Introducing Vert.x 2.0

Burr Sutter

Red Hat

Burr Bio

- Burr Sutter – Product Management Director:
  - JBoss Developer Studio/JBoss Tools (Eclipse)
  - Aerogear
  - Vert.x
  - Hibernate Search
  - Arquillian
  - And: RichFaces, TorqueBox, Errai, Snowdrop, Seam
- 8 years as President of Atlanta Java Users Group
- Founder of DevNexus & Atlanta's IASA chapter
- Been part of the JBoss by Red Hat team since 2006

JBoss ++

JBoss AS → WildFly

HIBERNATE

jBPM

Drools

JBoss ESB → SWITCHYARD

JBoss Cache → Infinispan

Apache Camel

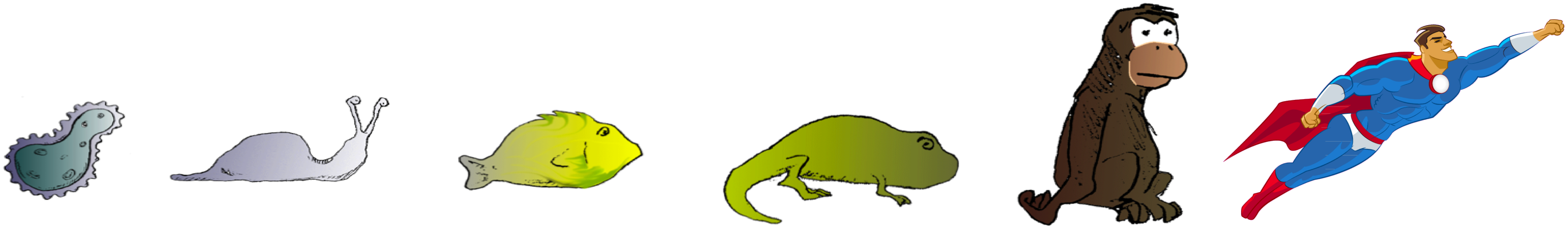
ActiveMQ

Apache CXF

VERT.X

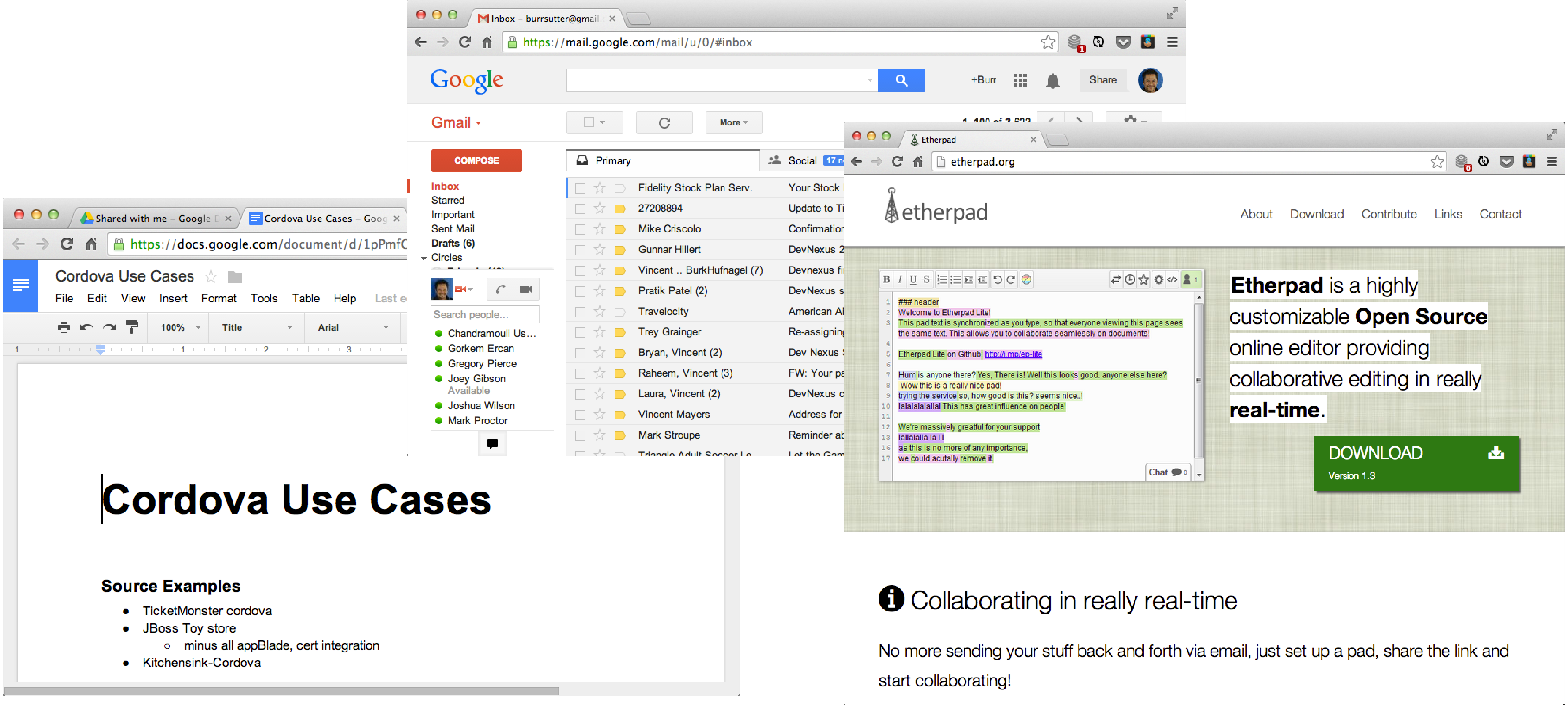
AeroGear

Programmer Evolution



70s	80s	90s	00s	10s
COBOL JCL WFL	C/C++ 4GLs RDBMS/SQL Unix	HTTP/HTML CGI GET/POST Cookies Java Servlet EJB Windows NT Solaris/AIX	MVC – Struts DI- Spring ORM – Hibernate XML WS-* JSF RIA/AJAX Agile Automated Testing CI SVN Linux	EE6 HTML5 Mobile iOS/Android Phonegap/Cordova Grails/Rails Scala/Clojure Maven/Gradle Git Node.js MongoDB/Redis Hadoop *-aaS
Batch	Interactive Distributed	GUI/Event Request/Response	AJAX Client	**Asynchronous** **Reactive**

Real-Time/Reactive/Async



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Cordova Use Cases – Goog
https://docs.google.com/document/d/1pPmfC
Cordova Use Cases
File Edit View Insert Format Tools Table Help Last e
