



MACHINEKIT

MACHINE CONTROL

READY FOR THE INTERNET OF THINGS

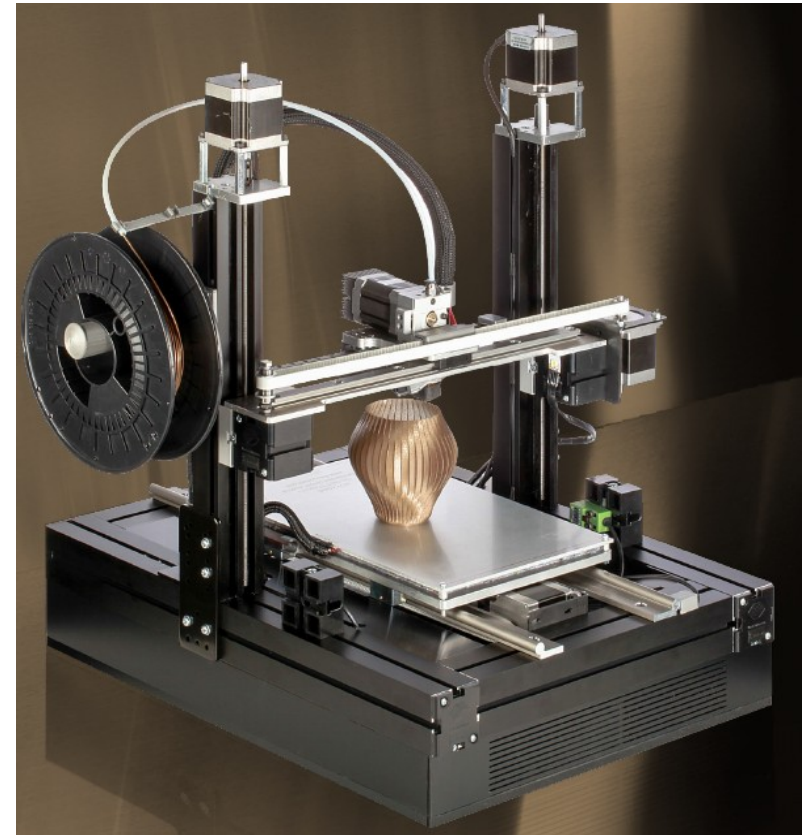
Alexander Rössler, BSc



- **About Me**
- **Machinekit**
- **Machinetalk**
- **Live Demo**

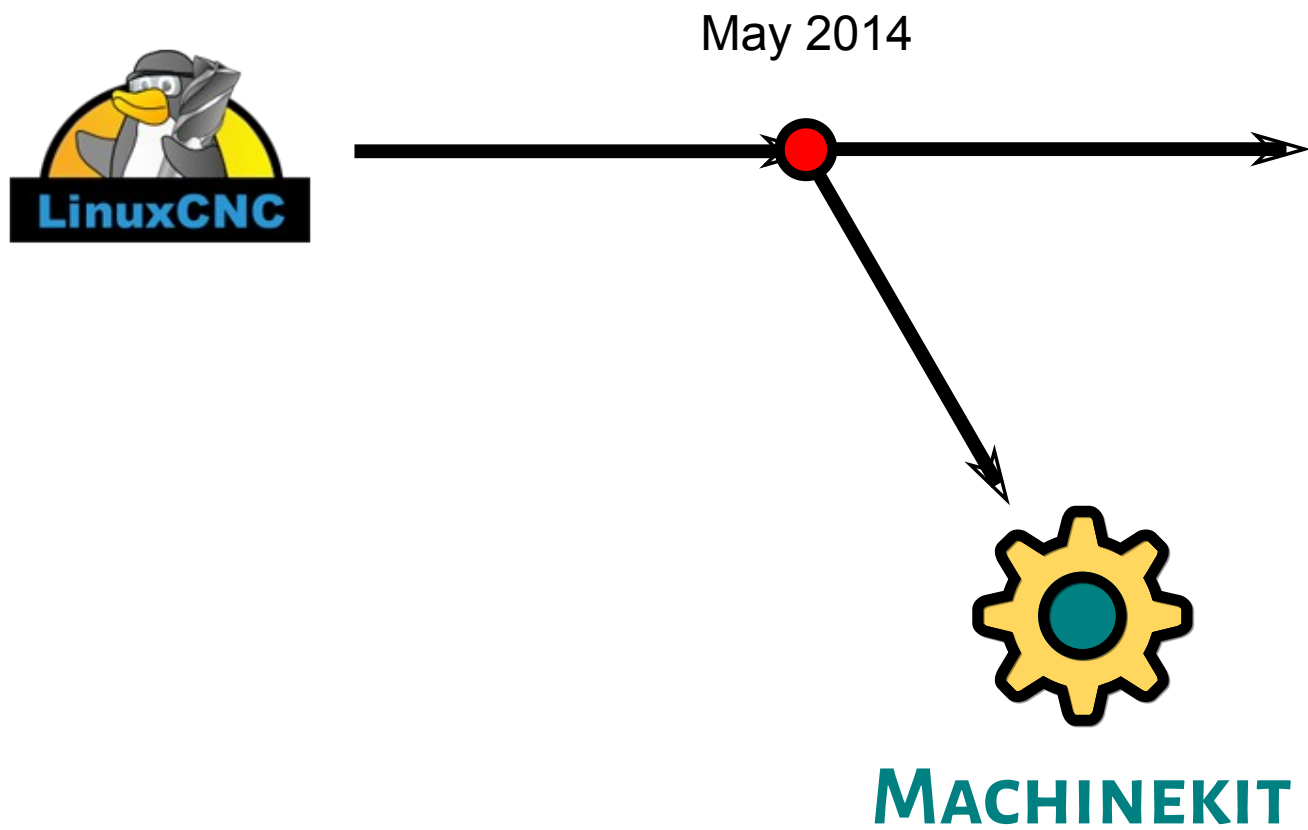


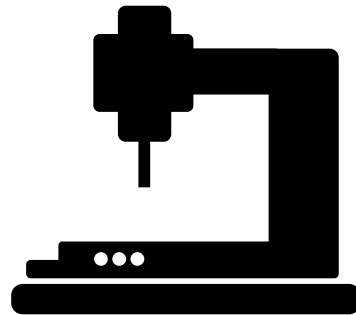
- **Alexander Rössler**
- **Embedded Systems**
- **OpenSource community**
- **3D printing**
- **The Cool Tool**



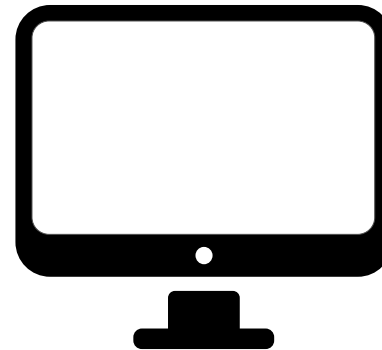
A teal-colored speech bubble with a white border, pointing downwards and to the left. It contains the text "WHAT IS MACHINEKIT?" in a bold, yellow, sans-serif font.

WHAT IS MACHINEKIT?



