

TANGO  controls

TANGO KERNEL + DOCUMENTATION CAMP

*Setting the scene for the K&D
Camp in Krakow
February 2019*

Andy Götz

Kernel + Doc Camp - History

- Some Kernel meetings have been held at ESRF and SOLEIL in the past
- First meeting was the **Write-Doc-Camp** in May 2017 in Grenoble (<http://www.tango-controls.org/community/events/write-docs-camp/>)
- Krakow and SOLARIS have played an important part in the development Tango Controls kernel:
 - **2015** - 29th Tango Meeting produced **Tango Roadmap** (<http://www.tango-controls.org/community/events/29th-tango-collaboration-meeting/>)
 - **2017** - **PyTango** meetup
 - **2018** - Igor and Olga **V10** paper
 - **2019** - Kernel and Doc Camp

SOLARIS – PyTango Code camp on 15/5/2017

Last week, SOLARIS invited MAX-IV for a 3-day pytango workshop. Thanks to SOLARIS' willingness to contribute, the workshop has resulted in:

- 6 pull-requests [1]*
- 2 documentation update [2]*
- 2 unit-tests update [3, 4]*
- 40 files updated to match PEP8 [5]*
- 4 packages uploaded to the tango-controls conda channel [6]*

In particular, the tango community might be interested in:

- The new section about asyncio green mode in the documentation [7]*
- The freshly created tango-controls conda channel [6]*

Many thanks to everyone for their good work!

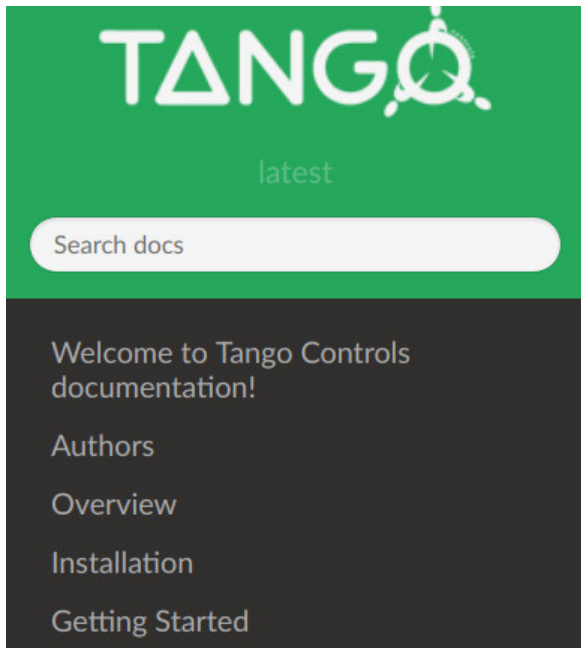
Vincent Michel (MAXIV) and others

Kernel + Doc Camp - History

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Tango developers guidelines



The screenshot shows the top part of the Tango documentation website. It features a green header with the 'TANGO' logo in white, where the 'O' is a stylized globe. Below the logo, the word 'latest' is displayed. A white search bar with the placeholder text 'Search docs' is positioned below the header. A dark grey navigation menu contains the following items: 'Welcome to Tango Controls documentation!', 'Authors', 'Overview', 'Installation', and 'Getting Started'.

☰ Developer's Guide

Overview

General guidelines

10 things you should know about CORBA

Tango Client

☰ Device Servers

Debugging and Testing

Advanced

Tango Core C++ Classes

Reference Documentation

📖 Read the Docs

v: latest ▾

TANGO Device Server Guidelines

Contents:

- Guidelines
 - About this document
- Tango Concepts
 - Tango Control system
 - Device concept
 - Hierarchy
 - Communication paradigms
 - Class, Device and Device Server
- Tango Device Design
 - Elements of general design
 - Device interface definition
 - Service availability
- Tango device implementation
 - General rules
 - Device interface
 - Pogo use
 - Internal device implementation
 - Device state management
 - Logging management
 - Error handling
- Appendices
 - Appendix 1 – Code Quality Checklist
 - Appendix 2 – Full code samples

Kernel + Doc Camp - Krakow's Angels

- Thanks to the **Tango Controls Collaboration** we are a **record 23 people** coming together this week ! Our **Goal** this week is to be **AT LEAST** as efficient as at past **Code Camps !!!**



Krakow's Angels !

Kernel + Doc Camp - Golden Rule

- If you see something you think needs improving or fixing - **MAKE** an **ISSUE** and then **WORK** on it !!!



Krakow's Angels !

Kernel & Doc Camp Objectives

Meeting for all the TANGO kernel developers for defining the detailed roadmap and the strategy how to implement it.

This will be followed by a Doc Camp to work actively on the documentation.

Goals of the meeting:

- (1) Review outstanding issues for LTS 9
- (2) Review proposal of IK for Tango V10
- (3) Review documentation and propose improvements
- (4) Review web site

Output of meeting:

- (1) Decide on a roadmap for V10
- (2) All kernel participants to make at least 1 pull request on kernel code
- (3) All doc participants to write at least 1 page of documentation

SOLARIS - Topics

- decentralization of Tango Database
- Tango library adaptation to work with C#
- transport protocols as plugins
- database engine as plugin
- IoT direction, mobile applications
- simplification of C++ API (something like High Level API in PyTango)
- handling of high speed detectors, data streaming
- archiving of huge amount of data, speeding up Tango

However, for me the more important issues are connected with the event and the Archiving system - Krystian Kedron

ALBA - Kernel topics

- Status of current Web applications (What happened with Tango.js?)
- HDB++ status:
 - mysql/mariadb divergence
 - lack of collaboration/sharing
 - myIsam/Aria/InnoDB comparison in cpu/disk usage
 - comments/results on JSON implementation for arrays
 - change/archive push event performance
 - PostgreSQL schema?
 - TimescaleDB?
 - Viewer for multiple DB's?
 - (C++ viewer for any backend)
 - Correlate different DB's on java viewer or eGiga?
- Discussion Tango 9 and PyTango
- Packaging of both
 - What about Debian official packages?

ALBA - Kernel issues

- Not possible to subscribe to events in server initialization phase #7
- Add `server_init_hook()` method #498
- Tango Monitor problems on server startup #12
- Device server crashes on Windows when reading attribute in between its two devices #19
- Not all messages from a DS are logged when launched from Astor #24
- TODO Study DS problem when using taurus 4 attribute (with serial mode)
 - How to reproduce:
 - PyTango device server.
 - Device creates a taurus device to some remote device and adds a listener.
 - Shutdown the device server hangs
- Problem with device emitting push and archiving events:
 - cpu increase due to both pushing; big devices unable to push both
 - implement `push_event` using a mask like `CHANGE|ARCHIVE` ?
 - many devices implement push by code; rewriting is not an option
 - was our PR integrated?
 - problems receiving periodic events
 - event-subscriber not started despite of `context=ALWAYS`
 - `hdbpp-mysql` #PR #issues

ALBA – Code camp

- Fandango / PyTangoArchiving / Panic documentation update ; integration with tango documentation
- Expand on debugging and testing:
- <https://tango-controls.readthedocs.io/en/latest/development/debugging-and-testing/index.html>
- Review of simulators documentation and examples
- Tango.js documentation ? Alternatives?
- Doc Tango source package creation. Missing deps. (Debian)
Tips for setting new conf. for mariadb
- Tango Heart beat
- Tango Unitless vs not unit

ESRF - Reynal's Kernel Topics

- Fix bugs reported by sonarcloud and flag as false positive the false positive (!)
- Improve the Travis tests
- Fix last known bugs in event system (IDL4 compat, DataReady and Pipe events idl5_ prefix wrongly added)
- Add Changelog.md and improve Release Notes

We need feedback on:

- Windows supported compilers (appveyor config)
- Travis CI and appveyor tests: we will hit tests timeouts if we add compatibility and benchmark tests.
- Units: A string unit property is missing to for standard unit label
- Code of conduct
- Warning about forwarded attributes which are currently not reliable. -
- **We need** to get some resources to improve this reliability and fix the bugs in cppTango and Jtango.