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Cordova Use Cases

Source Examples

- TicketMonster cordova
- JBoss Toy store
  - minus all appBlade, cert integration
- Kitchensink-Cordova

Fidelity Stock Plan Serv. — Your Stock
27208894 — Update to Ti
Mike Criscolo — Confirmation
Gunnar Hillert — DevNexus 2
Vincent .. BurkHufnagel (7) — Devnexus fi
Pratik Patel (2) — DevNexus s
Travelocity — American Ai
Trey Grainger — Re-assigning
Bryan, Vincent (2) — Dev Nexus
Raheem, Vincent (3) — FW: Your pa
Laura, Vincent (2) — DevNexus c
Vincent Mayers — Address for
Mark Stroupe — Reminder ab
Triangle Adult Soccer Le — Let the Gam

```
### header
Welcome to Etherpad Lite!
This pad text is synchronized as you type, so that everyone viewing this page sees the same text. This allows you to collaborate seamlessly on documents!

Etherpad Lite on Github: http://j.mp/ep-lite

Hum is anyone there? Yes, There is! Well this looks good. anyone else here?
 Wow this is a really nice pad!
trying the service so, how good is this? seems nice..!
lalalalalallal This has great influence on people!

We're massively greatful for your support
lallalalla la l l
as this is no more of any importance,
we could acutally remove it.
```

Etherpad is a highly customizable **Open Source** online editor providing collaborative editing in really **real-time**.

