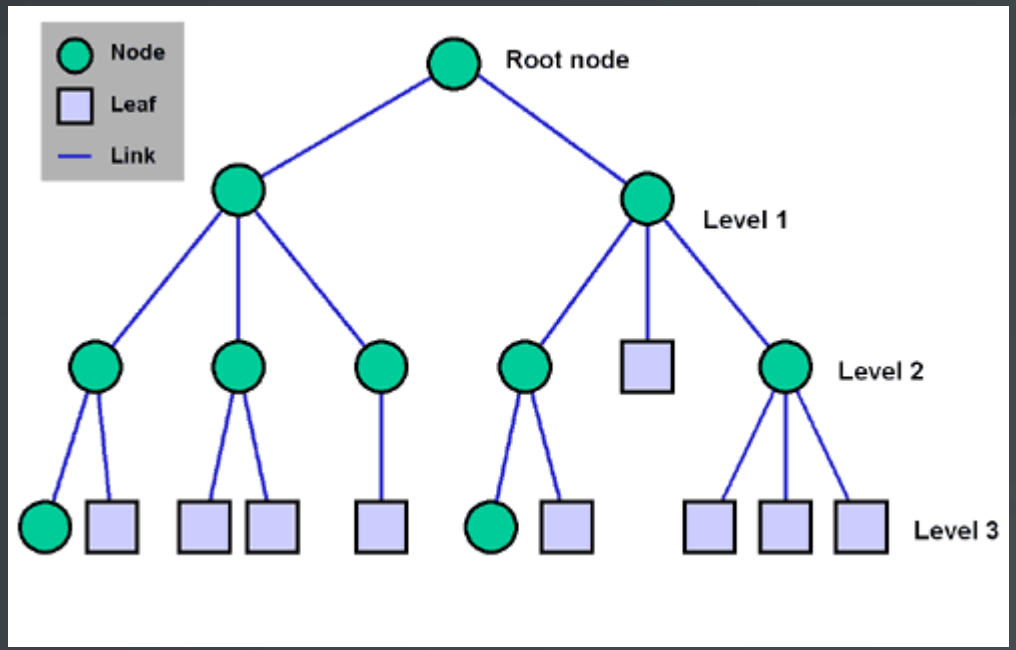
- *Jive and Astor are the standard system tools. These should be constantly enhanced by for example :*

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

- ***TFR 15: displaying dependancies dynamically between device servers***

DEVICE HIERARCHIES

- ***TANGO is an object oriented control system and therefore allows hierarchies of devices to be built :***



