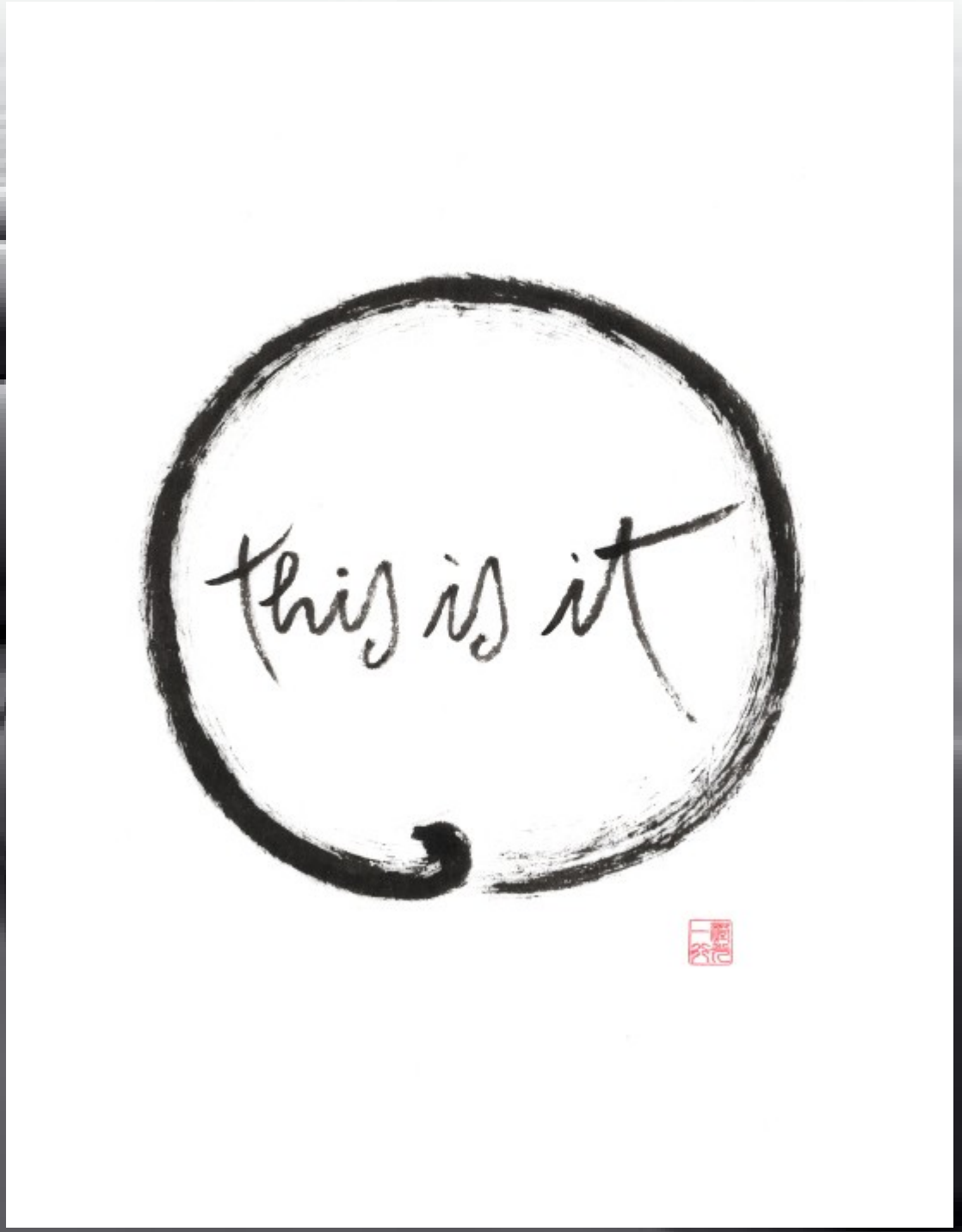
TANGO – can ZMQ replace CORBA?