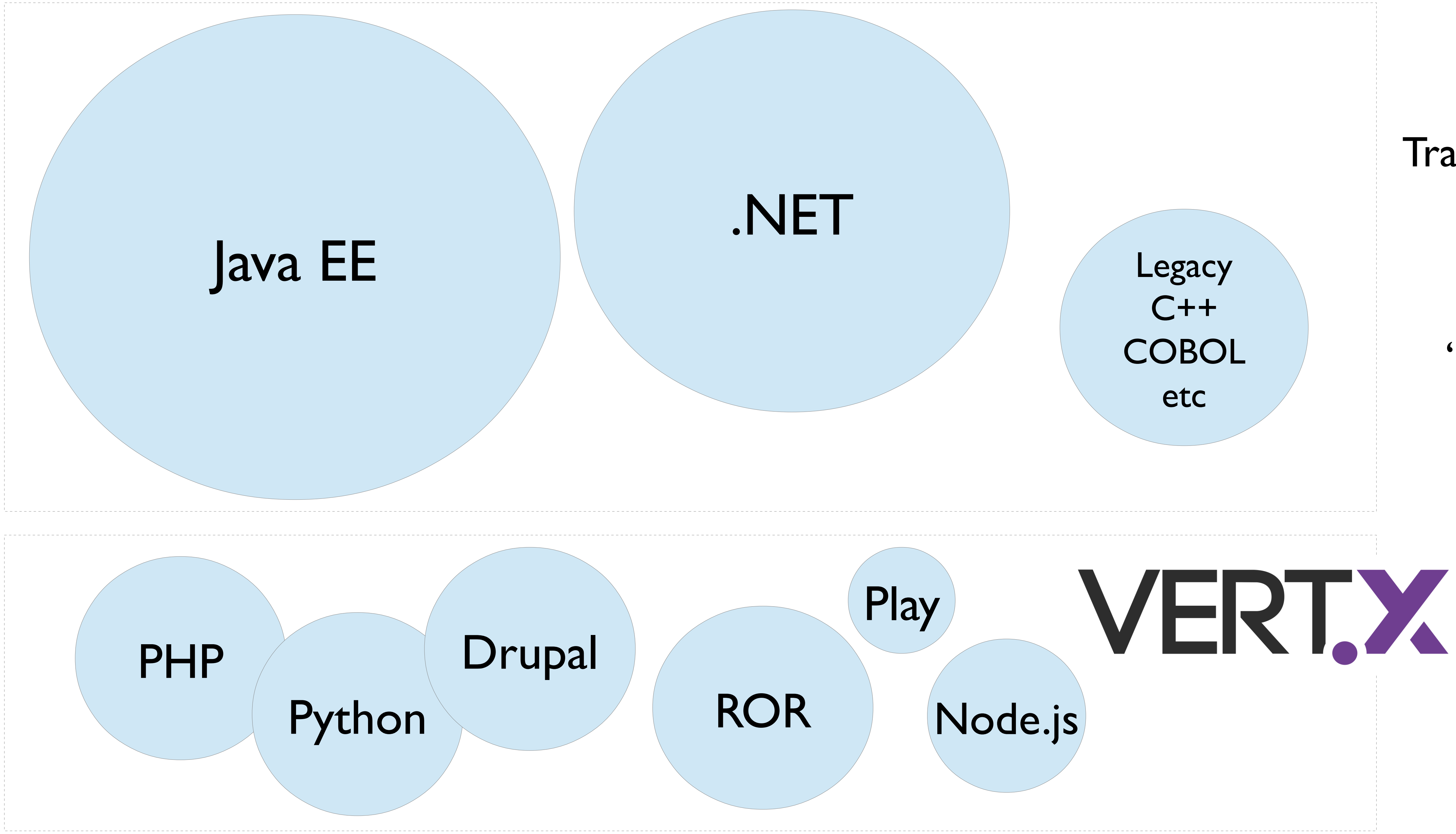
DOWNLOAD
Version 1.3

Collaborating in really real-time

No more sending your stuff back and forth via email, just set up a pad, share the link and start collaborating!