- ***<u>TFR 17</u>: 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***

SERVICES

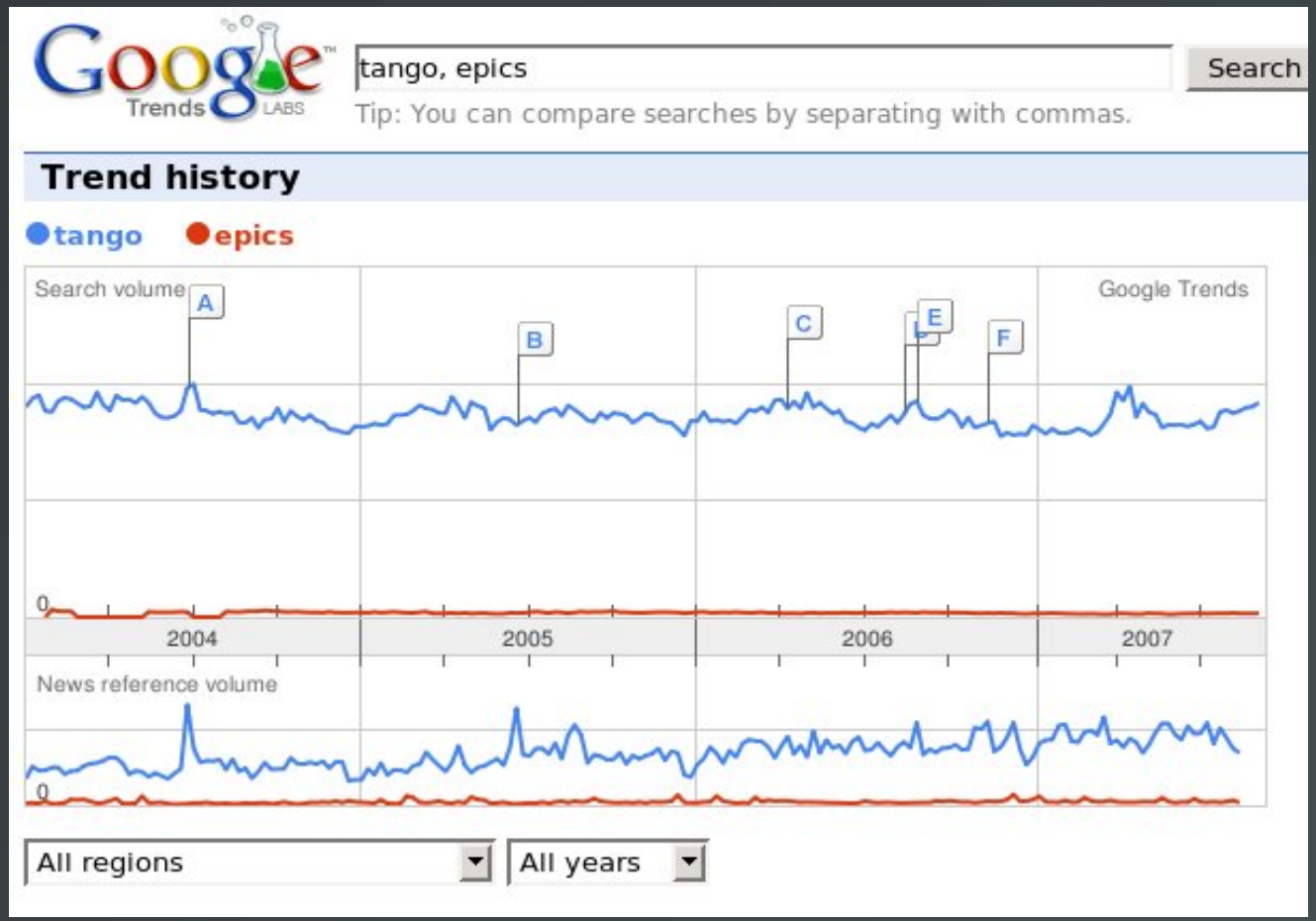
- *Service Oriented Architecture (SOA) is the practice of grouping core functions into independent services that don't change frequently*
- ***Tango already has a service – security***
- ***others : alarms, data analysis, storage, ...***
- ***TFR 14: add support services via a dedicated API***

TANGO COMPONENT MODEL

- *the long term future of TANGO is to be a wrapper technology which supports multiple communication protocols*