- We need help for code reviews and pull requests

ESRF – Reynald’s Documentation Topics

- improve the `Contributions.md` file from `cppTango` to give more details on how to create a Pull Request.
- add an easy-access link to JTango javadoc in JTango documentation as well as in the `tango-controls` documentation.
- help to fix some typos here and there.
- provide expertise in different topics (`cppTango`, `HDB++`),
- add an advanced section on how to debug heartbeat pb with `wireshark`

SKA SA – Anton Joubert's Topics

- TLS: ability to set a different log level for each log target. This is part of the SKA design guidelines. We need the same device to log to 3 different targets, each with an independently configured log level.
- **PyTango News:**
- **Vincent Michel** moved on (**big thank you to him**)
- Released v9.2.5 (some small improvements and bug fixes)
- Travis CI issue, after they changed infrastructure from containers to VMs.
- Event tests failing.
- when do we move to TANGO 9.3 for CI? Do we still need to test on 9.2.5?
- (Travis tests installing TANGO from Conda package, so would need a newer one)
options for syslog, logstash?)
- discuss Python 2 vs Python 3: DevString with bytes - <https://github.com/tango-controls/pytango/issues/251>
- discuss testing client and server across different Python versions (e.g. 2.7 client with 3.7 server).
- get a better understanding of PyTango architecture

SKA SA – Anton Joubert's Topics

- **Strategy:**
 - SKA to provide some resources, but I don't know when that will happen
 - I am keen to help, but have little time (and not that much knowledge)
 - Other sites that can help?
- **Packaging:**
 - Ideally automated packaging on release tag (Debian, Ubuntu 14, 16, 18, Conda, Win, others?)
 - build on Debian science gitlab pipeline?
<https://salsa.debian.org/science-team/pytango>

SKA SA – Anton Joubert's Topics

TODO:

- get unit tests passing on Travis CI again
- discuss/implement Pythonic logging to TLS, (maybe include options for syslog, logstash?)
- discuss Python 2 vs Python 3: DevString with bytes - <https://github.com/tango-controls/pytango/issues/251>
- discuss testing client and server across different Python versions (e.g. 2.7 client with 3.7 server).
- get a better understanding of PyTango architecture

MAXIV – Vincent's Topics

- deprecation of python 2 support
- CORBA alternative
- Run Tango on k8s (related to CORBA as well)

Thomas Braun - Topics

- Make the tango9 codebase more easier to use and less suprising. E.g. <https://github.com/tango-controls/cppTango/issues/206> could be something which I could be working on during the camp if that is something which we want to do.
- Is everyone happy with the Database server requiring mysql/mariadb? I would very much prefer a generic SQL interface, so that one can for example use things like SQLite. This is much more conventient to ship in small installations on customer machines.
- Discussion/Guidelines what kind of compatibility I have to expect from tango v10. Is it API-stable to tango 9? ABI stable? How will the wire-protocol change?

"From the program and considering my skills, I'm more in the Windows CI and PyTango category. But it can be anything else , depending on the discussions we will have. "



"The objectives are good for me. I have agreed with Igor to "code camp" together on jtango with to merge all pull requests, and review all open issues."



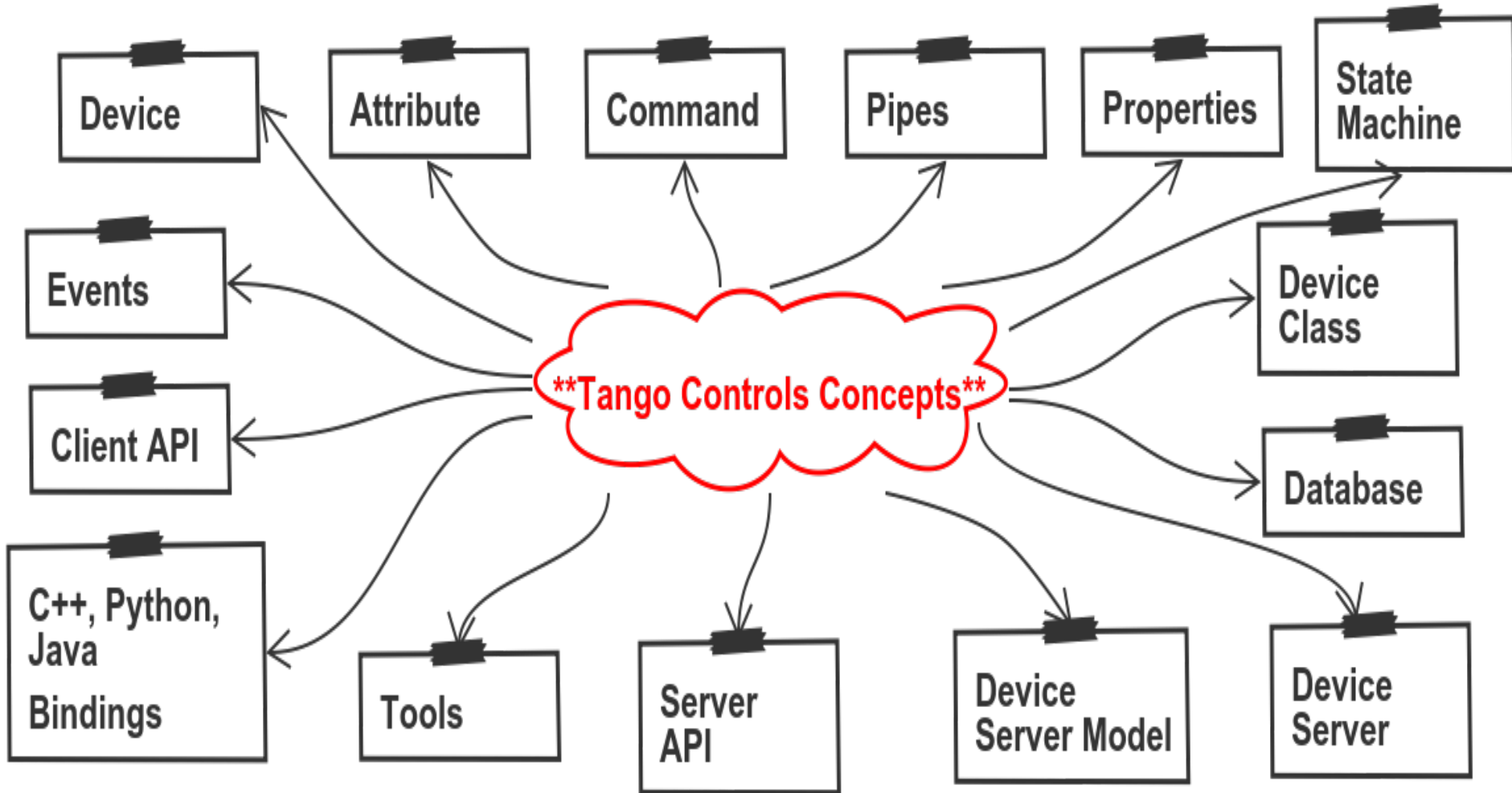
"I am interested in Tango 10 and PyTango related topics and of course in Documentation 😊. I would like to participate in the strategic discussion, too."