Enterprise IT Development

Standard Bearers



Java EE

.NET

Legacy
C++
COBOL
etc

Traditional Ops Focus
Maintaining
“Big Iron”
And
“Big Containers”

Agile Focused

PHP

Python

Drupal

ROR

Play

Node.js

VERT.X

DevOps Focus
Embeddability
Containerless
Automated

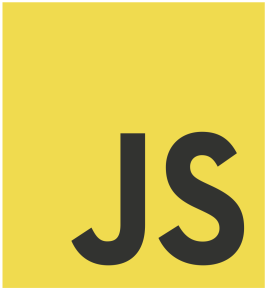
Asynchronous/Event-Driven/Reactive/Evented IO: Python Twisted & Tornado, Ruby EventMachine, Node.js

Vert.x Overview

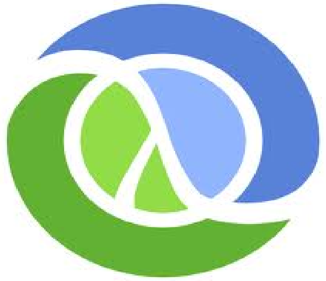
- Lightweight, reactive, application platform (5MB download)
- Superficially similar to Node.js - but not a clone!
- Inspired also from Erlang/OTP
- Polyglot
- High performance (see latest TechEmpower benchmarks!)
- Simple but not simplistic
- Embeddable

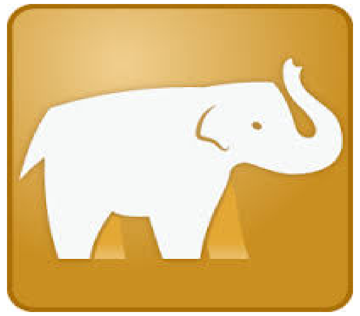
Polyglot

Full implementation:



Almost there:





Core Asynchronous APIs

- Core is small and static
- TCP/SSL clients and servers
- HTTP/HTTPS clients and servers
- Websockets, SockJS
- File system
- Event bus
- DNS (new)
- UDP (new)
- etc