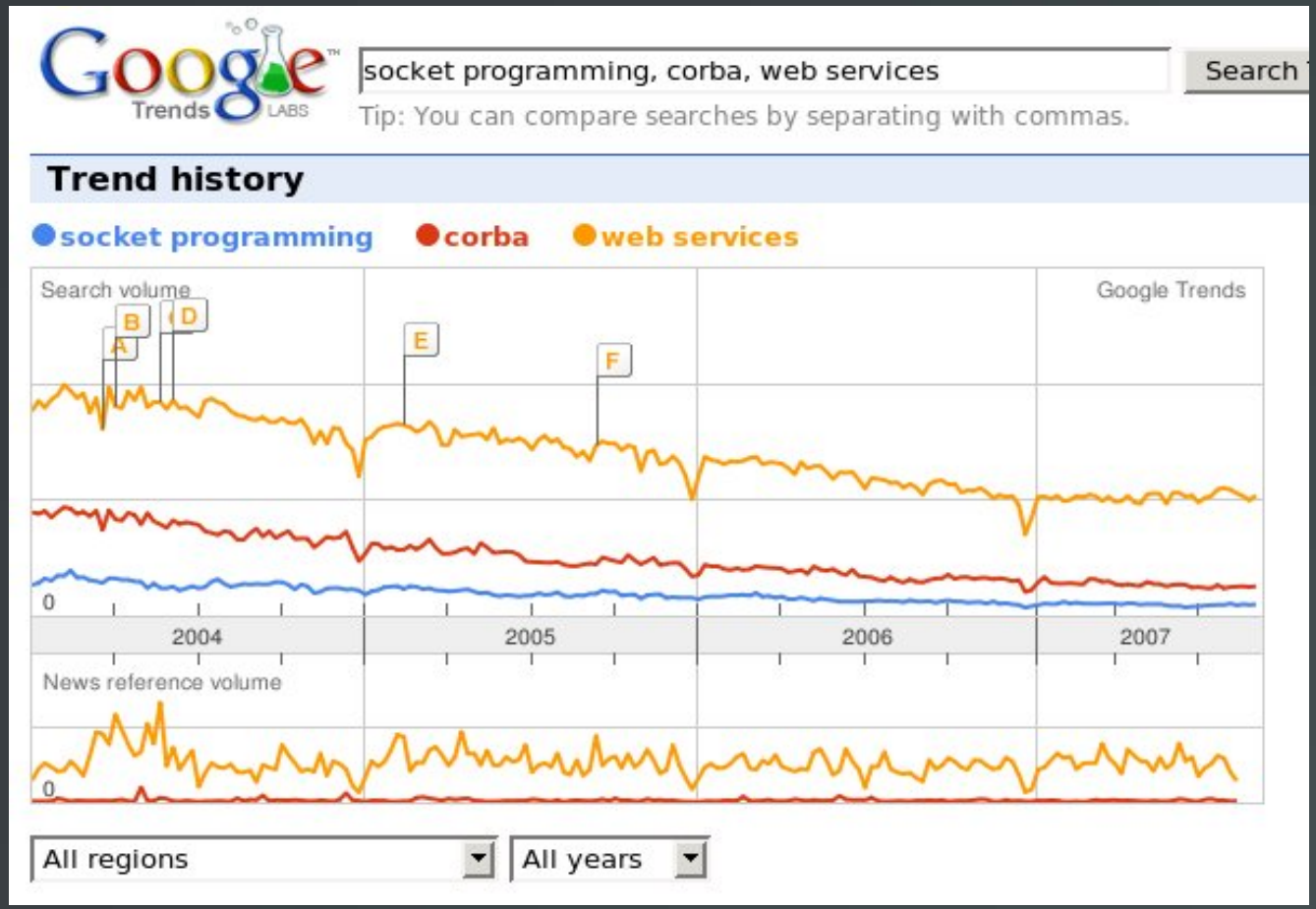
- ***this will enable Tango to outlast CORBA and other products i.e. we decide when the “expire by” date should be***

TANGO GOOGLE TRENDS



- TIP : choose a good name for your system !

