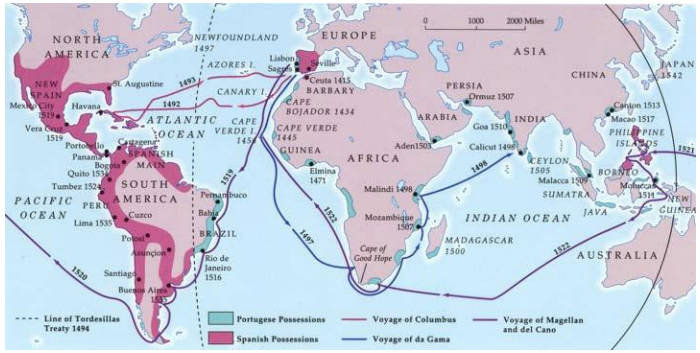
Map of the Tango Controls (RFC) - Status

Piotr Goryl on behalf of Tango Controls RFC Crew,
Tango Webinar, 17-11-2020, cyber-space

First start with a good map



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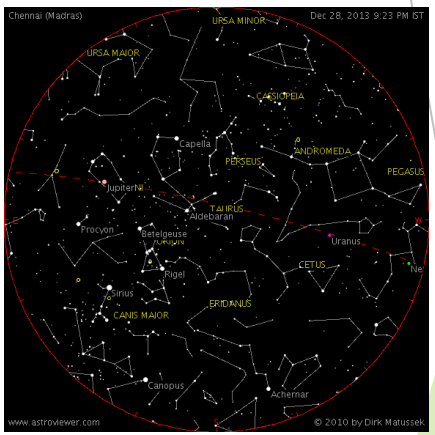

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- 21 topics proposed,
- 13 is required for development of a new Tango prototype

S2 INNOVATION

The cartography (goal)

- Provide a formal specification of the current (V9 LTS) Tango Controls system.
  - 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 Tango Community,
- The team used to meet every other week on telco. Now, the RFC topic is a part of Tango Kernel Meeting.

- Vincent Hardion (Max IV)
- David Erb (Max IV)
- Reynald Bourtembourg (ESRF)
- Andy Götz (ESRF)
- Gwenaelle 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)

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Hydrology (the structure)

- **Meta info** – who, what, state, relations to other specifications
- **Preamble** – common part between documents describing license and rules used in the document
- **Goals** – what kind of problem(s) a specified concept is going to solve
- **Use Cases** – example of it usages
- **Specification** – the formal content

S2 INNOVATION

Mapped areas

- RFC-1 - general concepts, introduction – WIP / 90%
- RFC-2 – The device object model - done
- RFC-3 – The command model – done
- RFC-4 – The attribute model - done
- RFC-5 – The property model - done
- RFC-6 – The database system - done

S2 INNOVATION

Mapped areas

- RFC-7 – The pipe model - done
- RFC-8 – The server model - done
- RFC-9 – Data types - done
- RFC-10 – The Request-Reply protocol – WIP / 80%
- RFC-12 – The Publisher-Subscriber protocol - done
- RFC-14 – Logging service - done
- RFC-15 – The dynamic attribute and command - done

„Blank” areas

- RFC-11 – CORBA implementation of Request-Reply protocol
- *RFC-16 – Cache system* – it will be a part of RFC-10
- *RFC-17 – Memorised attribute service* – mentioned in RFC-4
- RFC-18 – Authorisation system
- APIs

RFC-10 – Request-Reply protocol

- https://github.com/tango-controls/rfc/tree/raw-rfc-10-request-reply
- Connection management (currently called „Client duty”)
- Exceptions
- Timeout
- Synchronous/Asynchronous request
- Serialization
- Blackbox
- Device locking
- Cache
- Version compatibility
- Message

Request-Reply example

Synchronous request

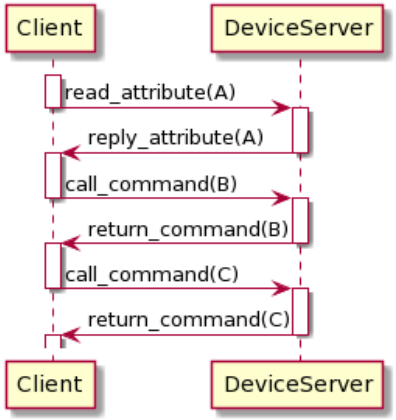
The client MAY send Synchronous Requests.

When the client sends a Synchronous Request it SHOULD wait for a request to be processed.

If one client thread sends multiple Synchronous Requests sequentially, these SHALL be processed in the same order as these have been sent.

The client SHALL handle the Synchronous Request in the way that it blocks the calling client thread until the request is fully processed (a Device Server reply to the request and the result is available to the client) or timeout or other error appear.

Below is a diagram showing an example seqence:



The client MAY allow multiple Synchronous Requests to be sent in parallel if these are sent by multiple client threads.

The Device Server MAY process multiple synchronous requests in parallel according to its Serialisation.