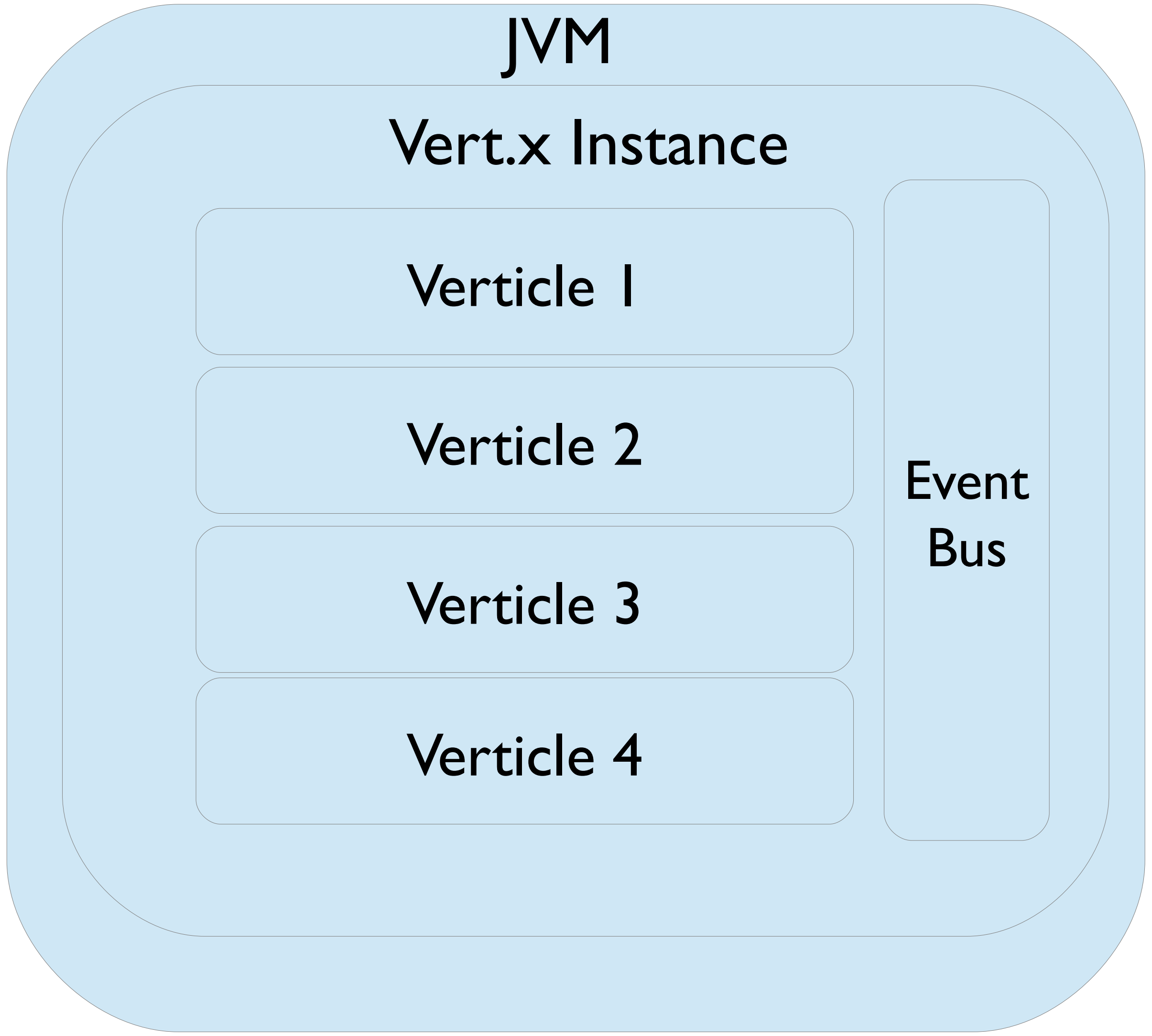
Why Asynchronous?

- Modern servers need to handle high levels of concurrency – web servers, websockets, IoT etc
- OS threads are still a precious resource
- Need to service many connections with small number of threads
- Blocked OS threads means they can't do other work

Verticle

- Execution unit of Vert.x
- Can be written in any language
- Single threaded – less scope for race conditions
- Verticles communicate by message passing
- Hmmm.. sounds like the Actor Model?

