

TANGO RFC

Cartography of the Tango Controls

Piotr Goryl on behalf of Tango Community, ICALEPCS'21, Shanghai virtualy, 19.10.2021



Quo Vadis?



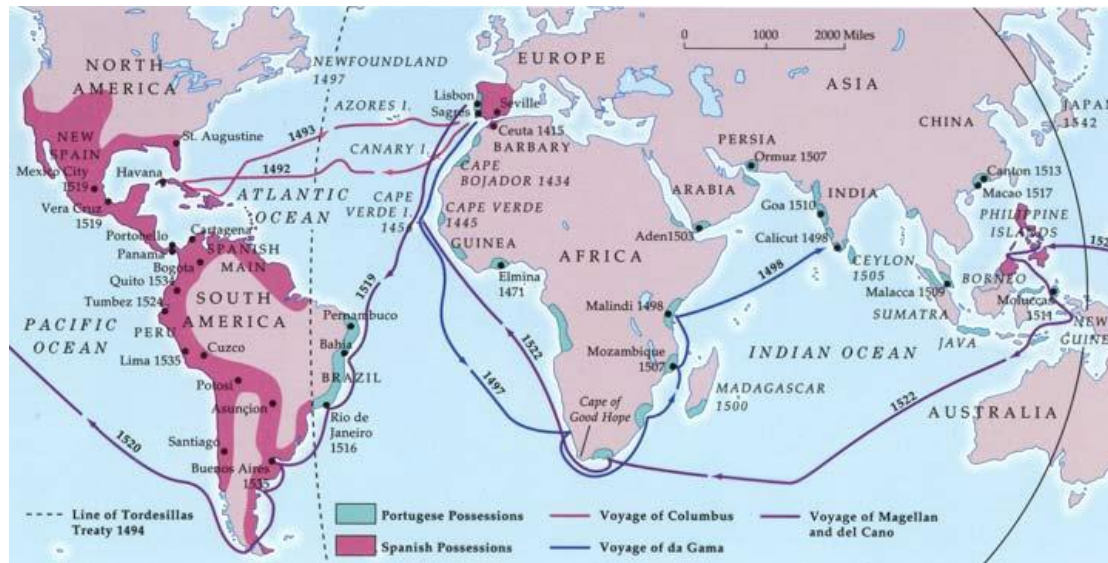
To zdjęcie, autor: Nieznany autor, licencja: [CC BY](#)

cppTango, JTango, PyTango

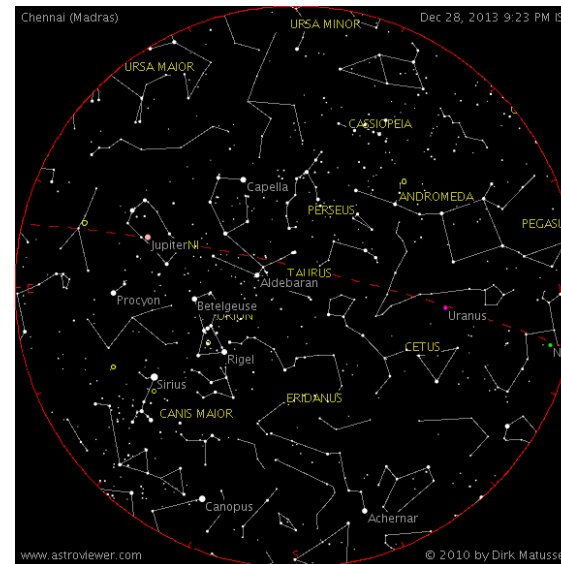


To zdjęcie, autor: Nieznany autor, licencja: [CC BY-SA-NC](#)

First start with a good map



To zdjęcie, autor: Nieznany autor, licencja: [CC BY-SA-NC](https://creativecommons.org/licenses/by-sa/4.0/)



To zdjęcie, autor: Dirk Matussek, licencja: [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/)

The cartography (goal)

- ▶ Provide a **formal specification of the current Tango Controls**
 - ▶ concepts,
 - ▶ terminology,
 - ▶ protocol behavior,
 - ▶ conventions,
- ▶ It shall be on a sufficient level for:
 - ▶ future evolution of Tango Controls
 - ▶ implementation in other languages
- ▶ **Concepts are more important** than implementation details.