Goal: Discuss and decide on a way forward to ensure the long term maintainability and development of Tango Controls kernel



REMINDER - Tango has a number of concepts



Check out <https://indico.esrf.fr/indico/event/10/contribution/0/material/slides/0.pdf>

Don't throw the baby out with the bathwater !

das Kind mit dem Bade ausschütten



Nie wyrzucaj dziecka z kąpielą

<https://curiator.com/art/unknown/dont-throw-the-baby-out-with-the-bath-water>

REMEMBER – Linux 1.0 did not have Kernel Modules

LKMs did not exist in Linux in the beginning. Anything we use an LKM for today was built into the base kernel at kernel build time instead. LKMs have been around at least since Linux 1.2 (1995).

Device drivers and such were always quite modular, though. When LKMs were invented, only a small amount of work was needed on these modules to make them buildable as LKMs. However, it had to be done on each and every one, so it took some time. Since about 2000, virtually everything that makes sense as an LKM has at least had the option of being an LKM.

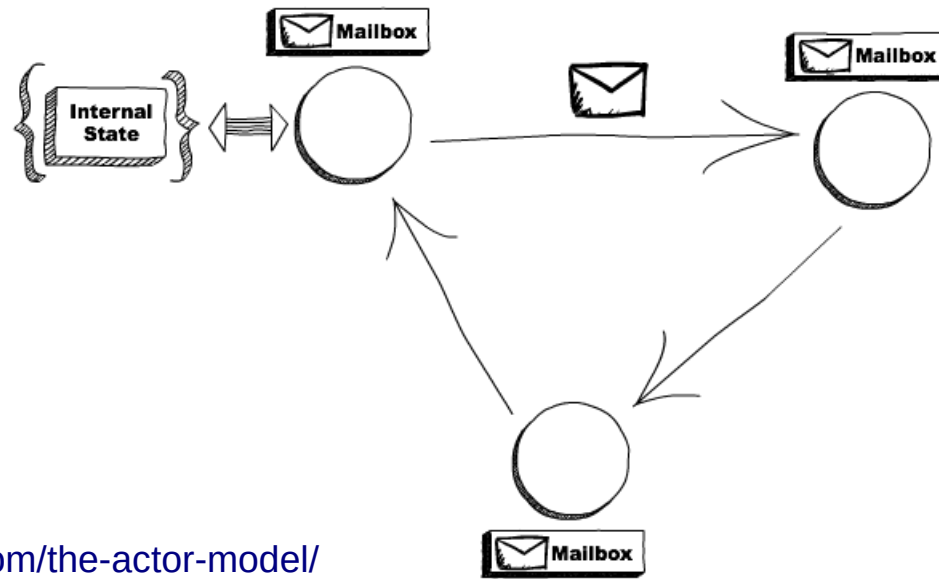
<http://tldp.org/HOWTO/Module-HOWTO/x73.html>



Tango = actors + microservices

- Tango is based on the concept of **Distributed Devices**
- This is an implementation of the **Actor Model**
- Device servers implement **Microservices**
- **Actors + Microservices** are *a la mode*
- **TANGO** is based on **MODERN** concepts !