Vert.x Verticle



A Verticle is always executed on the same thread

A single thread may execute several verticles – event loop

A Verticle Instance normally starts 1 thread/event-loop per core

Demo

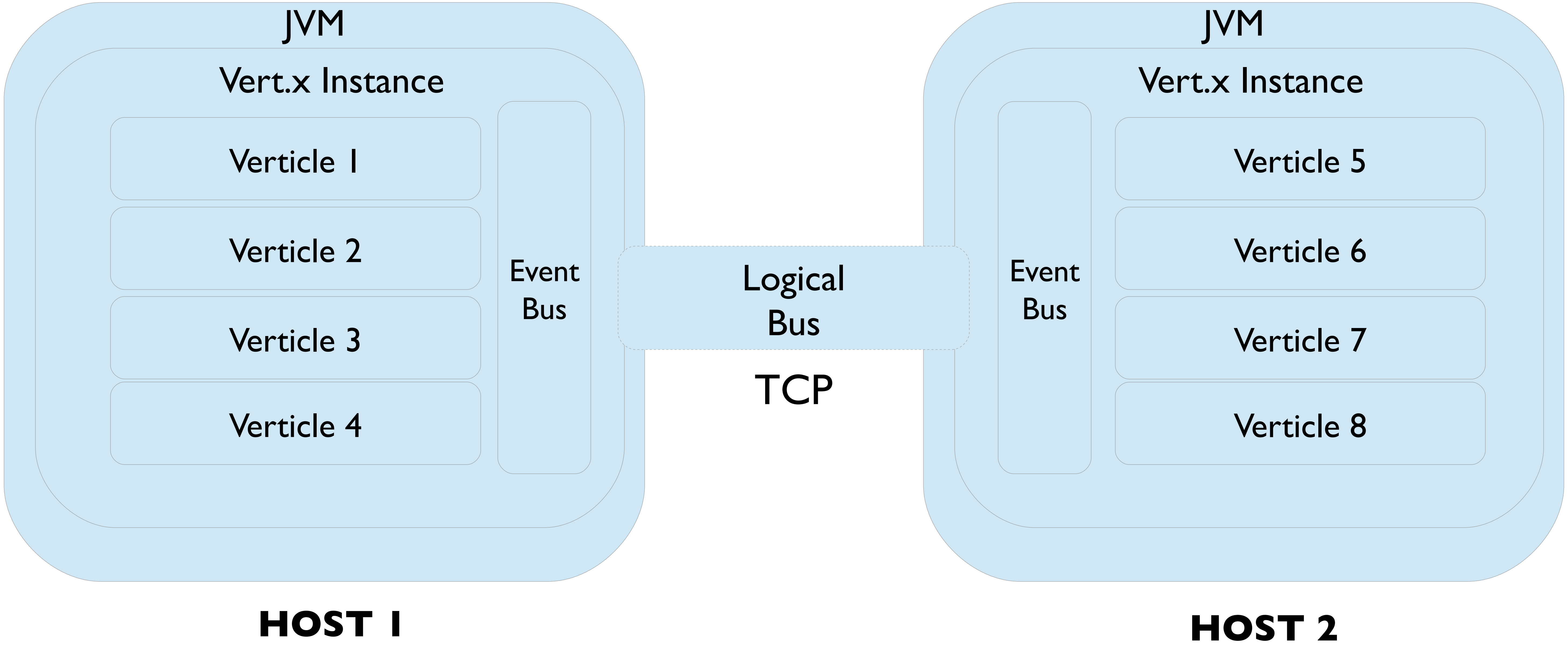
Event Bus

- The nervous system of Vert.x
- Verticles send messages over the event bus
- Point to point. Publish/Subscribe. Request/Response
- Pass strings, buffers, primitive types or JSON
- JSON messages are preferred for structured data

Clustered Event Bus

- Lightweight peer-to-peer messaging system
- Connects multiple Vert.x JVM instances
- Applications are loosely coupled components distributed across your network
- No monolithic "application server"
- Cluster manager is pluggable, default is Hazelcast