CORBA GOOGLE TRENDS



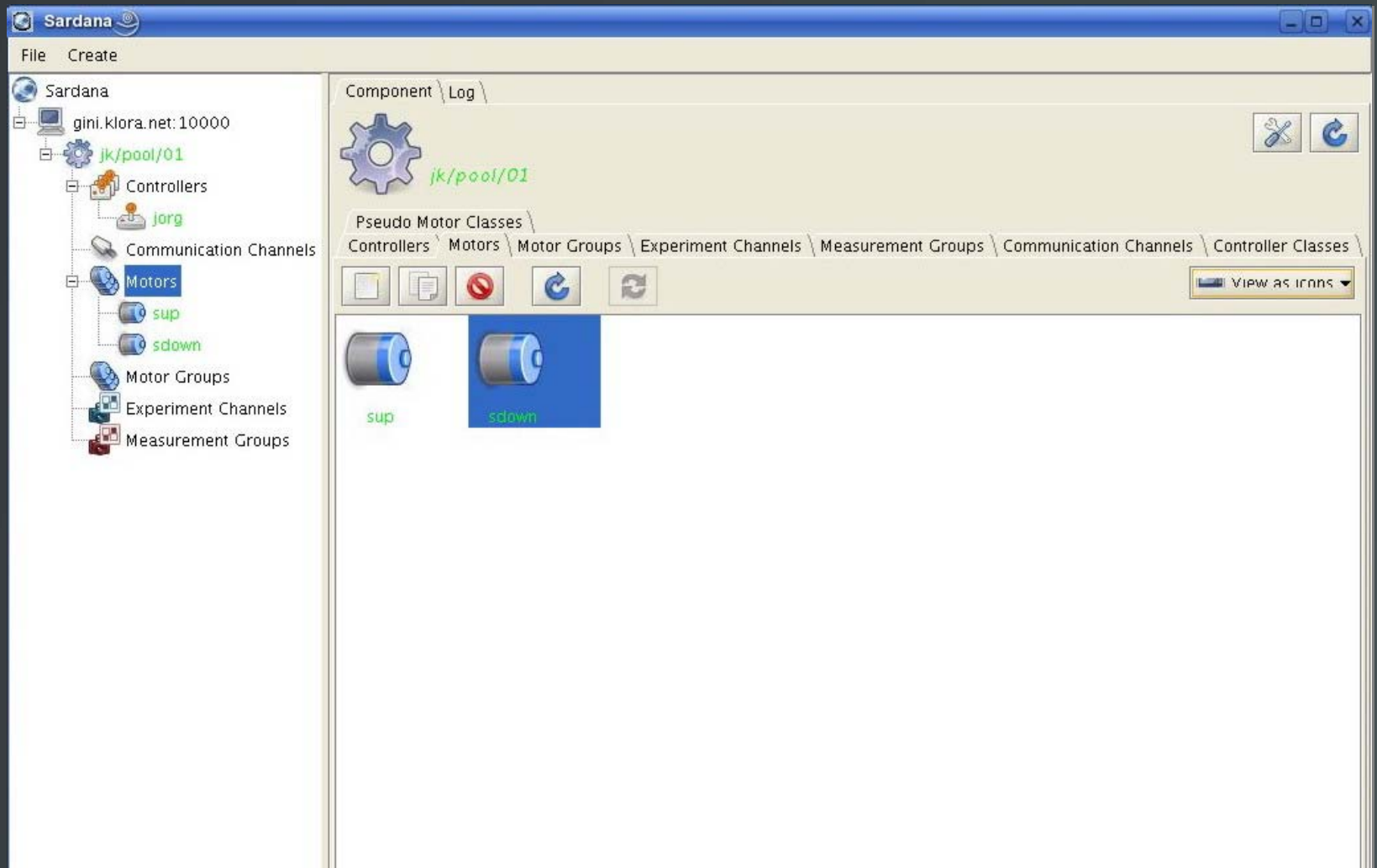
SHARING DOMAIN SOLUTIONS

- ***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 ?***

DEVICE POOL

- ***a Python based framework for doing beamline control***