The Crew

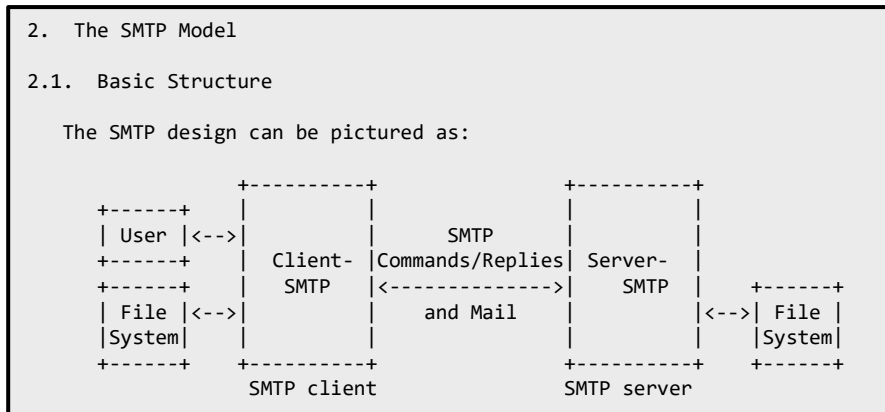
- ▶ The team is volunteers from the whole Tango Community,
 - ▶ The team meets every 2 weeks on a telco to synchronise and discuss pending work,
 - ▶ S2Innovation is leading the meetings and does administration work,
- Vincent Hardion (Max IV)
 - David Erb (Max IV)
 - Reynald Bourtembourg (ESRF)
 - Andy Götz (ESRF)
 - Gwenaëlle Abeillé (SOLEIL)
 - Sergi Blanch-Torné (ALBA)
 - Sergi Rubio (ALBA)
 - Lorenzo Pivetta (Elettra)
 - Graziano Scalamera (Elettra)
 - Olga Merkulova (IK)
 - Igor Khokhriakov (IK)
 - Thomas Braun (byte physics)
 - Piotr Goryl (S2Innovation)
 - Michal Liszcz (S2Innovation)

The ship (tools)

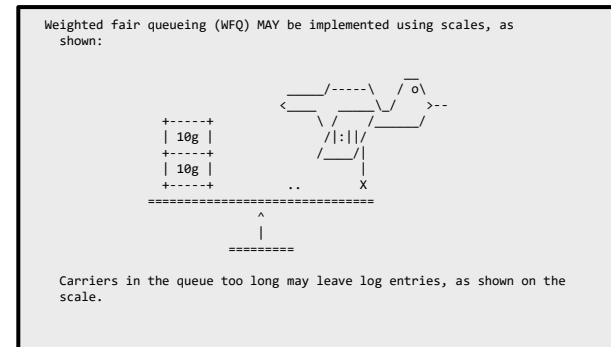
- ▶ Using the Consensus-Oriented Specification System (COSS) + C4,
- ▶ Work is conducted on GitLab (previously GitHub) repository:
<https://gitlab.com/tango-controls/rfc>
- ▶ Documents are written as .MD format, the ABNF is used for describing communication tokens,
- ▶ A dedicated Slack channel is used for communication,
- ▶ 3 x Write the RFC (WtRFC) remote workshops

What is the RFC?

- ▶ RFC means Request For Comments
(the first RFCs were indeed documents circulating between ARPA researchers for gathering comments)
- ▶ Example: <https://tools.ietf.org/html/rfc5321>



RFC 5321 - SMTP



RFC 2549 - IP over Avian Carriers with QoS

COSS - Consensus-Oriented Specification System

- ▶ Facilitates collaborative specification writing,
- ▶ C4 - Similar to source code peer-review process,
- ▶ Roles for each topic:
 - ▶ An editor - a Tango Collaboration representative
 - ▶ Contributors - anyone from the Tango Community, sending a proposal as a pull request

Process

Markdown, ABNF, UML



Remote Workshops



Regular meetings



COSS, C4

Charts

Tango Request For Comments (RFC)
latest

Search docs

☰ **Tango Request For Comments (RFC)**

- Mission
- Contribution
- RFCs

- ☰ 1/Tango Control System
- ☰ 2/Device Model
- ☰ 3/Command
- ☰ 4/Attribute
- ☰ 5/Property
- ☰ 6/Database
- ☰ 7/The Tango Pipe specification
- ☰ 8/Device Server Model
- ☰ 9/Data types
- ☰ 12/Publisher-Subscriber protocol
- ☰ 14/The Tango Logging Service
- ☰ 15/The dynamic attribute and command