Clustered Event Bus



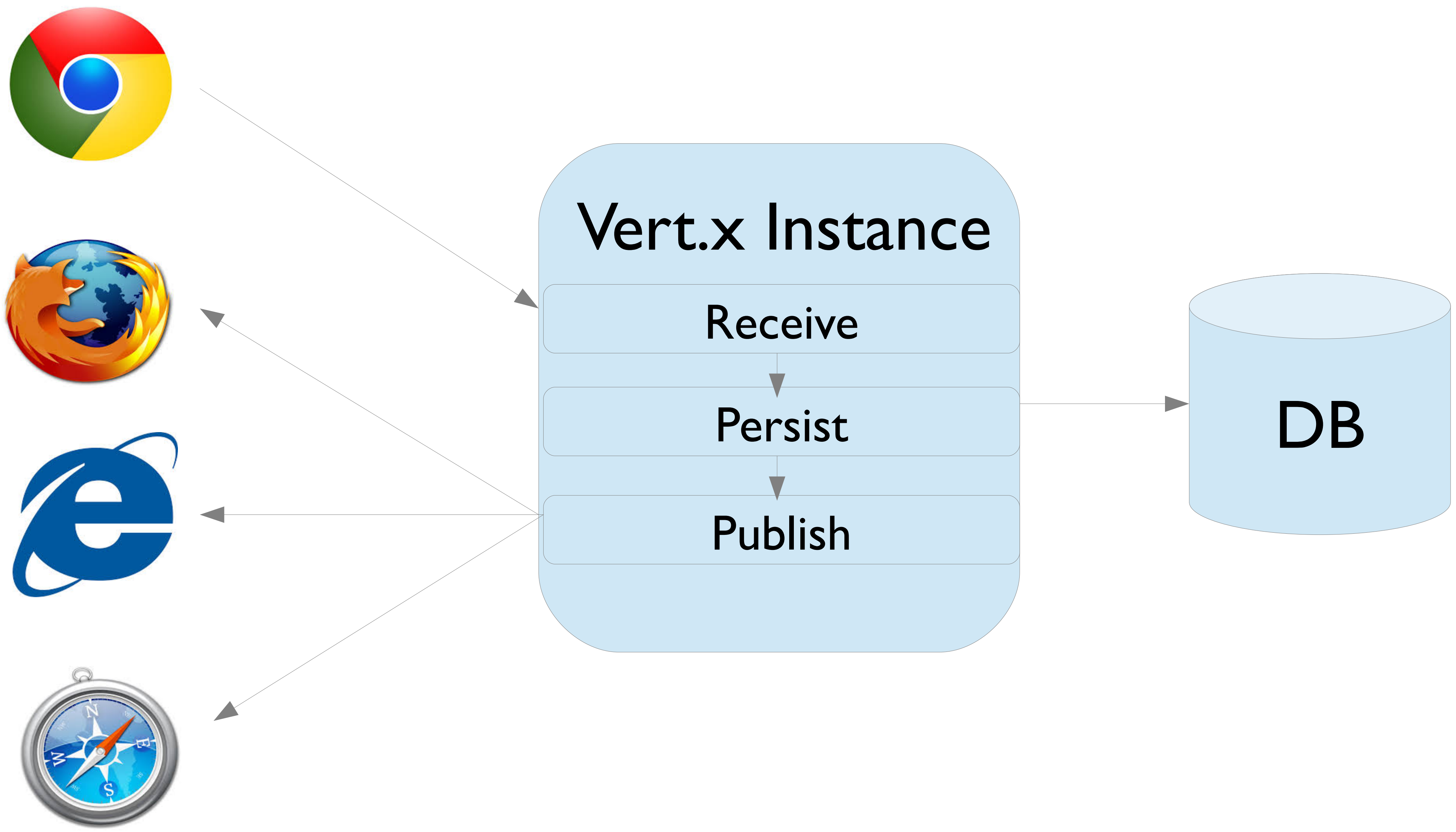
Hazelcast for cluster member discovery

Demo

Event bus in the Browser

- Event bus extends to *client side* JavaScript too
- Uses the same API on the client
- Powerful distributed event space spanning both client and server nodes
- Ideal for modern “real-time” web applications
- Use whatever client side toolkit you prefer (e.g. jQuery, Backbone, AngularJS, etc)