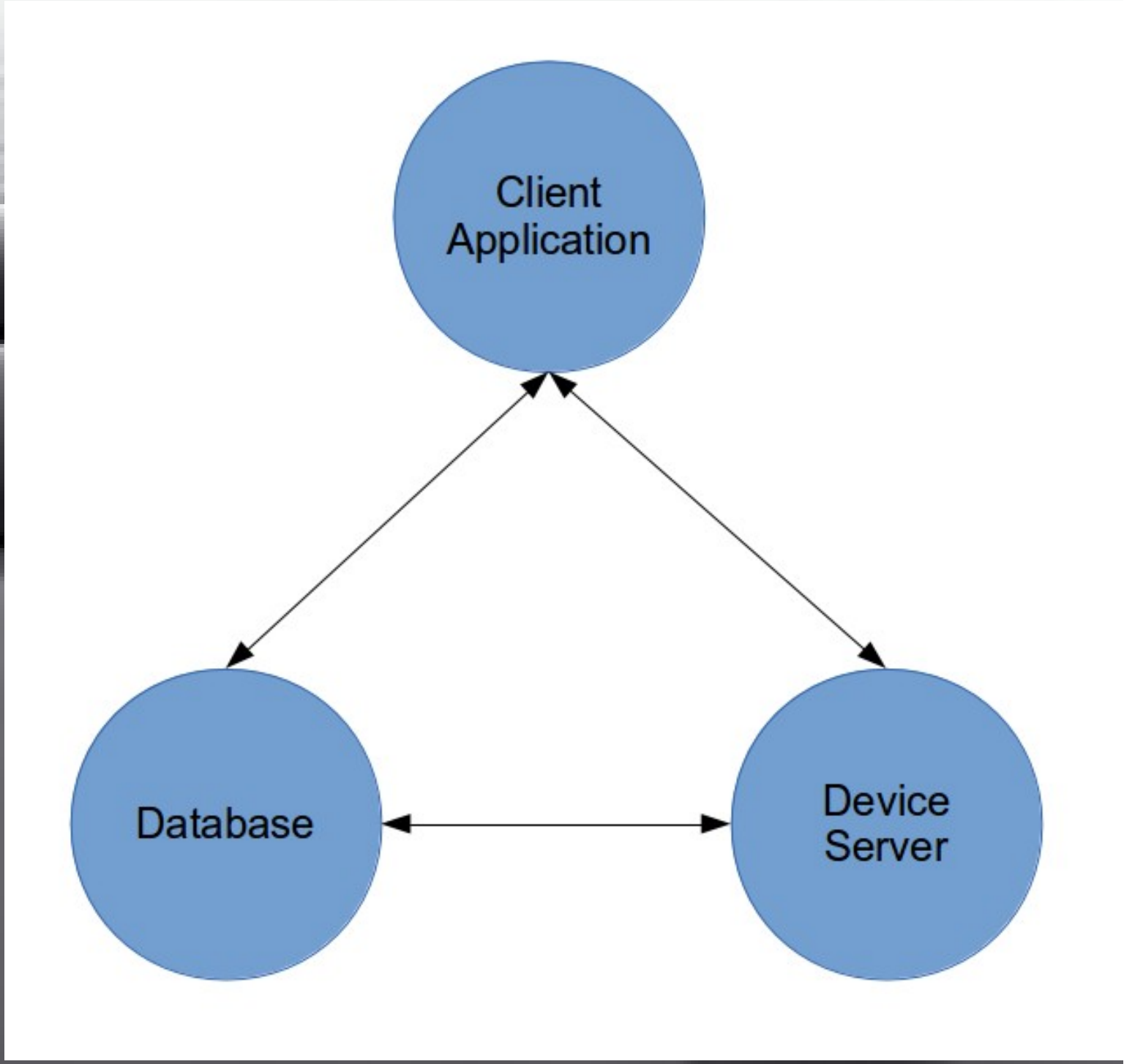
Ensō



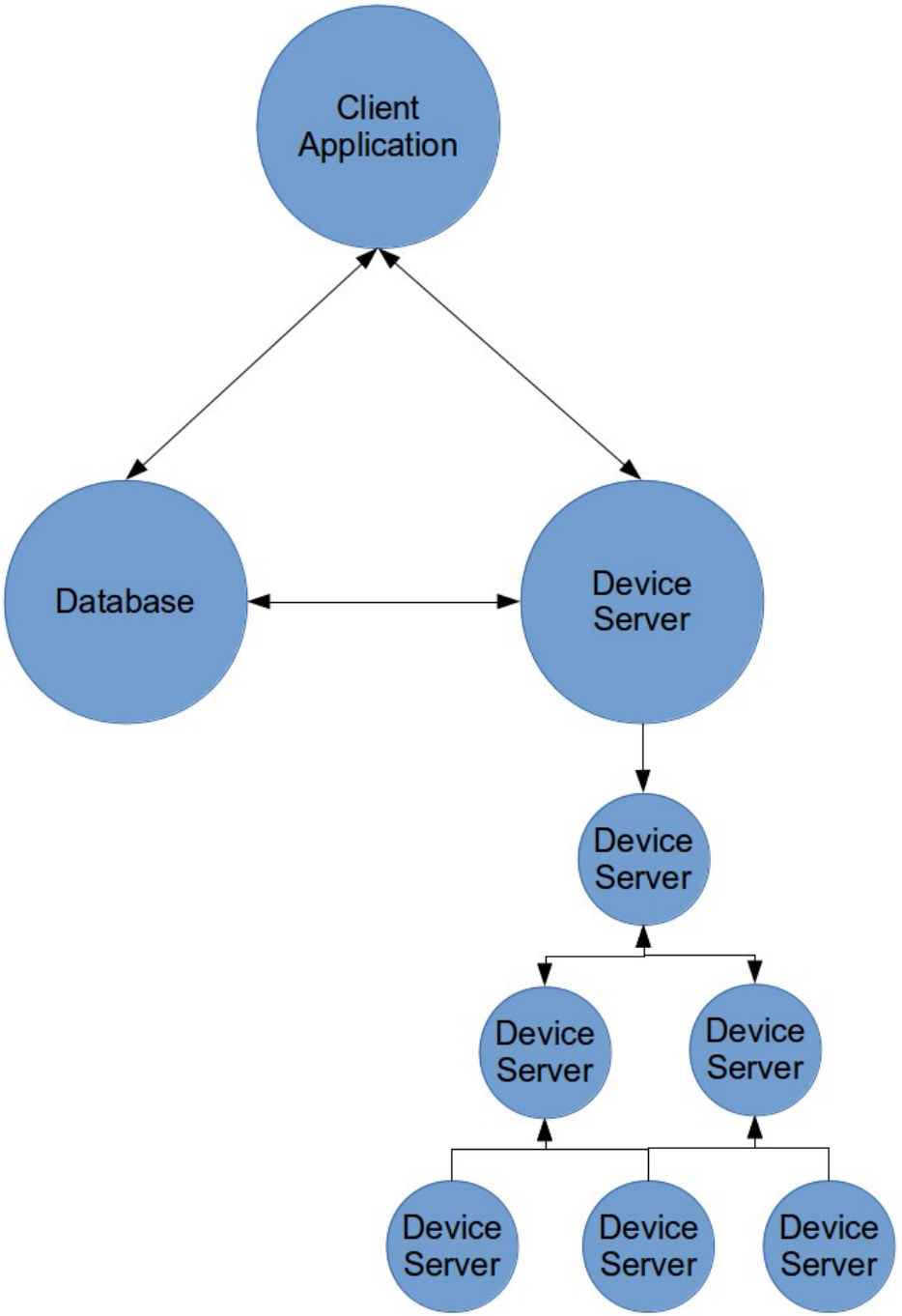
It takes 3 to TANGO

Connecting things together

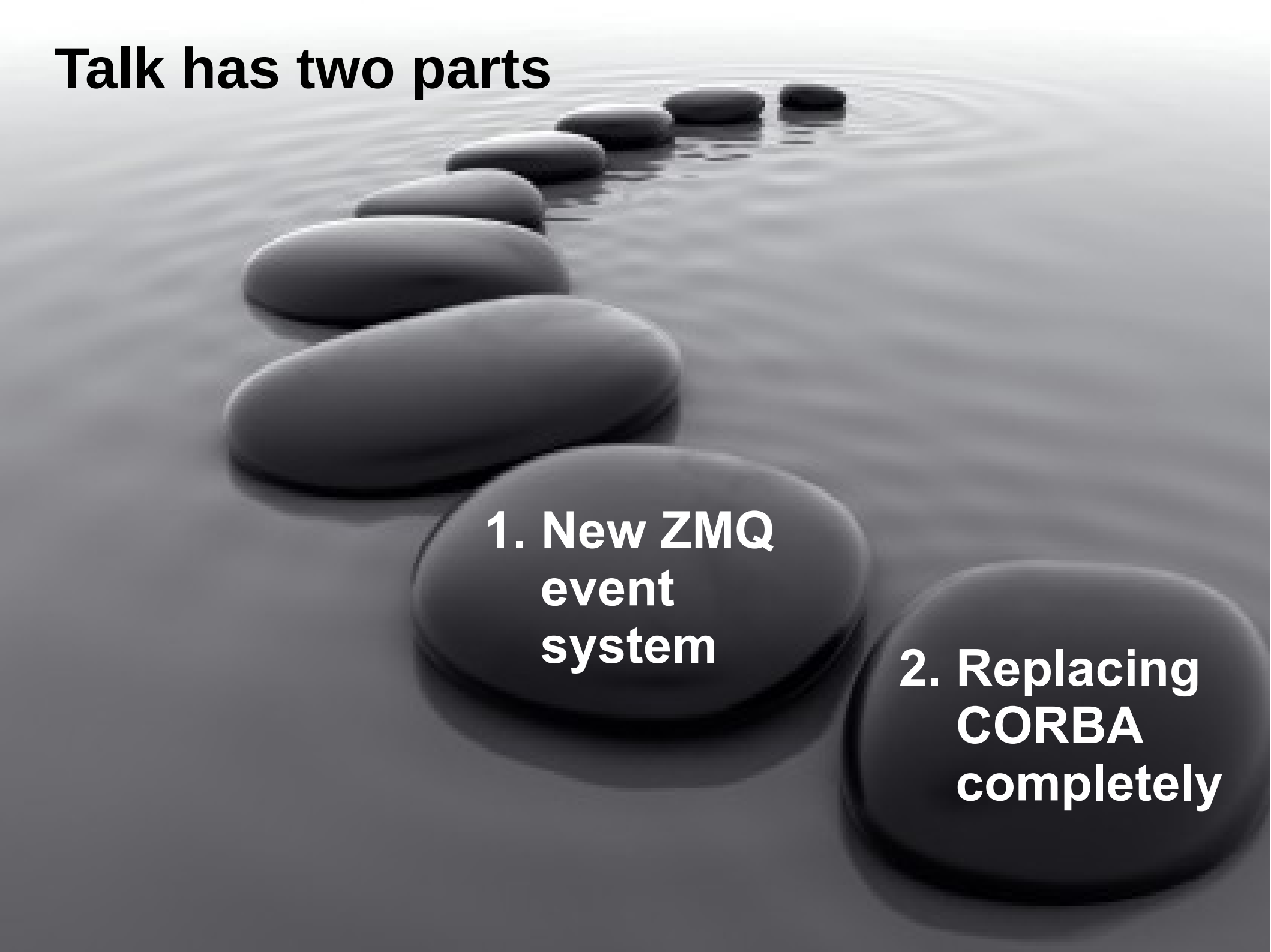
Simple Peer-to-Peer



Managing complexity simply



Talk has two parts