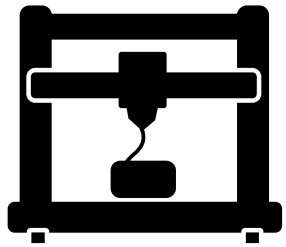


CNC Machines



Desktop Computers

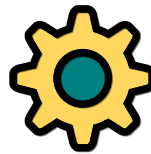
APPLICATIONS



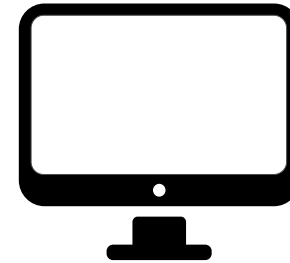
3D Printers



CNC Machines



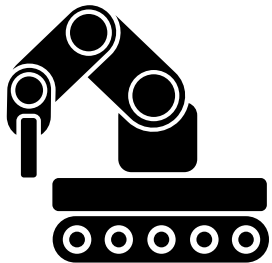
MACHINEKIT



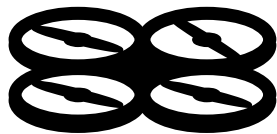
Desktop Computers



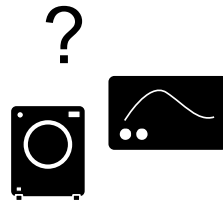
Embedded Devices



Robots



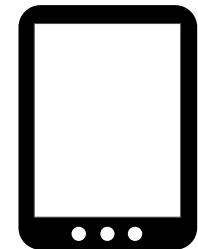
Quadcopters



Other Applications



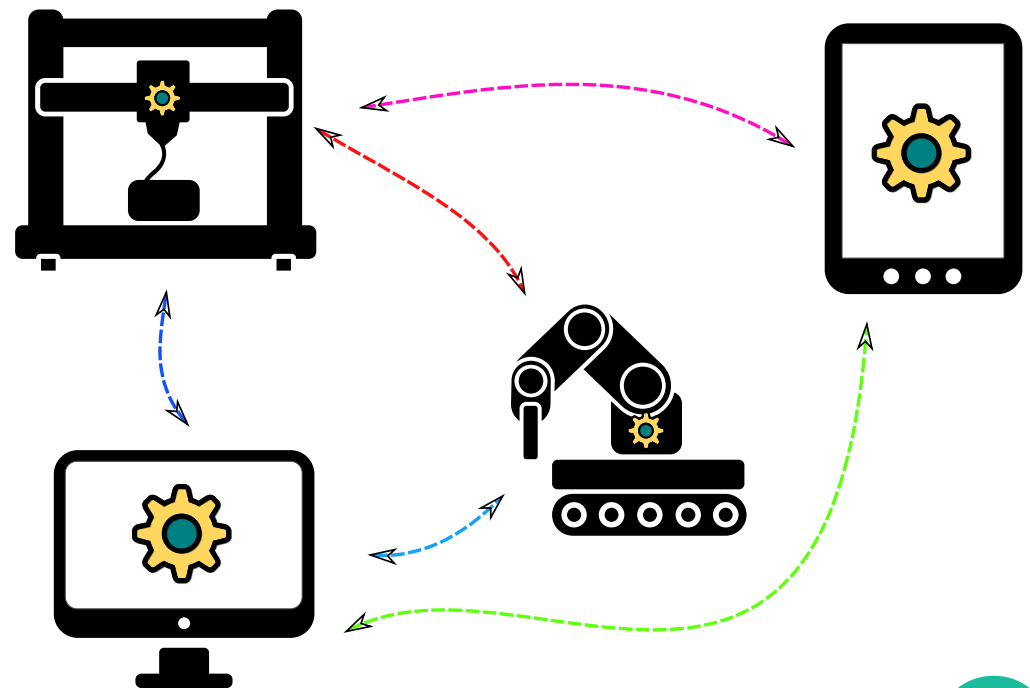
Smartphones



Tablets



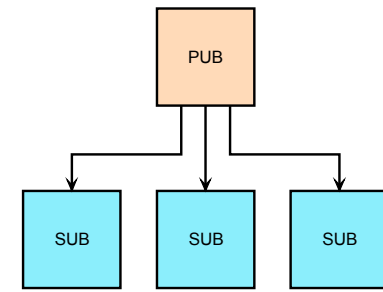
- **Middleware**
- **Interaction between RT and non-RT**
- **Distributed setups**



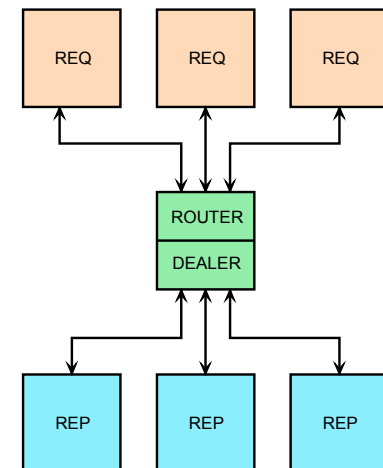


- **ZeroMQ**
- **End-to-end**
- **Communication patterns**
- **Several transports (TCP, IPC, ...)**
- **No startup order dependency**
- **Automatic reconnect**