📖 Read the Docs v: latest ▾

Short Name	Title	Status	Editor
RFC-1	The Tango control system	Raw	Lorenzo Pivetta
RFC-2	The device object model	Draft	Vincent Hardion
RFC-3	The command model	Draft	Sergi Blanchi-Torné
RFC-4	The attribute model	Draft	Sergi Blanchi-Torné
RFC-5	The property model	Draft	Gwenaelle Abeillé
RFC-6	The database system	Draft	Gwenaelle Abeillé
RFC-7	The pipe model	Draft	Reynald Bourtembourg
RFC-8	The server model	Draft	Lorenzo Pivetta
RFC-9	Data types	Draft	Gwenaelle Abeillé
RFC-10	The Request-Reply protocol	Raw	Reynald Bourtembourg
RFC-11	The Request-Reply protocol - CORBA implementation	Raw	
RFC-12	The Publisher-Subscriber protocol	Draft	Vincent Hardion
RFC-13	The Publisher-Subscriber protocol - ZeroMQ implementation	Raw	
RFC-14	Logging service	Raw	Sergi Blanchi-Torné
RFC-15	The dynamic attribute and command	Draft	Reynald Bourtembourg
RFC-16	Cache system	Raw	
RFC-17	Memorised attribute service	Raw	
RFC-18	Authorisation system	Raw	

Result

<https://tango-controls.readthedocs.io/projects/rfc/>

🏠 Tango Request For Comments (RFC)
latest

Search docs

- ⊕ Tango Request For Comments (RFC)
- ⊕ 1/Tango Control System
- ⊕ 2/Device Model
- ⊕ 3/Command
- ⊖ 4/Attribute
 - Preamble
 - ⊕ Tango Attribute specification
 - ⊕ Specification
- ⊕ 5/Property
- ⊕ 6/Database
- ⊕ 7/The Tango Pipe specification
- ⊕ 8/Device Server Model
- ⊕ 9/Data types
- ⊕ 12/Publisher-Subscriber protocol
- ⊕ 14/The Tango Logging Service
- ⊕ 15/The dynamic attribute and command

See [Attribute events](#) section for more details.

```
rel-change = change
abs-change = change

archive-rel-change = change
archive-abs-change = change

number = [ "-" ] 1*DIGIT [ "." ] *DIGIT
change = number [ "," number ]

period = 1*DIGIT
archive-period = period
```

Attribute runtime parameters

At given point in time an Attribute MUST have associated:

- *quality*, an enumeration describing the state *read value* (one of *VALID*, *INVALID*, *ALARM*, *CHANGING*, *WARNING*),
- *read value*, an object representing the value of the Attribute. It MUST conform to *data format* and *data type*,
- *read dim x*, an integer describing the number of data elements in *read value* in X dimension. If *data format* is *SCALAR*, it MUST be either 0 or 1. If *data format* is *SPECTRUM* or *IMAGE*, it MUST be between 0 and *max dim x*.
- *read dim y*, an integer describing the number of data elements in *read value* in Y dimension. If *data format* is *SCALAR* or *SPECTRUM*, it MUST be 0. If *data format* is *IMAGE*, it MUST be between 0 and *max dim y*.

Tango Controls

V9.x.x



V10

V9 features in a new shape



V11

Tango with features beyond



To zdjęcie, autor: Nieznany autor, licencja: [CC BY-NC-ND](#)

Benefits of writing the RFCs

- ▶ Managing the future,
- ▶ Community tightening,
- ▶ Building terminology consistency and understanding,
- ▶ Code has been extensively reviewed:
 - ▶ Knowledge has been gained and shared,
 - ▶ Features (and bugs) discovered,
- ▶ Discussion of features for Tango 11, improvement of the current code base..

- <https://tango-controls.readthedocs.io/projects/rfc/>
- <https://gitlab.com/tango-controls/rfc>



Thank You!

- Vincent Hardion (Max IV)
- David Erb (Max IV)
- Reynald Bourtembourg (ESRF)
- Andy Götz (ESRF)
- Gwenaëlle Abeillé (SOLEIL)
- Sergi Blanch-Torné (ALBA)
- Sergi Rubio (ALBA)
- Lorenzo Pivetta (Elettra)
- Graziano Scalamera (Elettra)
- Olga Merkulova (IK)
- Igor Khokhriakov (IK)
- Thomas Braun (byte physics)
- Piotr Goryl (S2Innovation)
- Michal Liszcz (S2Innovation)

www.s2innovation.com

piotr.goryl@s2innovation.com

contact@s2innovation.com

+48 795 794 004