What is wrong with CORBA?

What is ZMQ ?

Library

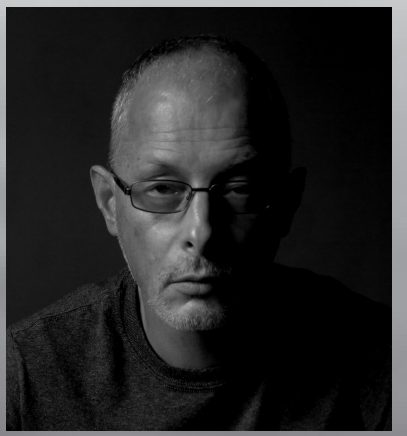
A protocol

Sockets on steroids

Concurrency framework

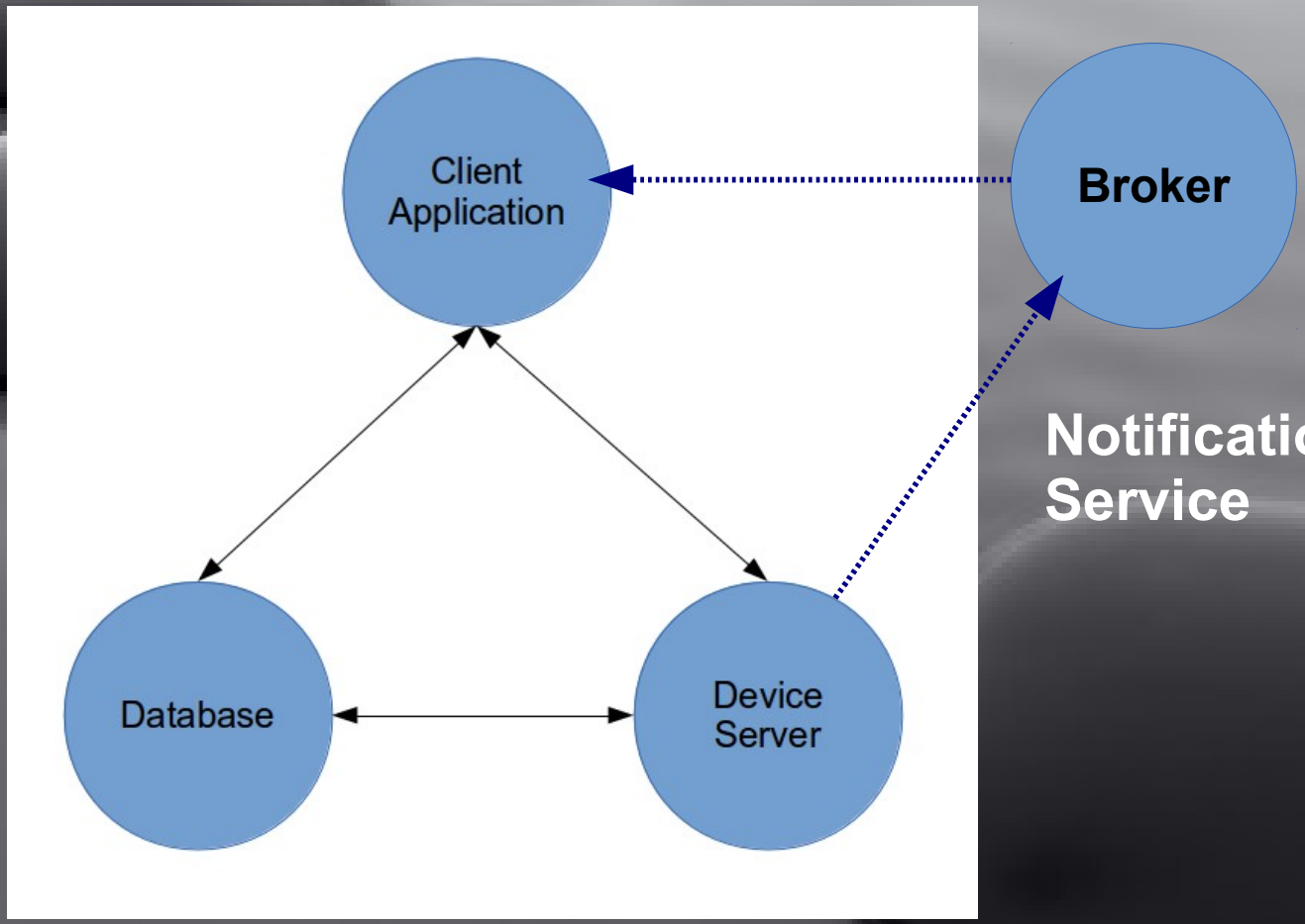
Asynchronous I/O
high performance
on multicores