Publish-Subscribe



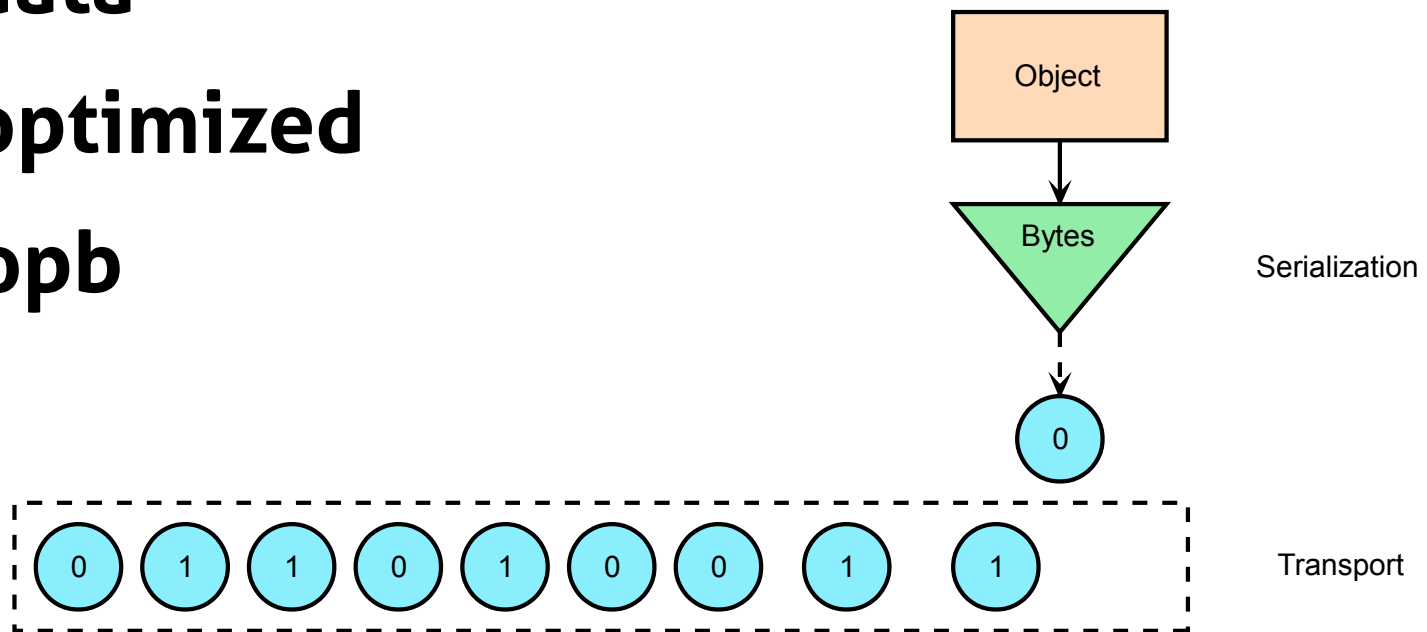
Router-Dealer



SERIALIZATION



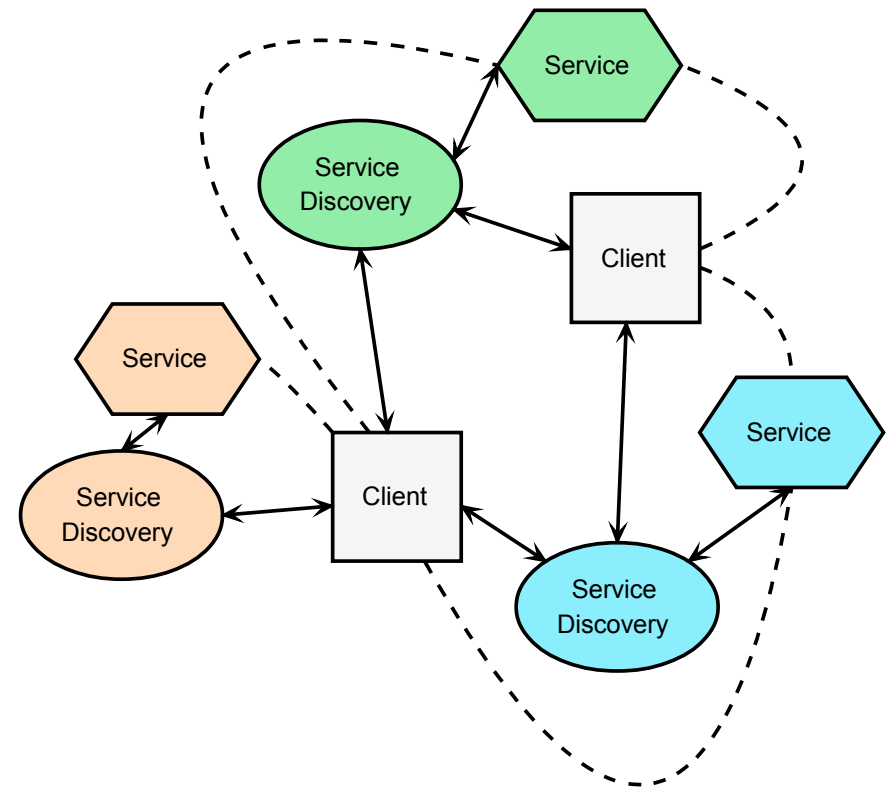
- Protocol Buffers
- Wire format
- Binary data
- Highly optimized
- RT: nanopb