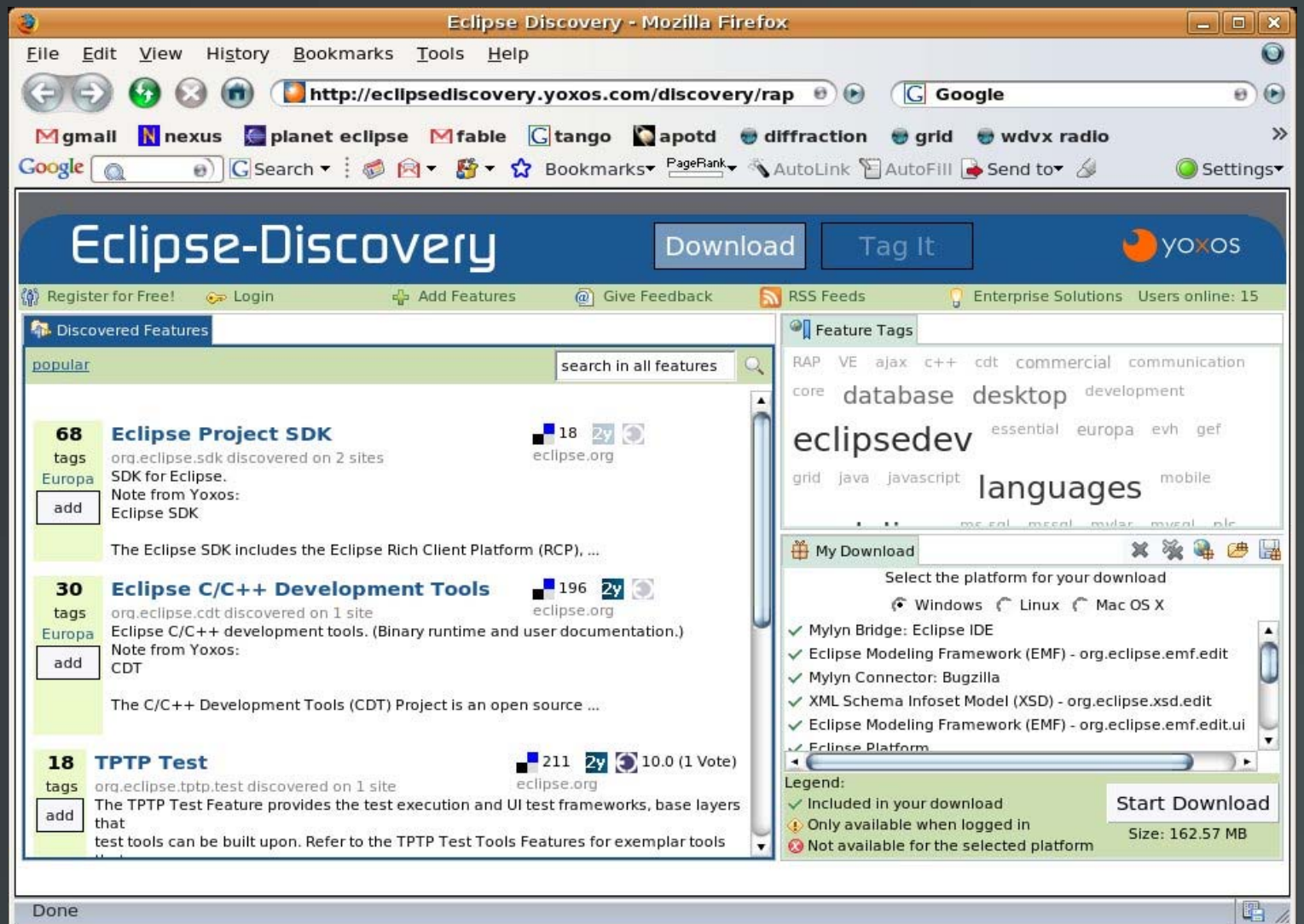


INTEGRATED WORKBENCH

- ***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 + scienctific programming
- Why not share our experiences around a plate of cheese + wine ?

WHY WE DON'T USE EPICS / DOOCS / TINE ...