http://hintjens.com/

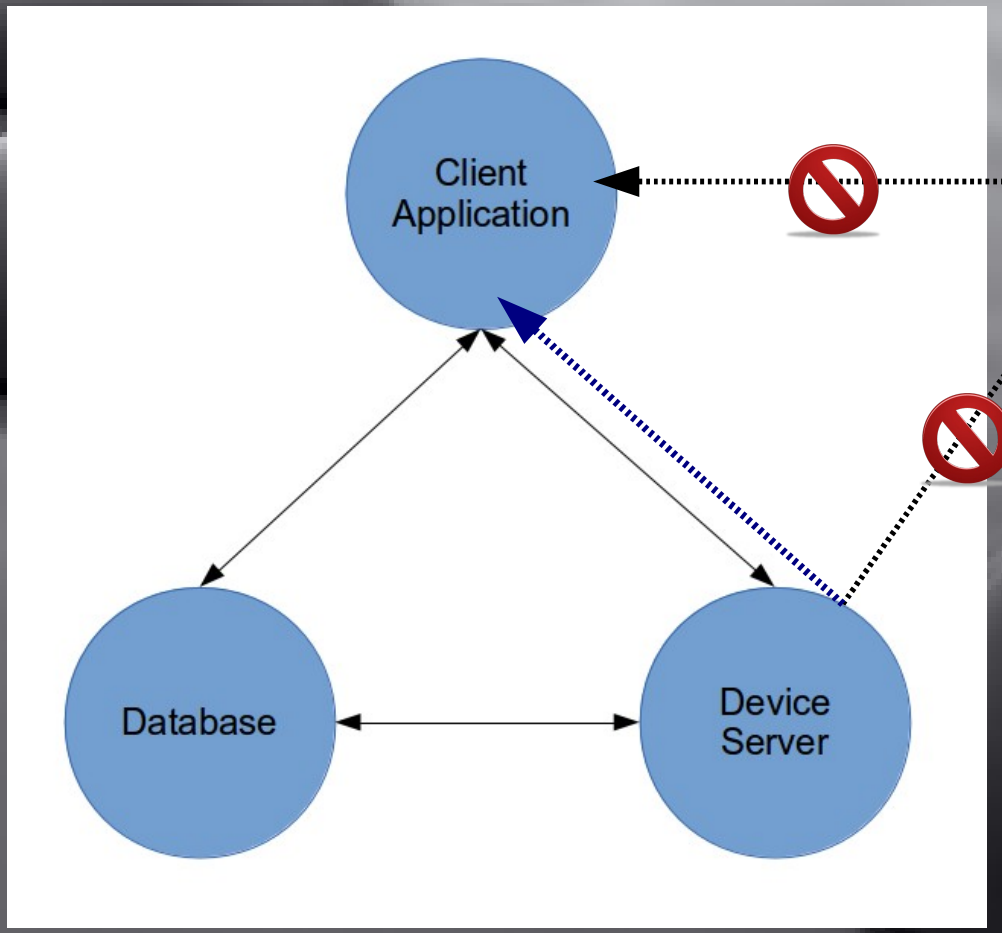


Pieter Hintjens

TANGO events based on Notification Service



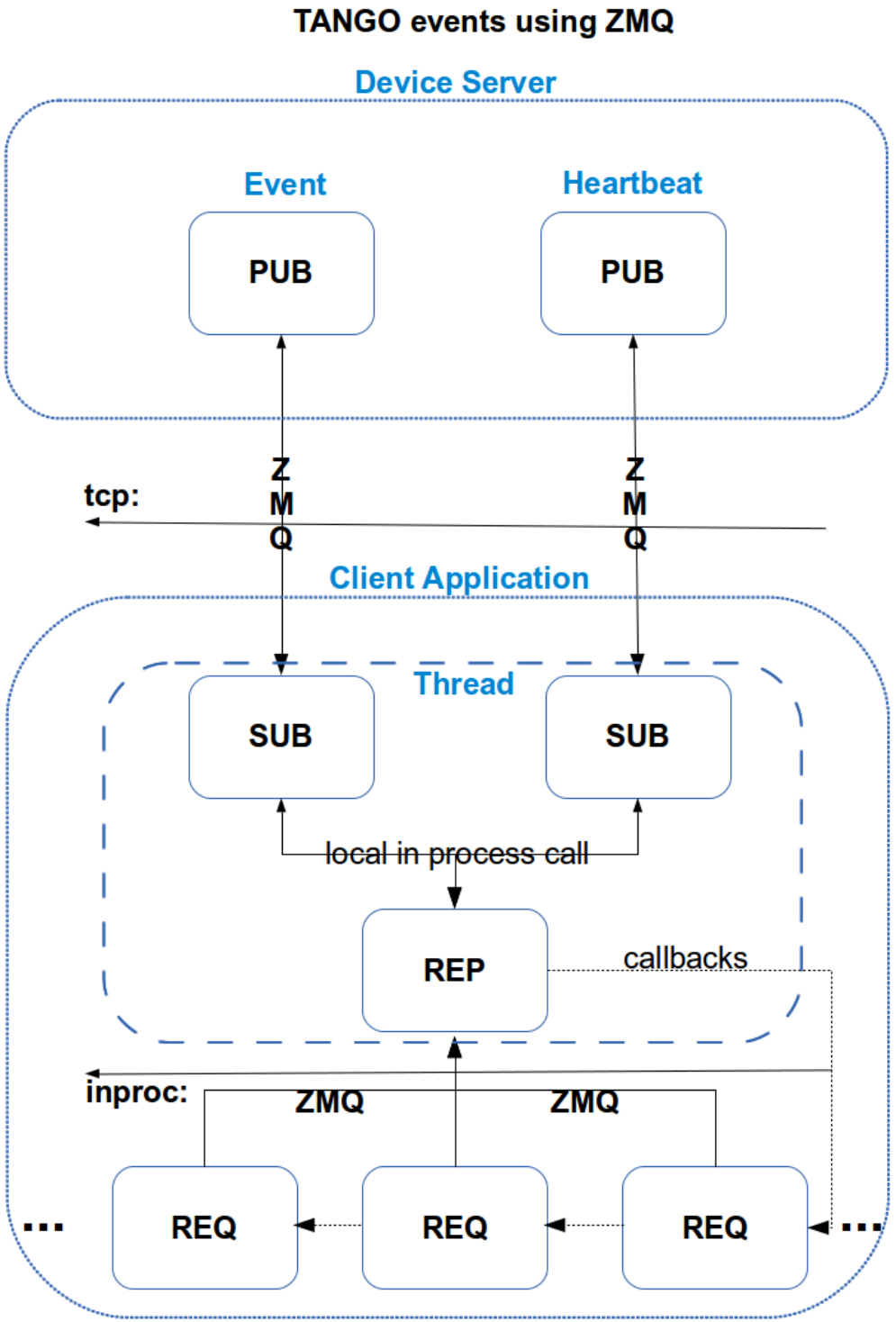
TANGO ZMQ events Remove Broker