Actor model

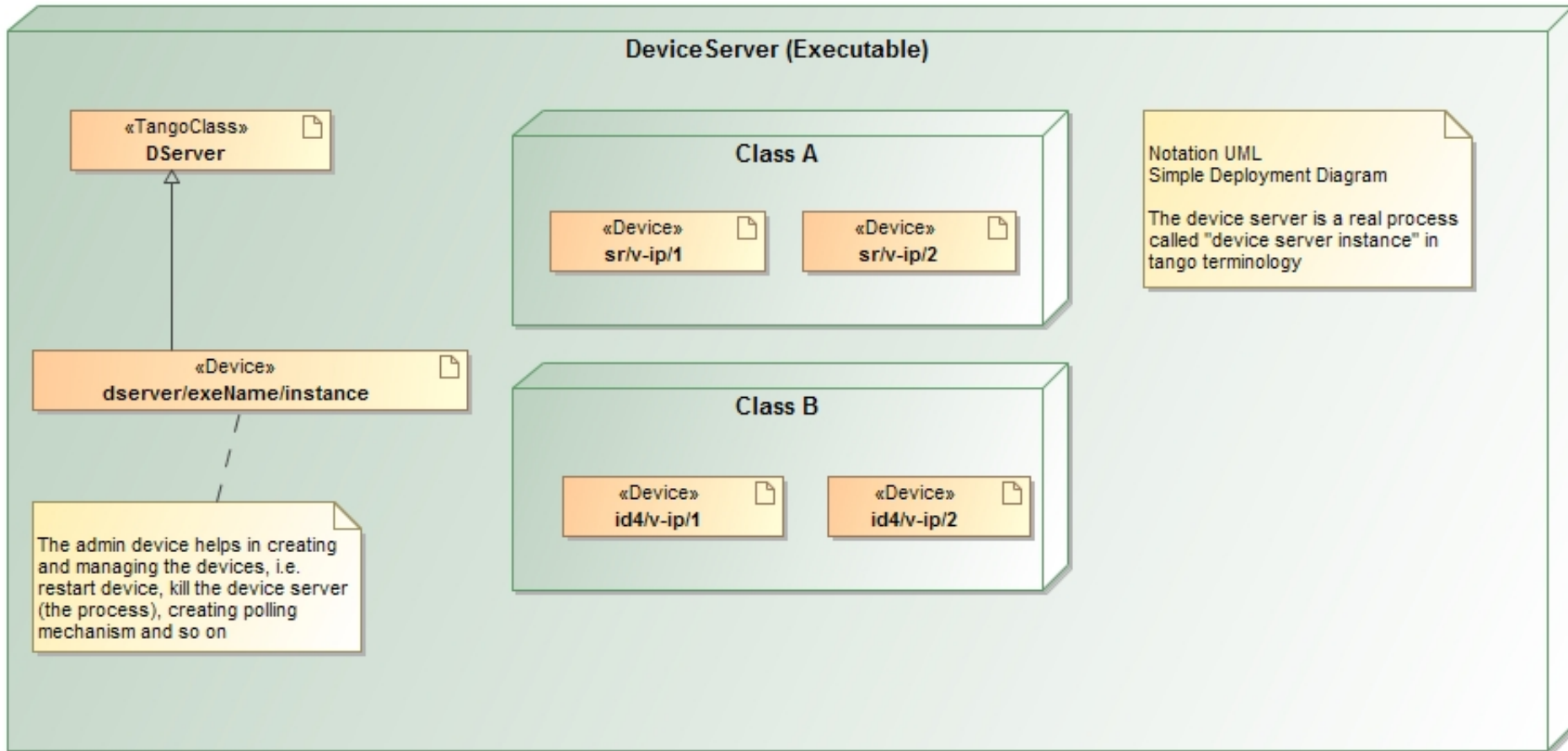


<http://www.brianstorti.com/the-actor-model/>

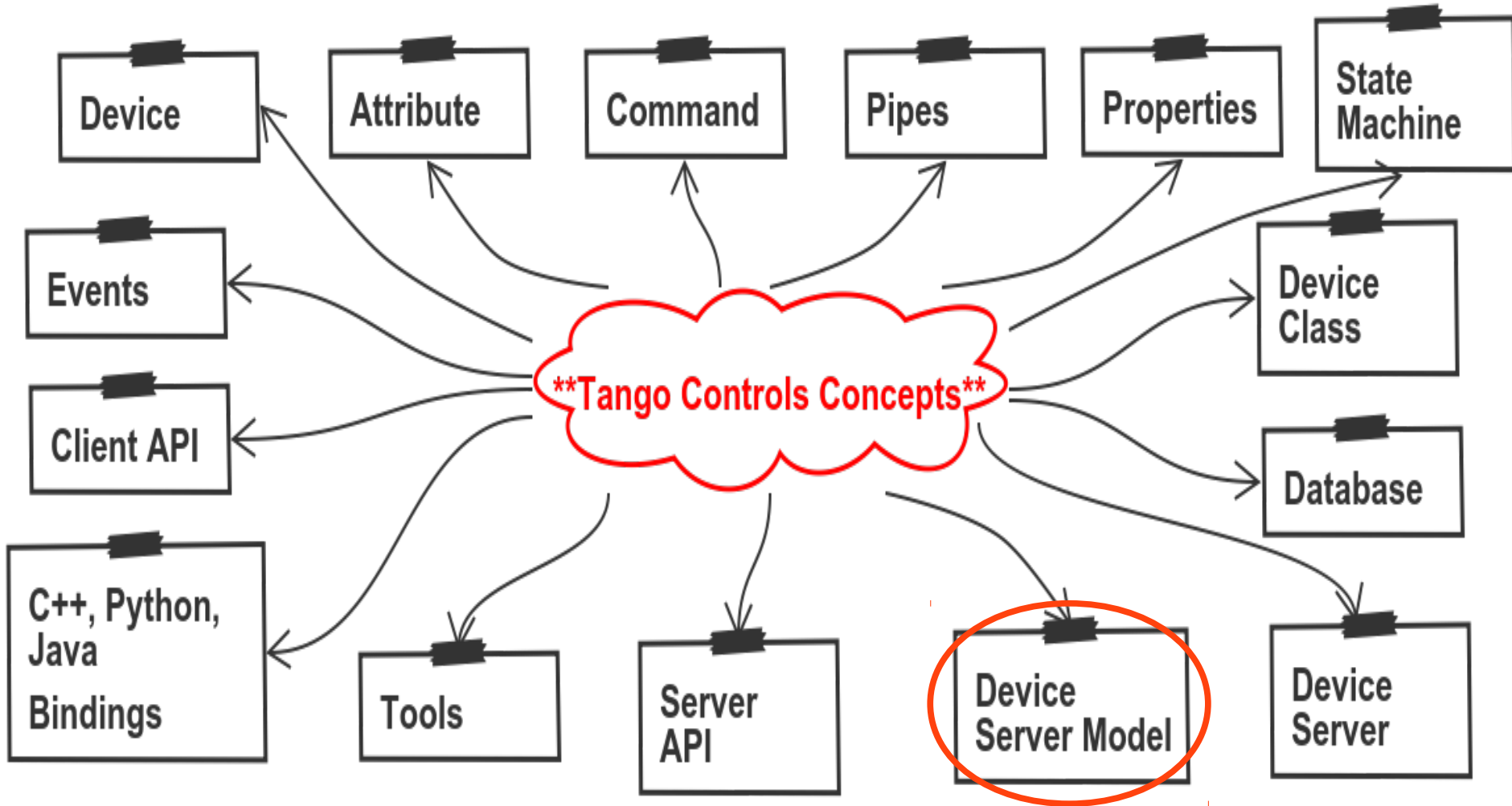
The actor model in **computer science** is a **mathematical model** of **concurrent computation** that treats "actors" as the universal primitives of concurrent computation. In response to a **message** that it receives, an actor can: make local decisions, create more actors, send more messages, and determine how to respond to the next message received. Actors may modify **private state**, but can only affect each other through messages (avoiding the need for any **locks**).