Attribute model - ABNF example

Attribute naming schema

Formal specification of Attribute name is given below:

```
attribute-name = 1*attribute-name-char
attribute-name-char = %d48-57 / %d65-90 / %d97-122 / "_" ; 0-9 / A-Z / a-z / _

full-attribute-name = device-name "/" attribute-name

attribute-alias = *attribute-alias-char
attribute-alias-char = OCTET ; except %x00 "/" " " "#" ":" "->"
```

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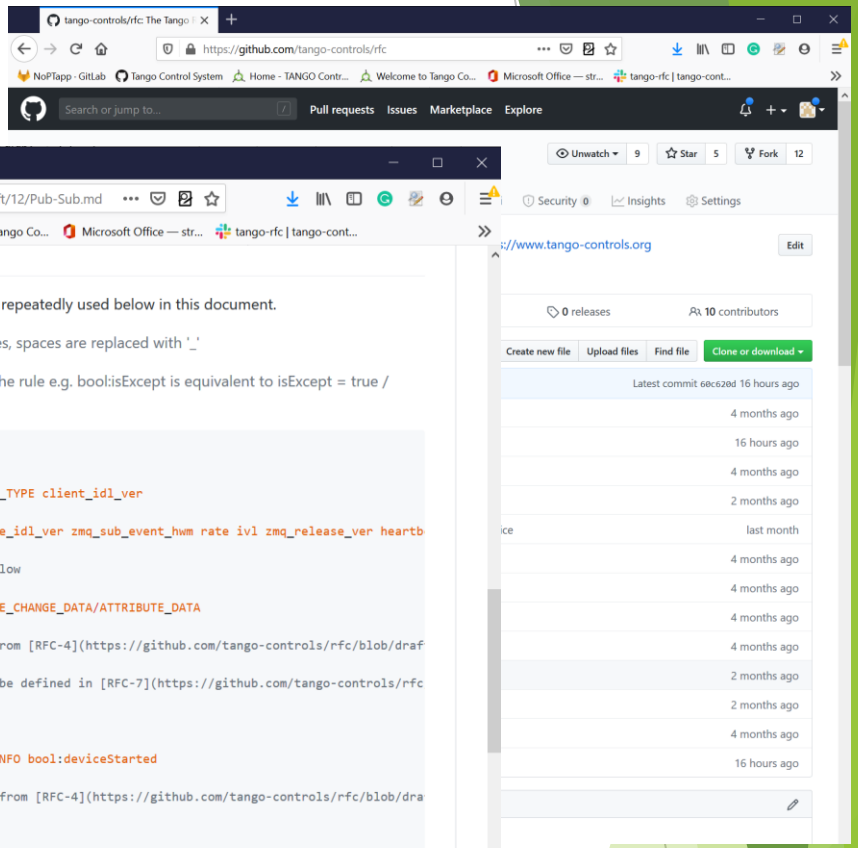
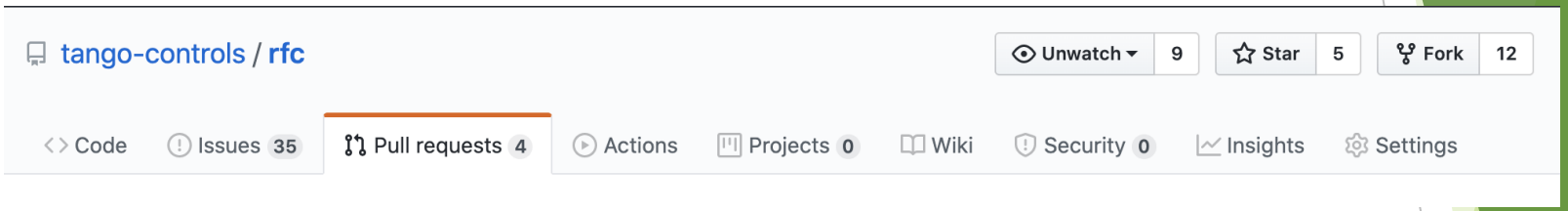


https://github.com/tango-controls/rfc

Byproduct when defining RFC



- Group of contributors: More people knows about the core
- Integrate new core developers
- Same vocabulary:
  - i.e Admin device, DServer, DeviceServe
- Discuss new feature, breaking compatibility, improvement on the concept level:
  - Simplify types
  - Service using the underline protocol: integration in container orchestration
  - Load balancer

Shallow waters passed (challenges)

- Distance to navigate (time to be spent on writing),
- Reverse engineering (browsing the code),
- Getting consensus on intended features,
- Keeping the RFCs implementation agnostics,
- Mermaids (most of us did the writing in-meanwhile, having other duties at Institutes),

Next waypoints

- Review of the specification by Tango Controls Gurus,
- Using the specification when implementing new features or bug fixing,
- Tango v9 implementation in new languages?
- A prototype implementation (heading the Tango v10)
  - Keeping Tango Controls model described in the RFCs
  - Transport protocol not-necessary compatible with Tango v9
  - **WIP at MAX-IV**

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Tango v10 vs. v9:

- same concepts
- new implementation

S2 INNOVATION

Tango v11 vs. v10:

- Same concepts,
- New features

Thank You!

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