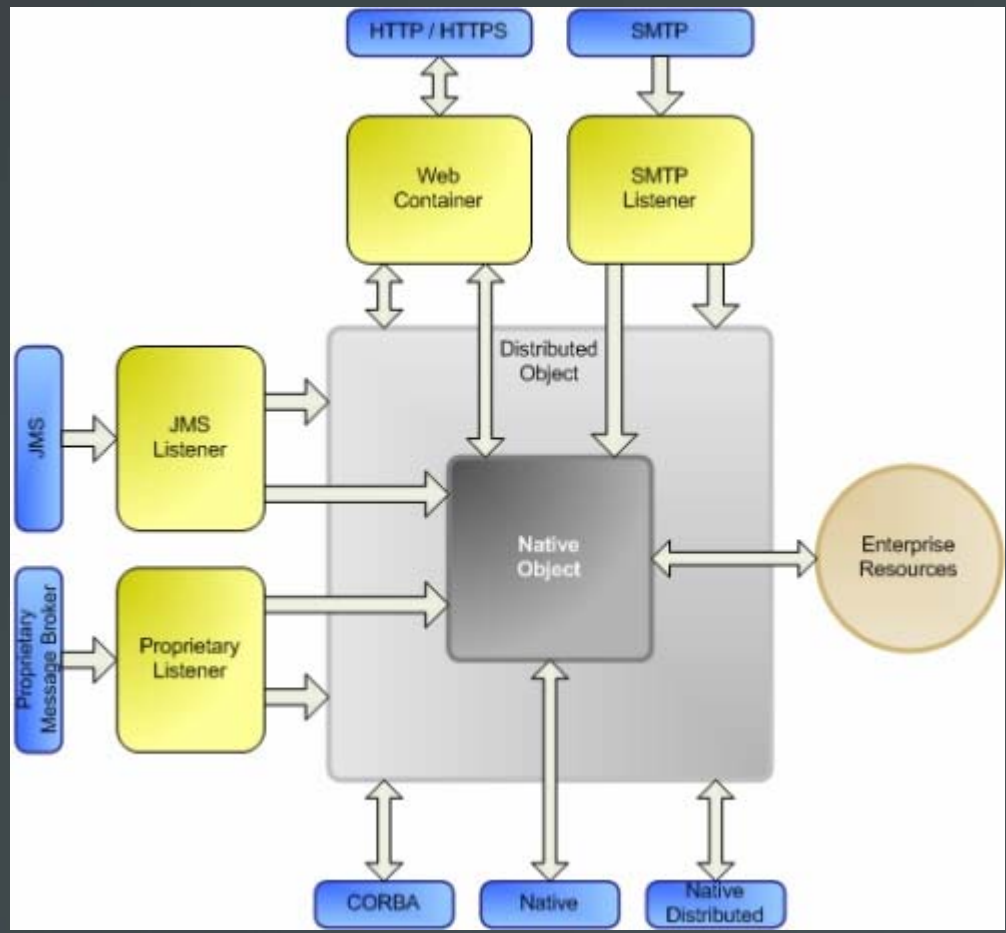
- the answer is obvious - BIODIVERSITY

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***

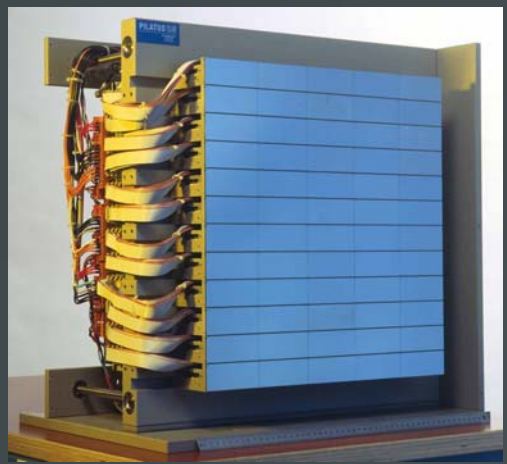
MULTI-PROTOCOLS

- ***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

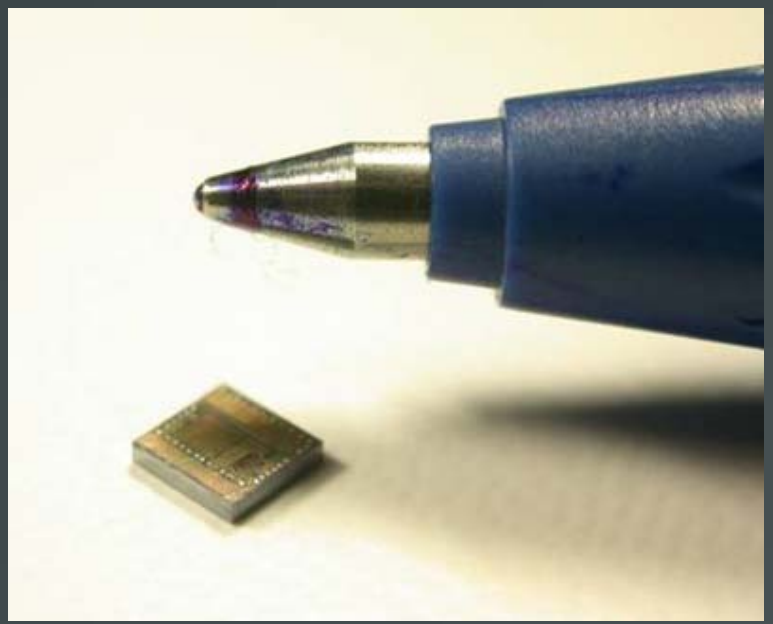
- ***Geographical Information Systems - GIS is a system for creating, storing, analyzing and managing spatial data and associated attributes***

- ***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**



OFFICIAL CONCLUSIONS

- ***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 !