Proposed in **1973** by **Carl Hewitt and others**

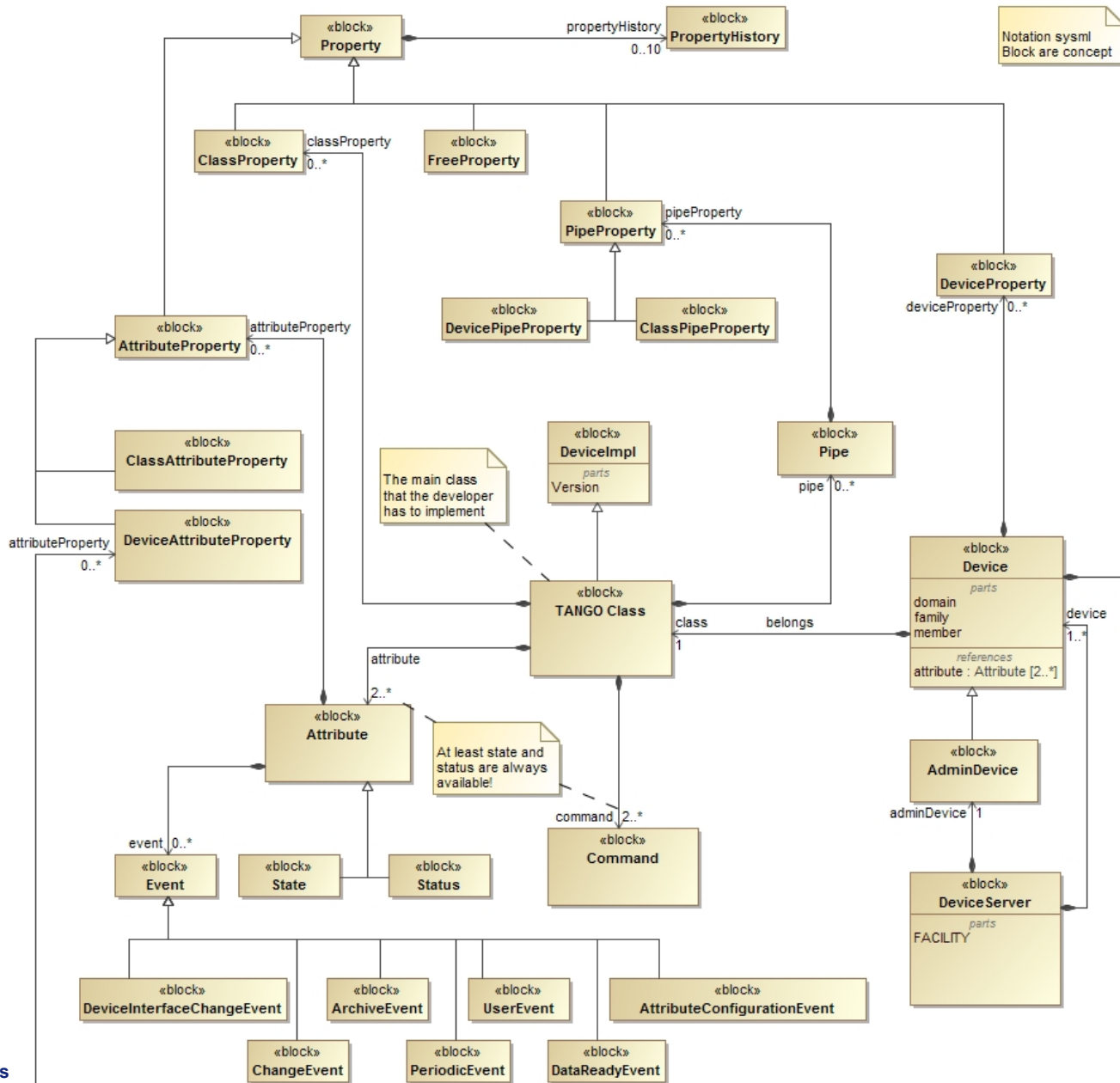
Tango runtime device model



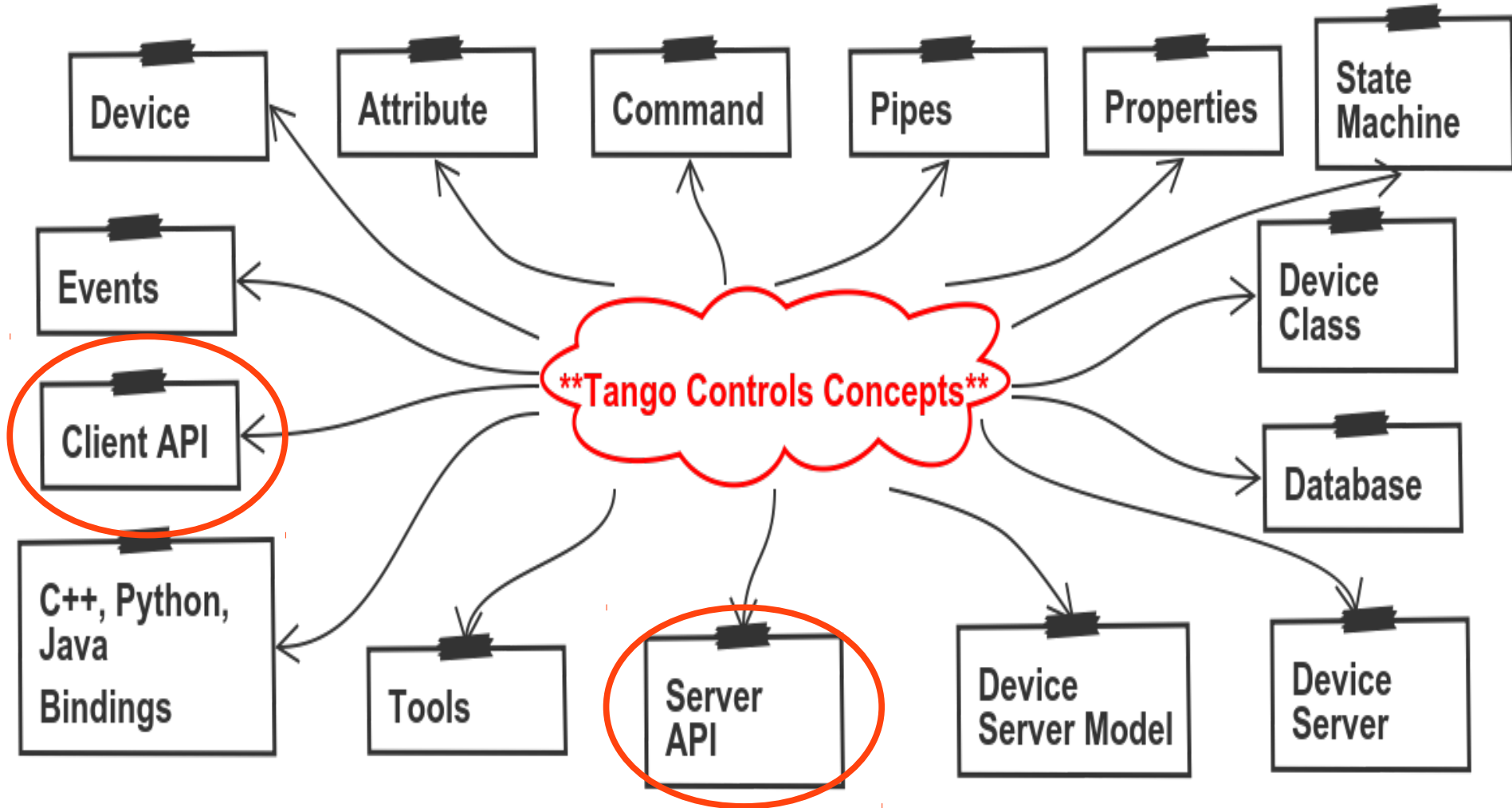
Device server model concept



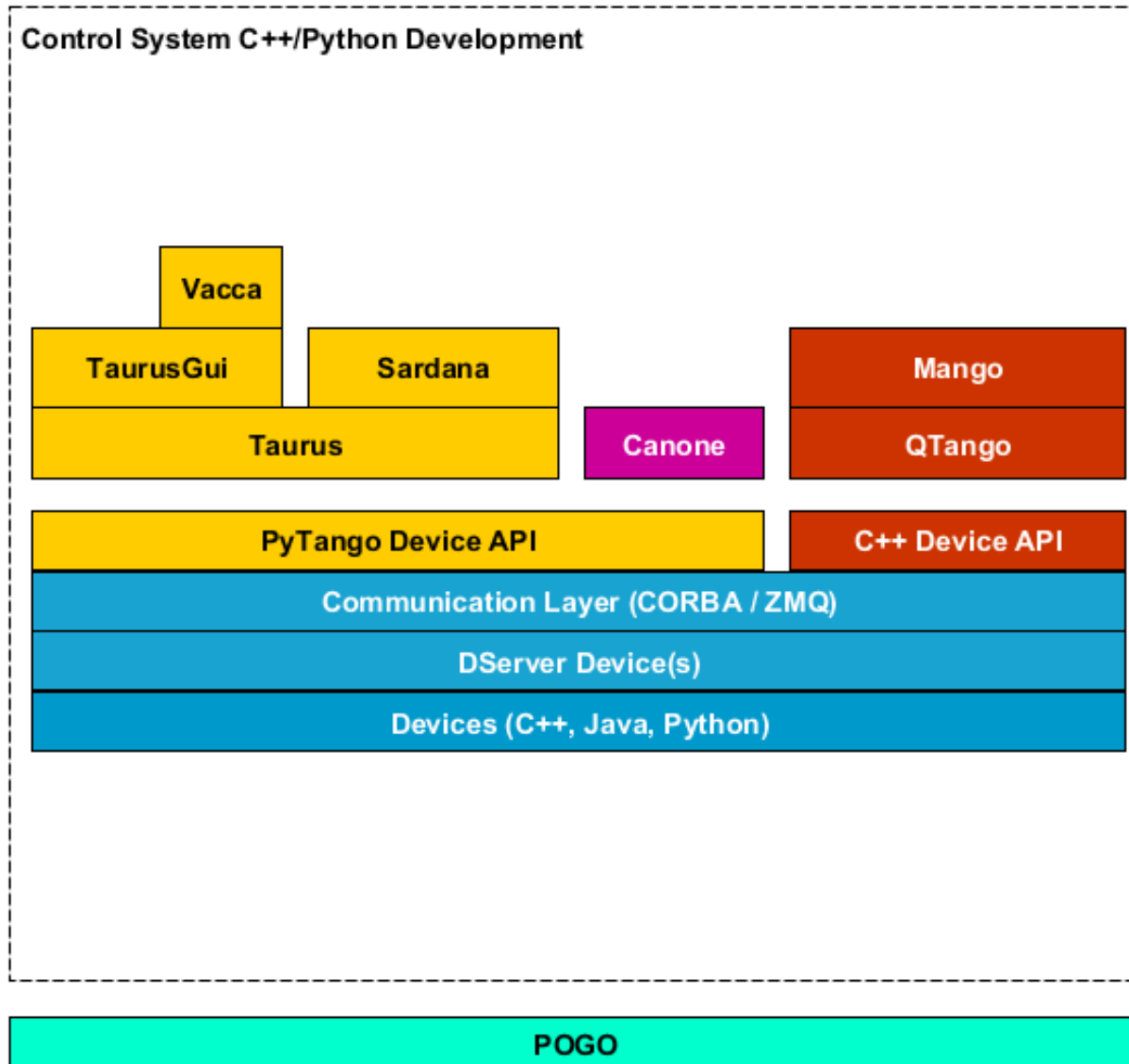
Tango full device model



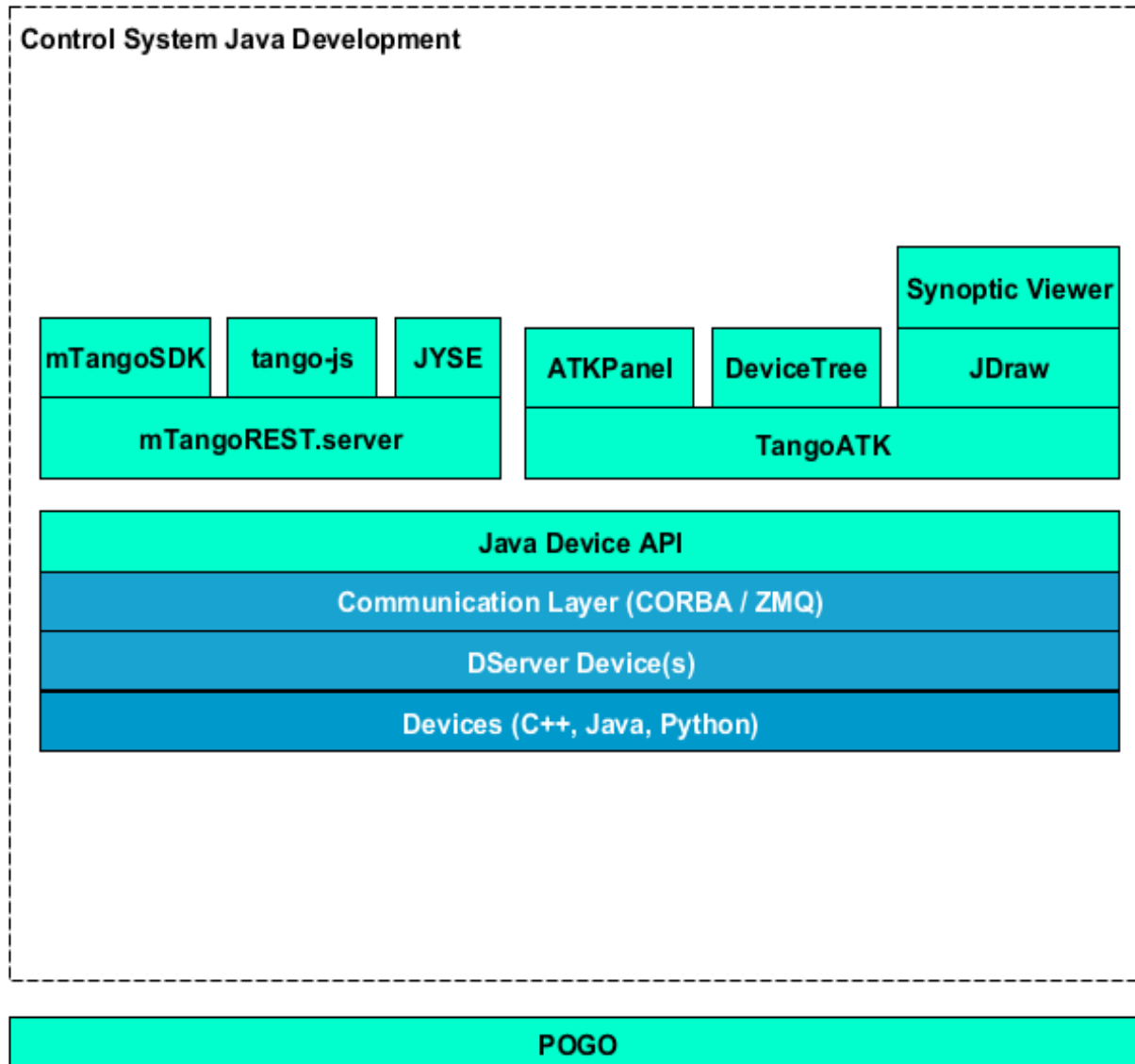
Server client api concept



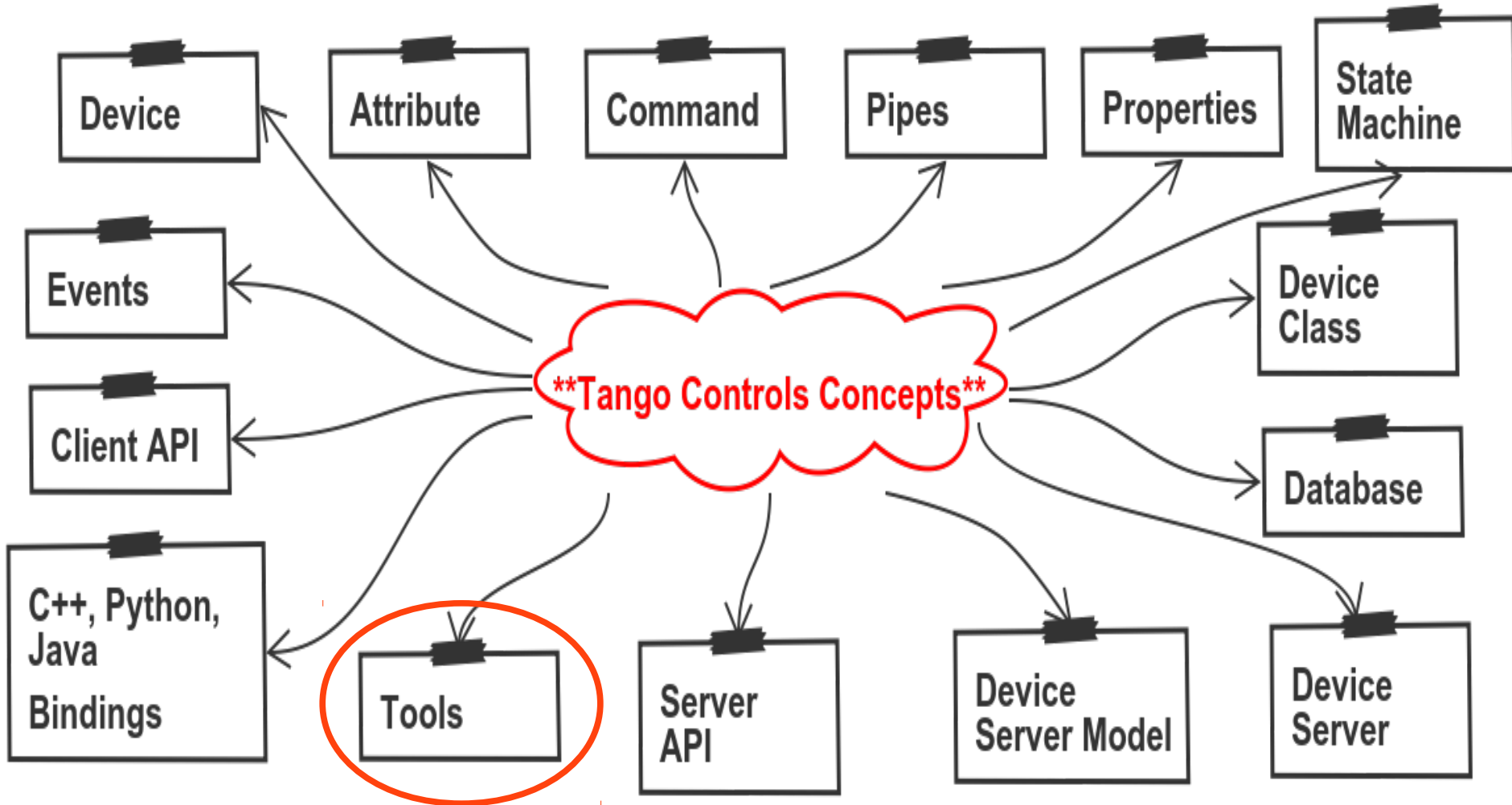
Tango developers map



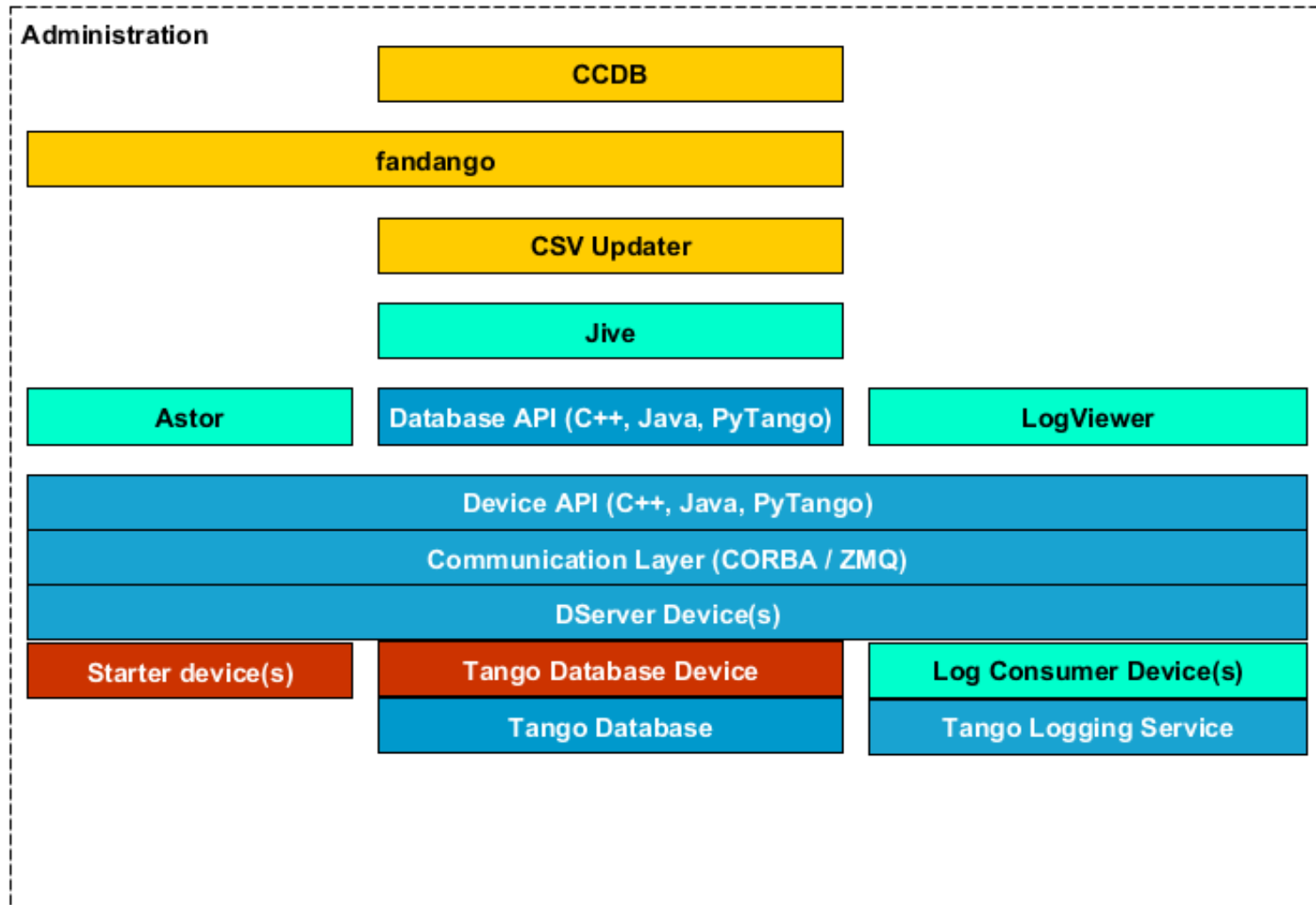
Tango developers map



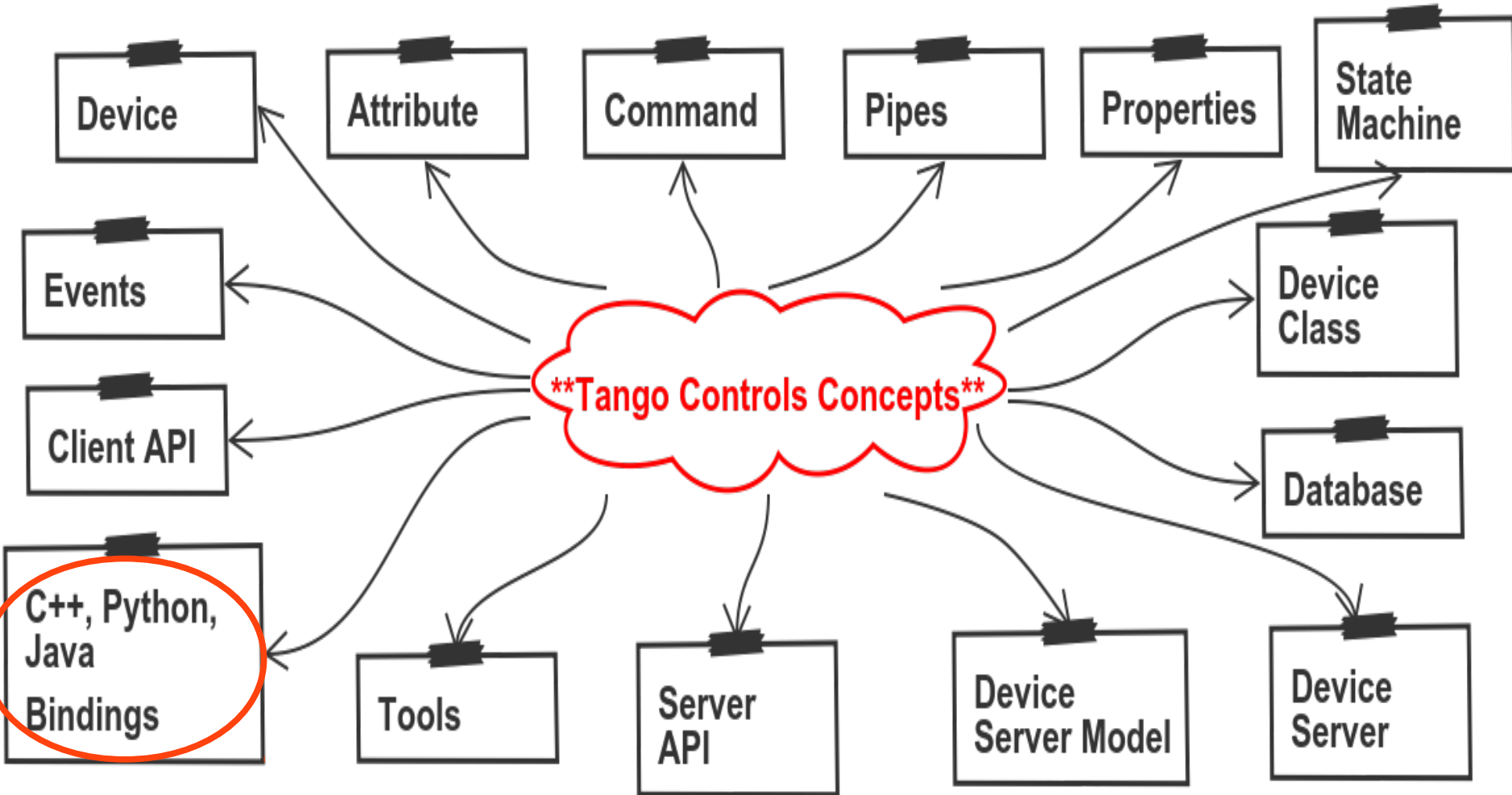
TOOLS concept



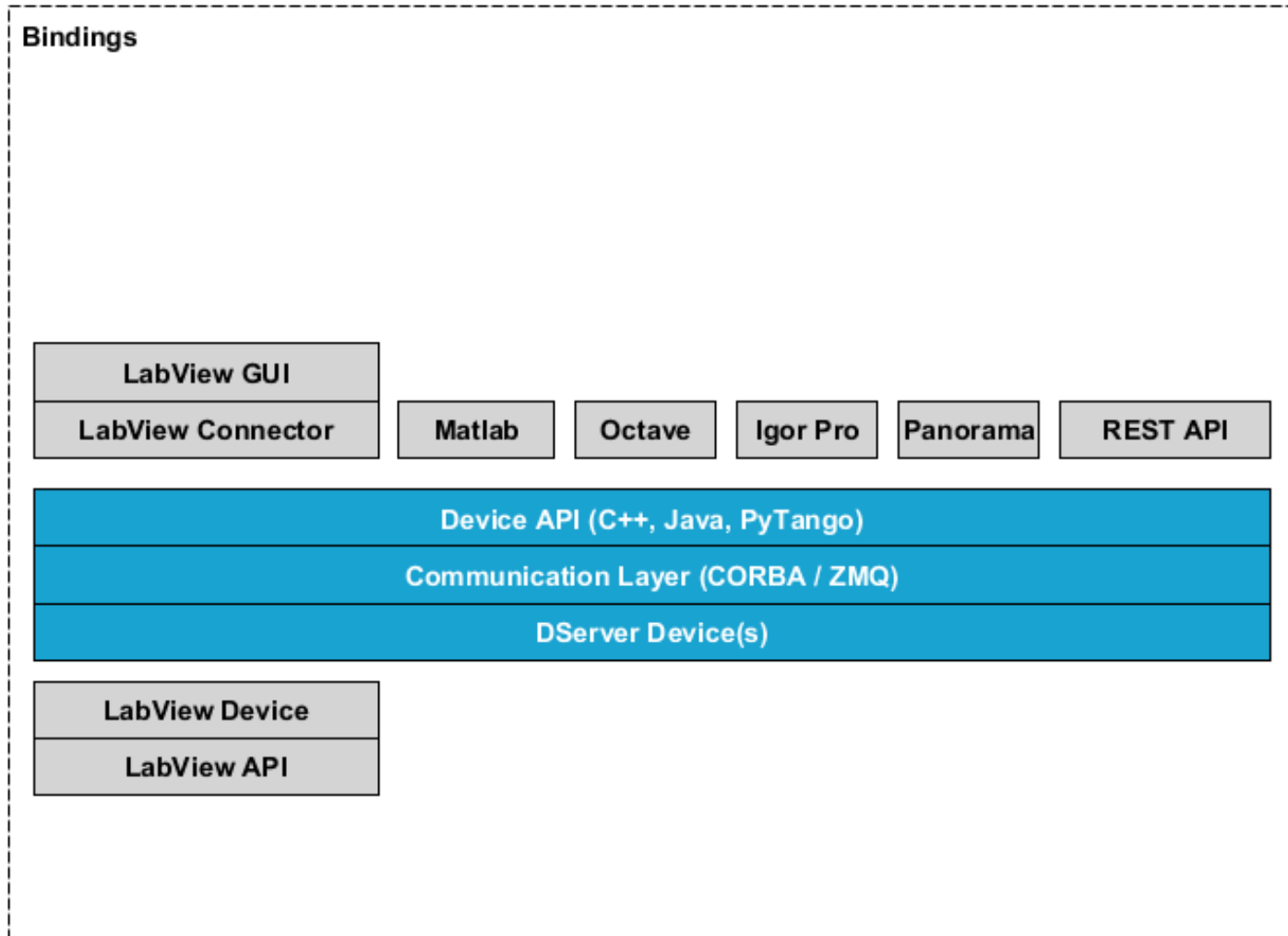
Tango TOOLS map



BINDINGS concept