SERVICE DISCOVERY



- MDNS/DNS-SD
- Auto configuration
- No user interaction
- Decentralized
- Multicast
- Unicast





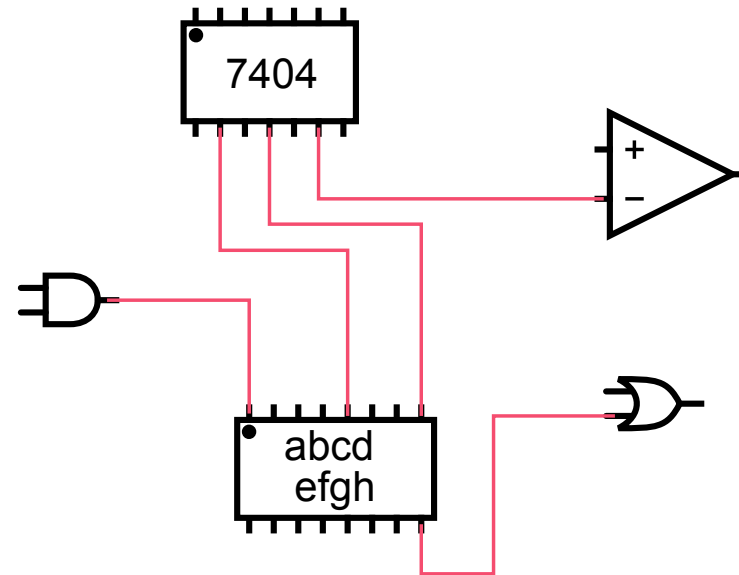
- **Bridge**
- **Protobuf → JSON**
- **ZeroMQ → websockets**