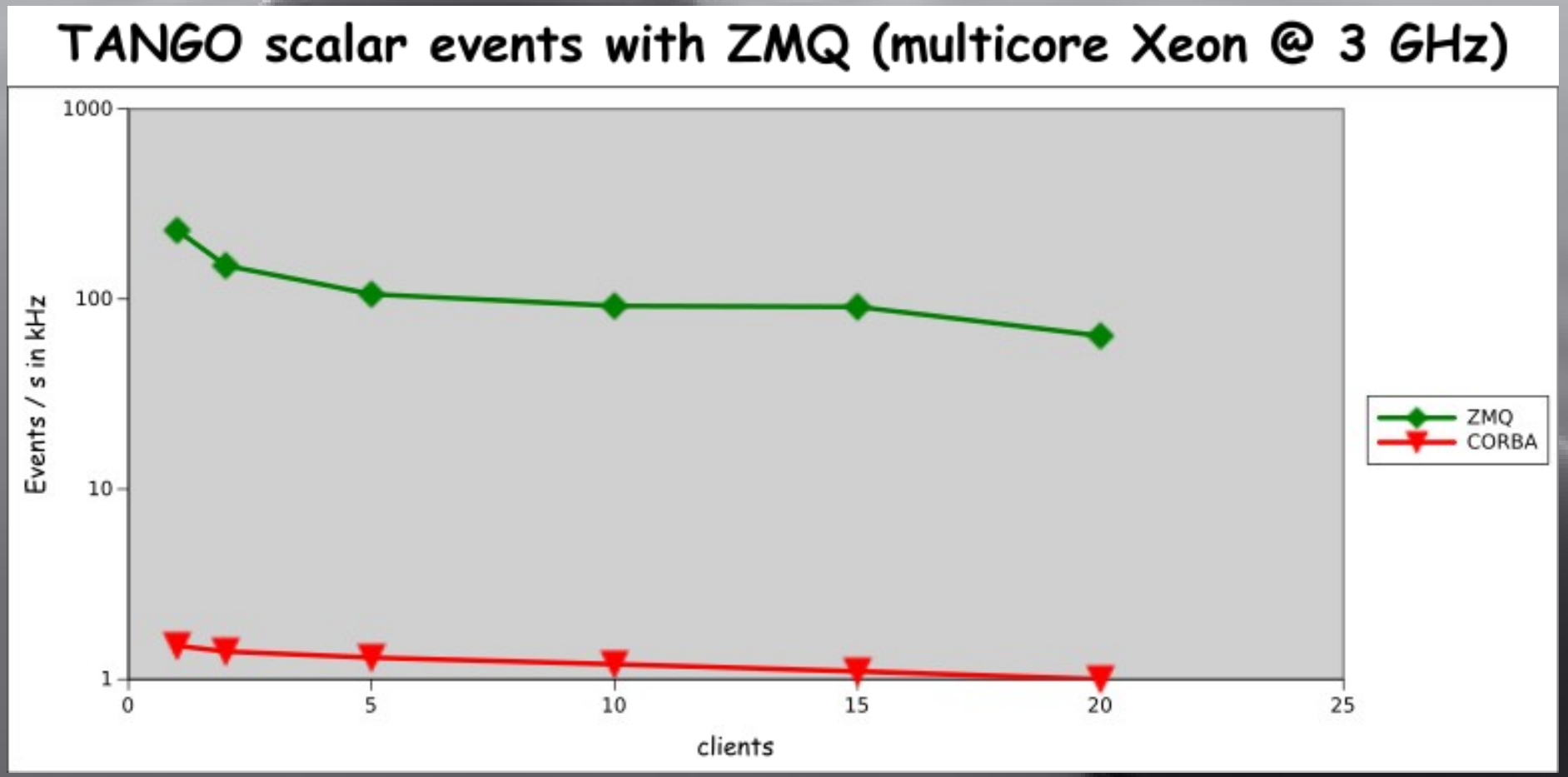
omniNotify
= dead project

TANGO ZMQ Events

- C++ and Java
- Few 1000 lines
- 18 months
- In 24/7 mode TANGO ≥ 8.1
- ZMQ ≥ 3.2