Tango bindings map



Programme – Monday

Monday, 4 February 2019

- 14:00 - 17:30 Tango Kernel meeting
- 14:00 **Opening 15'**
Speaker: Andrew Goetz (ESRF)
 - 14:15 **Tango 9.x news 30'**
Speaker: Reynald Bourtembourg
 - 14:45 **Discussion on LTS roadmap 30'**
 - 15:15 **Continuous integration and packaging 15'**
Linux and Windows continuous integration and packaging
 - 15:30 **coffee break 15'**
 - 15:45 **Tango 10.x news 30'**
Speaker: Igor Khokhriakov (hgz)
 - 16:15 **Discussion on Tango 10.x roadmap 30'**

Tuesday, 5 February 2019

- 09:00 - 17:30 Tango Kernel meeting
- 09:00 **PyTango news 20'**
 - 09:20 **Discussion about PyTango strategy 20'**
who will take the lead in PyTango maintenance and development

Programme - Tuesday to Wednesday

09:40 **PyTango packaging 20'**
Windows binary package and Conda packages for linux

10:00 **Jtango news 20'**

10:20 **discussion about jtango maintenance 20'**

10:40 **coffee break 20'**

11:00 **code camp 2h0'**

13:00 **lunch break 1h0'**

14:00 **code camp 3h0'**

14:00 - 17:30 Tango Documentation camp: Documentation camp

14:00 **opening 20'**

14:20 **documentation camp 3h0'**

Wednesday, 6 February 2019

09:00 - 20:55 Tango Documentation camp

09:00 **code camp 1h30'**

10:30 **Coffee break 20'**

10:50 **code camp 40'**

11:30 **doc camp 1h30'**

13:00 **Lunch break 1h0'**

14:00 **doc camp 2h40'**

16:40 **coffee break 20'**

17:00 **doc camp 2h10'**

19:10 **coffee break 20'**

19:30 **doc camp 1h25'**

09:00 - 13:00 Tango Kernel meeting

09:00 **code camp 1h30'**

10:30 **coffee break 20'**

10:50 **Strategic discussion 1h10'**

definition of the detailed next steps of development, distribution of the respon

12:00 **closing 20'**

Speaker: Andrew Goetz (ESRF)

Thursday, 7 February 2019

09:00 - 13:00 Tango Documentation camp