Why messaging is a good thing
When and how to use it

Muharem Hrnjadovic <muharem@openquake.org>
OpenQuake

Seismic hazard/risk, socio-economic impact

- Scaling seismic calculations
- Teams based in Zürich/CH and Pavia/Italy
- We are hiring: jobs@openquake.org
Main ideas

- Information bus for dynamic systems
  - Point-to-point (Queues)
  - Publish-subscribe (Topics)

http://www.eaipatterns.com/Messaging.html
Info bus for dynamic systems

Point to point

http://www.eaipatterns.com/PointToPointChannel.html
Info bus for dynamic systems

Publish/subscribe

http://www.eaipatterns.com/PublishSubscribeChannel.html
Messaging History

- Work started in the late 80s
- Popular in the financial industry
- But
  - Many proprietary systems (TIBCO, IBM MQseries, MSMQ)
  - Vendor lock-in
- JMS (API definitions)
Today

- AMQP
  - Open standard (like SMTP)
  - Pretty mature at this time
- Free and open source amqp brokers
  - RabbitMQ
  - ZeroMQ
  - qpid
decoupling

- time/space
- languages
- concerns

scaling

- performance
- availability
- deployment
- development
- agility
Connections and channels

- Single connection to broker
- Multiple channels

http://media.digikey.com/photos/General%20Cable%20Photos/C4070.41.10.jpg
Producers and consumers

Fanout exchange

Direct exchange

Topic exchange

Virtual host (vhost)

- A vhost contains
  - exchanges, queues and bindings
  - authentication & permissions
- Users may be registered with multiple vhosts

http://matcmadison.edu/files/users/kfoster3/seattle-mail-boxes.jpg
Are we there yet..?

http://www.pauldoolan.com/2011/05/running-from-boredom.html
Surviving a crash/reboot

- Surviving a reboot
- Exchanges, queues: durable
- Message delivery mode: persistent

There is a cost to persisting messages
- Use in moderation

http://picz.jikan.fr/2010/07/Bsod_nt.jpg
Resource management

- dynamic configuration of exchanges, queues & bindings
- declaring queues 2x is fine
- check existence by declaring with "passive" flag

Temporary resources

- temporary exchanges
- temporary queues
e.g. for RPC:
  - Private, auto-delete queues with unique names
  - Queue name in "reply_to" header

http://www.flickr.com/photos/clearwater88/with/4675557567/
Patterns!

- Enterprise Integration Patterns
- By Gregor Hohpe, Bobby Woolf
- 736 pages
Wake up! It's code time!!

https://github.com/al-maisan/ep11

1: RPC

- Private, temporary queue with unique name
- "reply_to" header to enable responses
- round robin of incoming messages
- Correlation ID

http://www.eaipatterns.com/RequestReply.html
Show the $%*\&**^$ code !!

2: Pipes and filters

- Series of queues
- One queue for failure reports

http://www.eaipatterns.com/PipesAndFilters.html
The code!!
3: Topic exchange

- pattern matching on routing keys
  - *.en.#
  - twitter.#

http://www.eaipatterns.com/PublishSubscribeChannel.html
Questions?

http://www.roflmachine.com/fun/argh.jpg