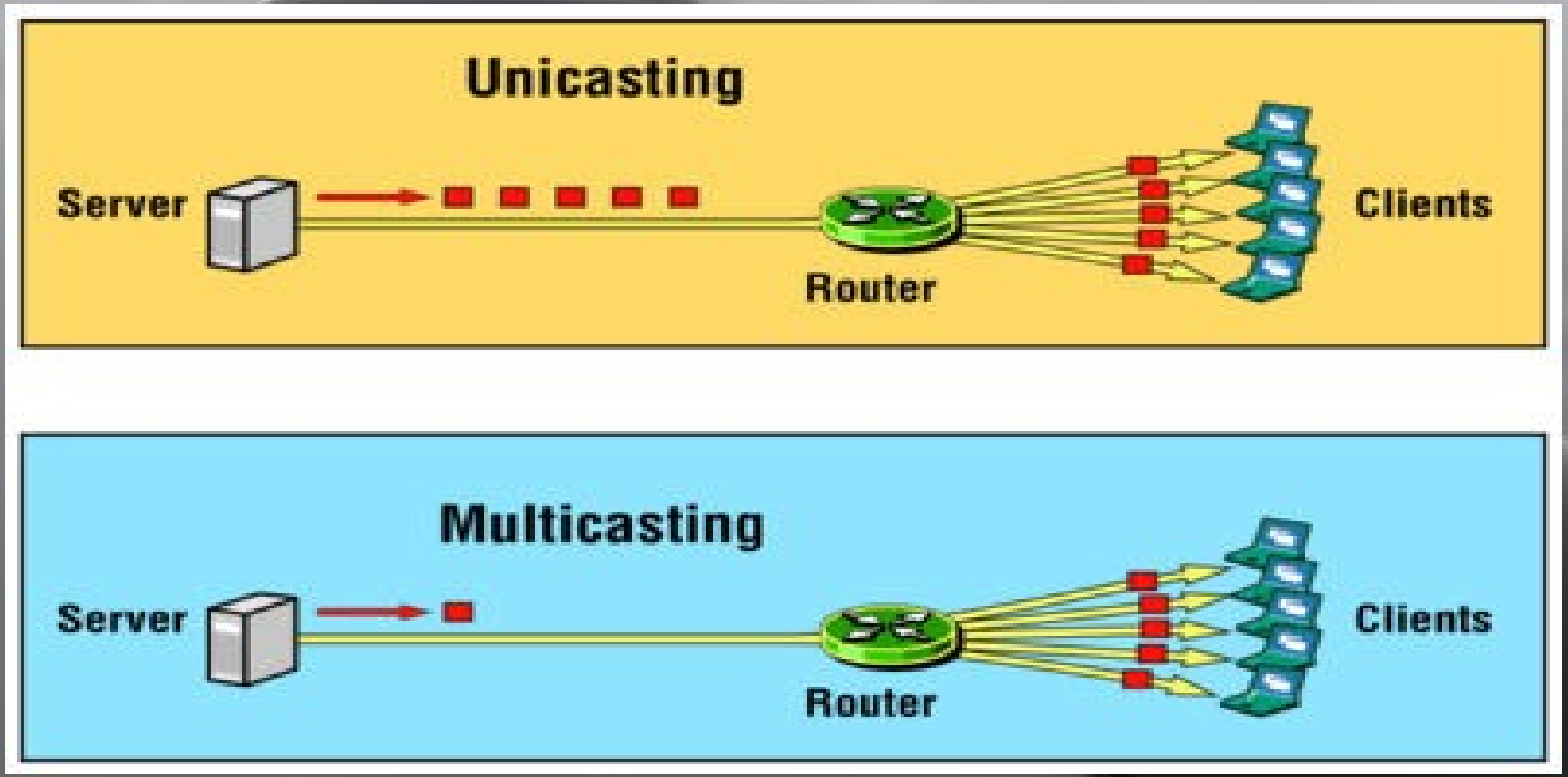


Why ZMQ ?



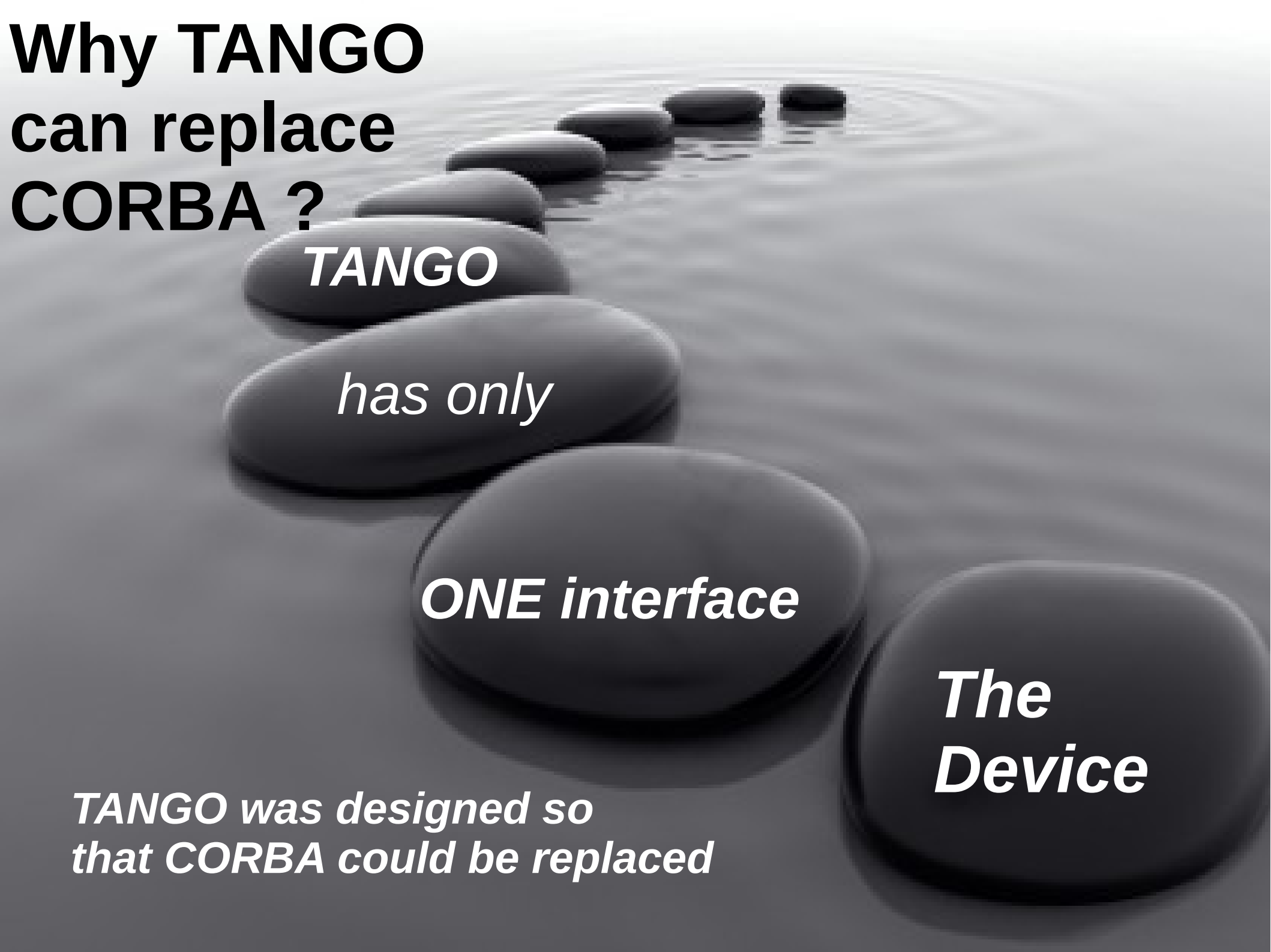
"What else ?"

Why ZMQ ?



Adds support for multi-casting

Why TANGO can replace CORBA ?