HARDWARE ABSTRACTION LAYER



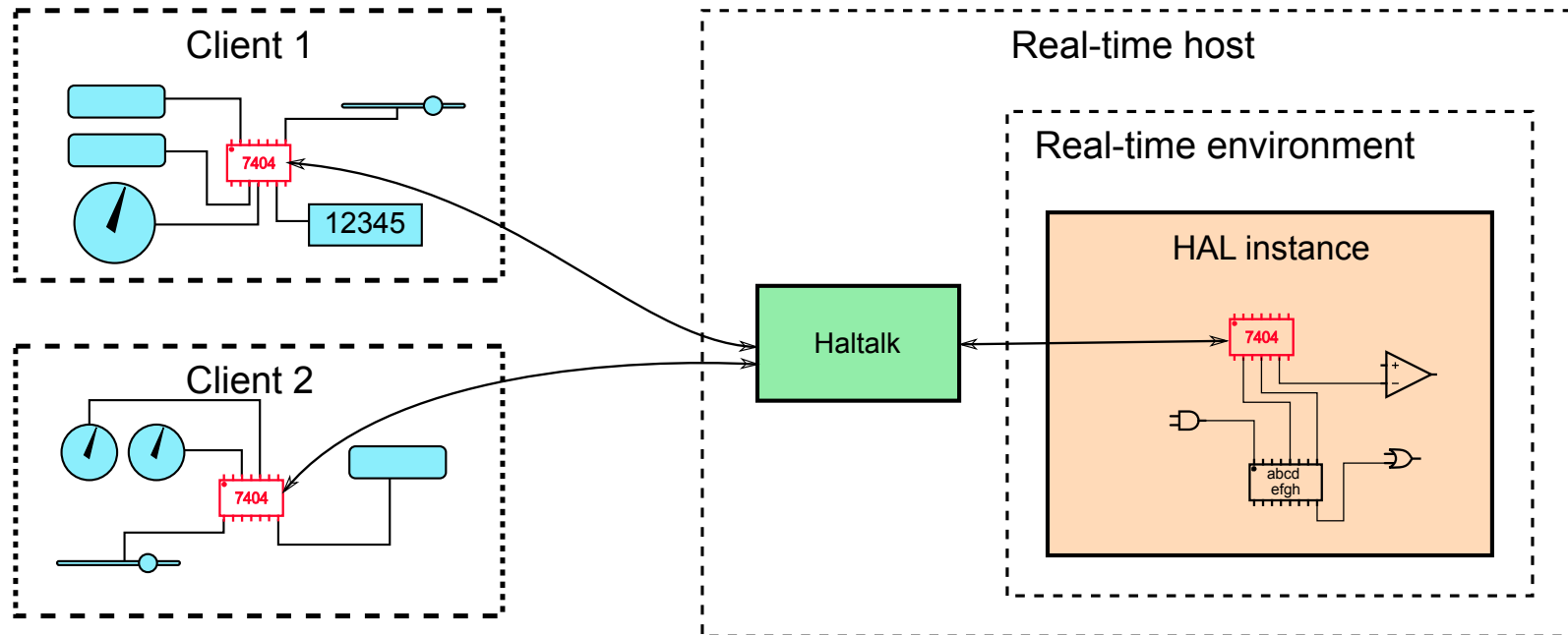
- **Configuration**
 - Components
 - Pins
 - Signals
- **Realtime**
- **Userland**