TANGO was designed so that CORBA could be replaced

TANGO uses in CORBA

1. IDL
2. IOR
3. DII
4. Corbaloc
5. Collocation
6. Interceptors
7. CDR serialisation
8. Binary performance
9. Multi-language bindings
10. OmniORB + JacORB threading
11. Synchronous calling mechanism

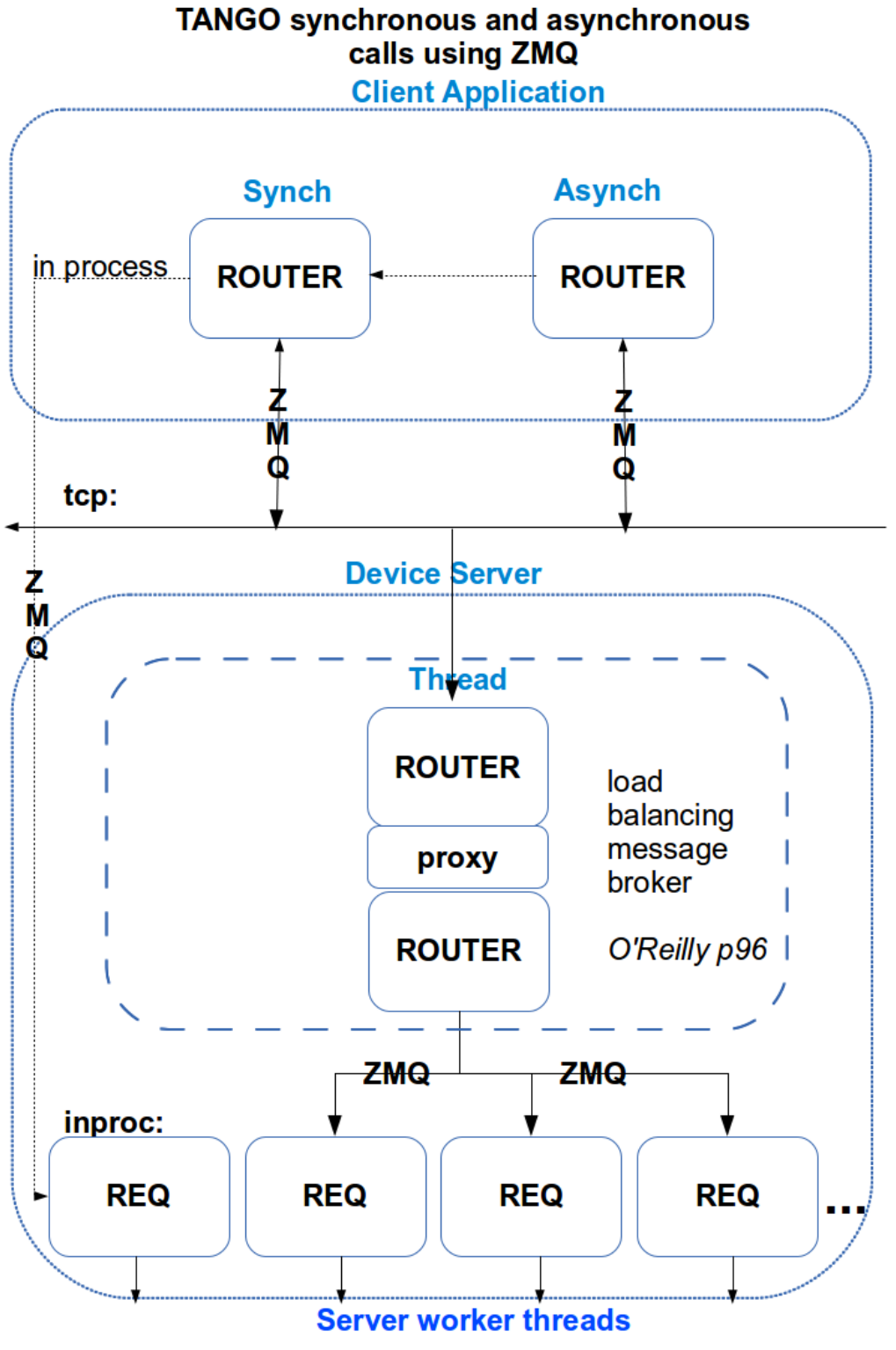
TANGO implements

1. Naming
2. Versioning
3. Persistence
4. Security
5. Startup
6. Logging
7. Polling
8. Caching
9. Rich Data types
10. Connection management

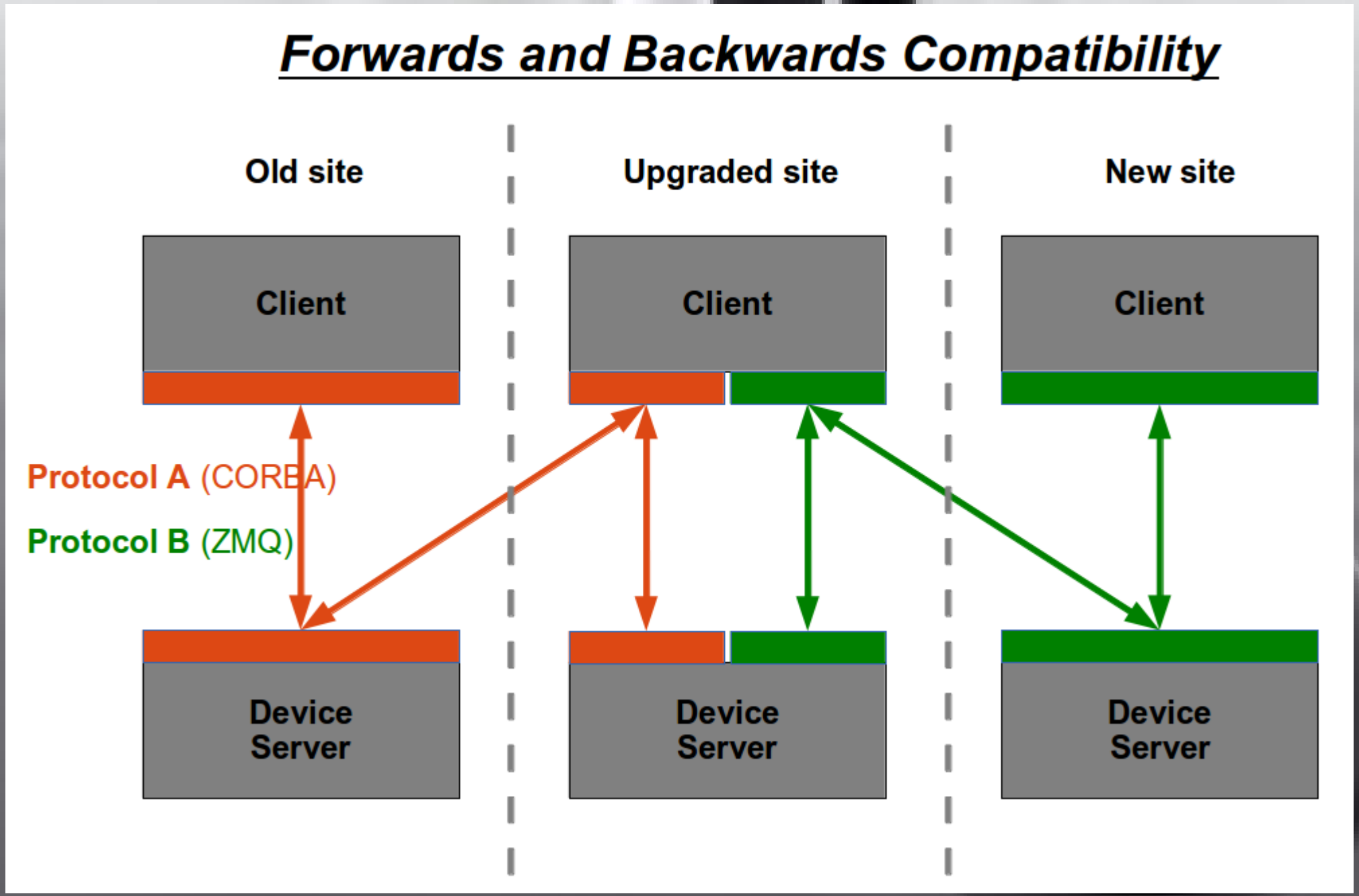
Replacing CORBA

1. **IDL –** ***TANGO** has only **ONE interface (Device)!***
2. **IOR –** replace with **<protocol>:<host><port><FQDN>**
3. **DII –** replace with **ROUTER-ROUTER** socket pattern
4. **Corbaloc –** same as for **IOR**
5. **Collocation –** replace with **<inproc>**
6. **CDR serialisation –** replace with **open source library**
7. **Binary performance – built-in** with **ZMQ**
8. **Multi-language bindings – built-in** with **ZMQ**
9. **OmniORB + JacORB threading –** use **ZMQ concurrency**
10. **Synchronous calling mechanism –** use **ROUTER**

Device Servers based on ZMQ



Key to adoption = Compatibility



What do we gain with ZMQ?

(1) **simplicity**

(2) **performance**

(3) support for **new protocols e.g. encryption, streaming, web, multi-casting, batching**

(4) **portability** for mobile and embedded platforms,

(5) larger more active **user community**

longer life time for TANGO due to more modern protocol

TANGO Protocol

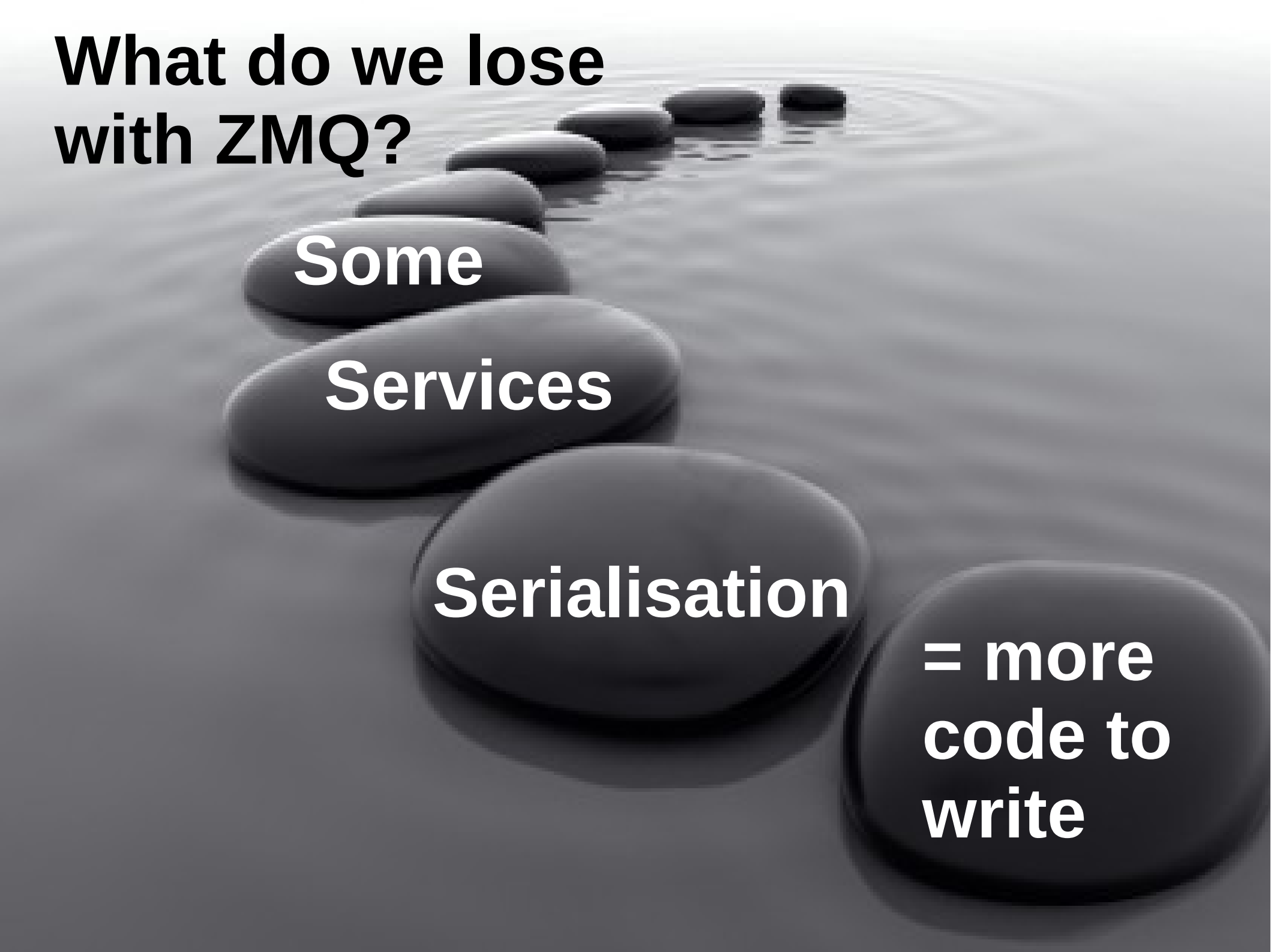
Devices on embedded platforms without Linux could publish the

TANGO protocol (TANGOP) using a protocol stack like *picotcp*

mbed LPC1768

Ethernet, USB and 32-bit ARM® Cortex™-M3 based

What do we lose with ZMQ?



Conclusion

- TANGO has successfully replaced the CORBA Notification service with a ZMQ event based system
- The performance increase can be up to 2 orders of magnitude
- Study of replacing CORBA completely in TANGO while maintaining backwards compatibility shows there are no show stoppers
- There are a number of advantages replacing CORBA completely with ZMQ not least of which are simplicity and ensuring TANGO stays modern

Next steps

- Implement prototype
- Present it to the community
- Community decides to adopt TANGO 2.0
- Implementation and testing in C++, Python and Java will take ≈ 24 person months