HAL Remote Component

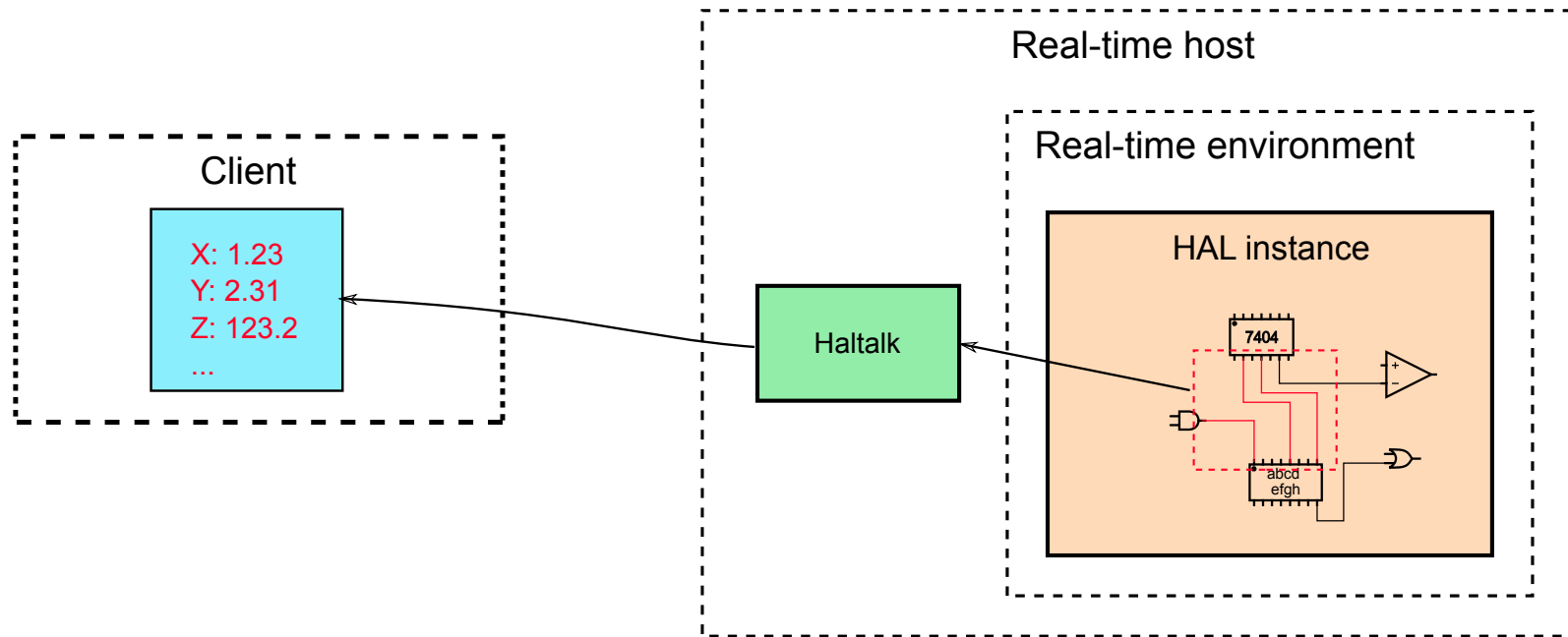


- Like normal components
- Remote API





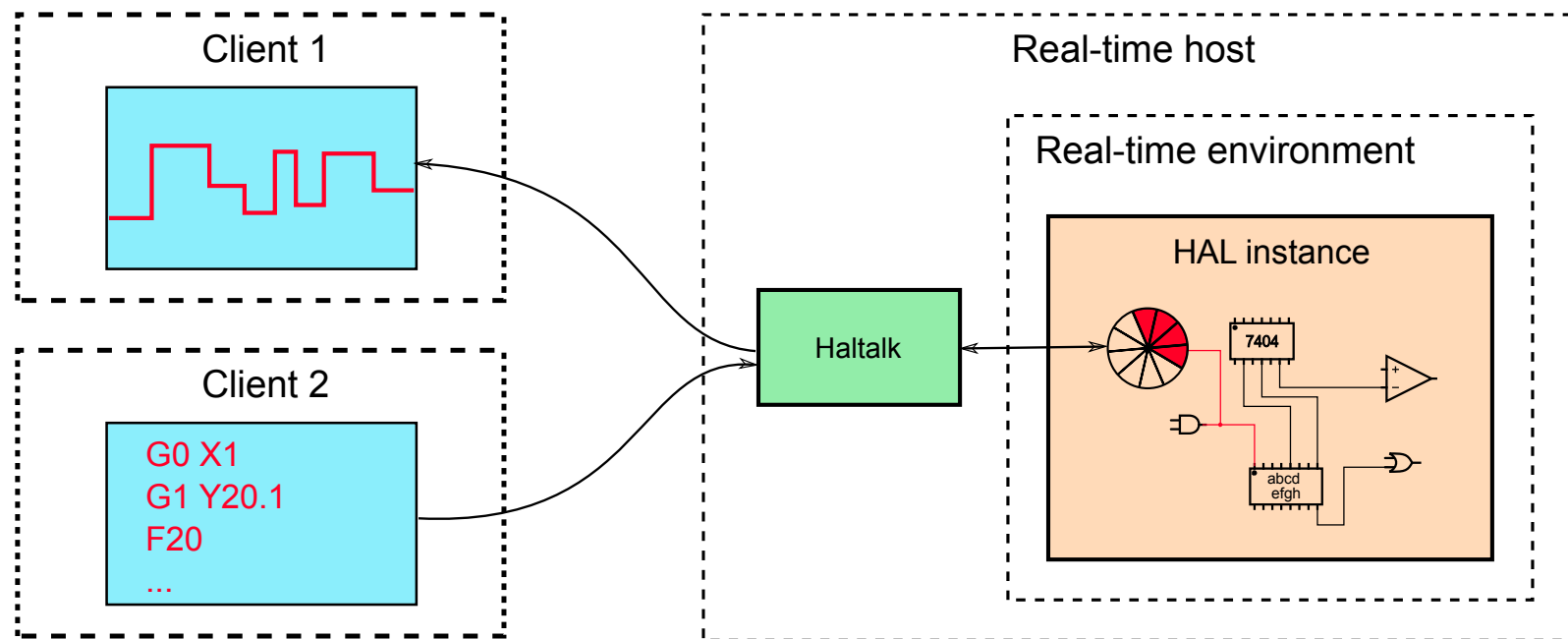
- Grouping signals
- Value updates



HAL NAMED RING BUFFERS

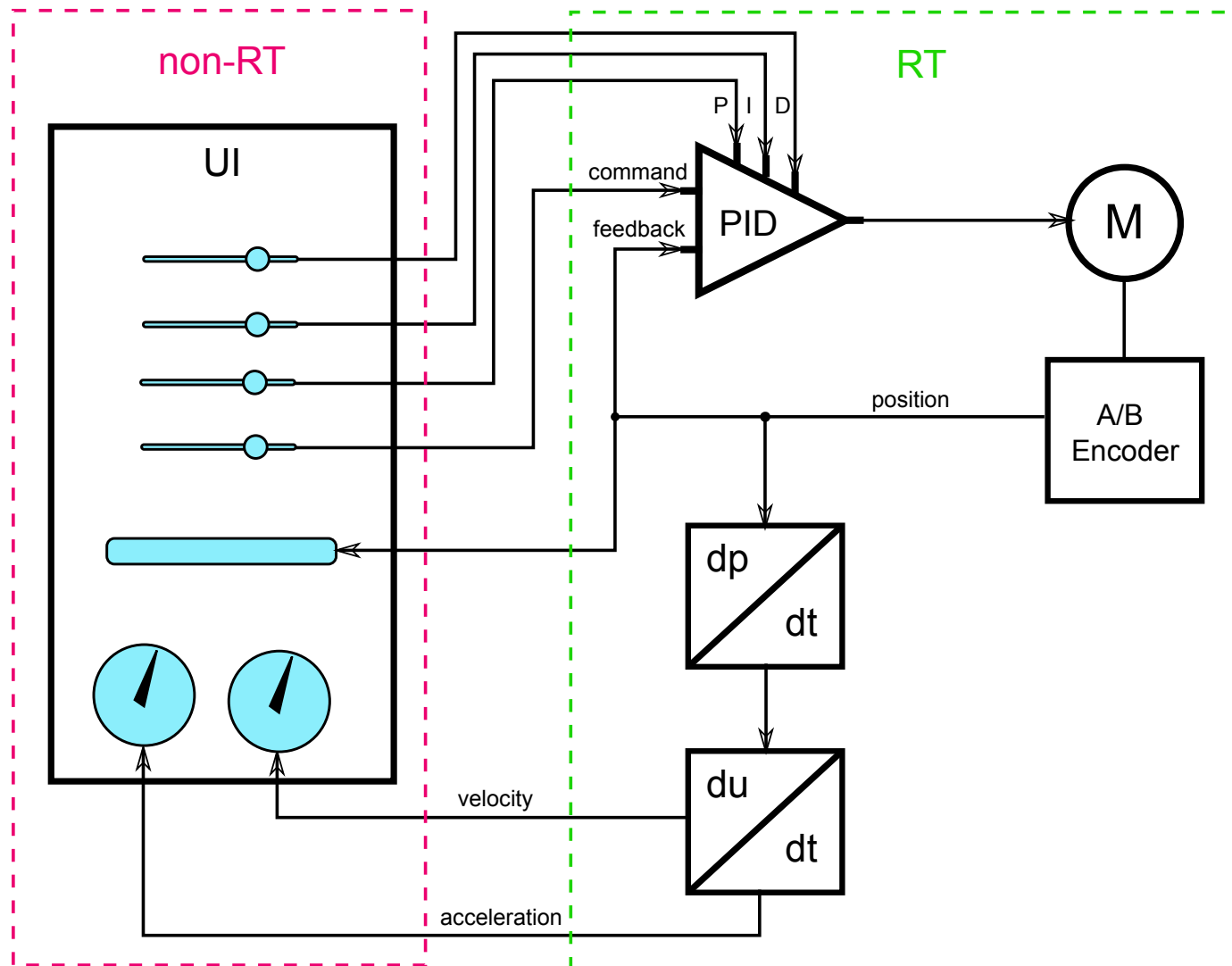


- Queued command and response
- RT to non-RT interface



A large teal speech bubble with a tail pointing towards the bottom-left corner, centered on a dark gray background.

SHOWTIME!



MORE INFORMATION



- **machinekit.io**
- **Machinekit on Google Groups**

A large teal speech bubble with a tail pointing towards the bottom left, centered on a dark gray background.

QUESTIONS?