Browser Event Bus

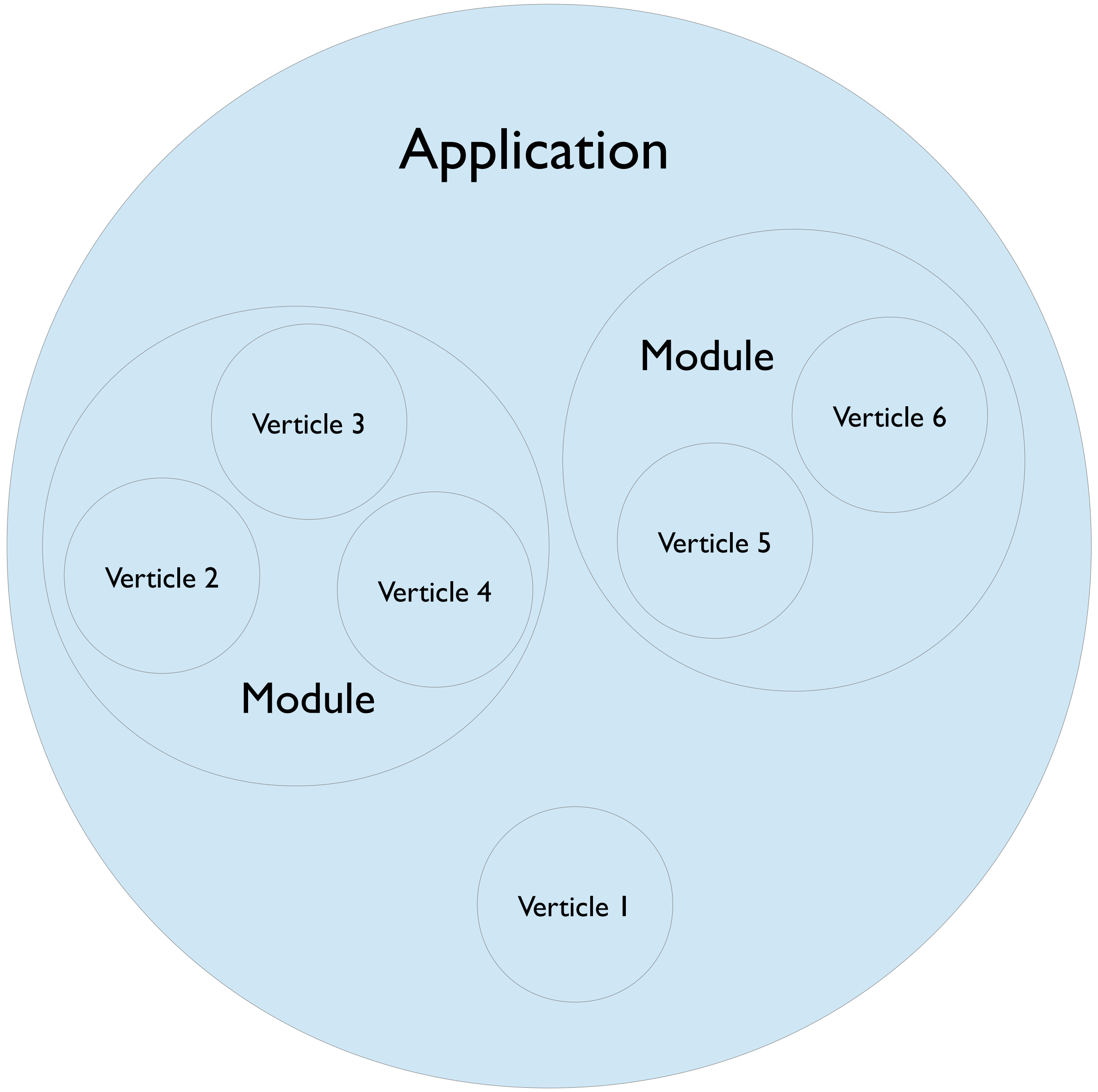


Demo

Modules

- Modules encapsulate code and resources
- One or more modules per application
- Must include a mod.json descriptor file
- Modules contain zero or more verticles
- Can be runnable or non runnable
- Module class-loaders provide isolation

Vert.x Modules



Packaging: encapsulate code & resources

With a specific folder name
com.yourcompany~module-name~1.0-beta1

Add a mod.json descriptor

Module class-loader isolation

Runnable and non-runnable (library)

Publishable to your Maven Repository for reuse

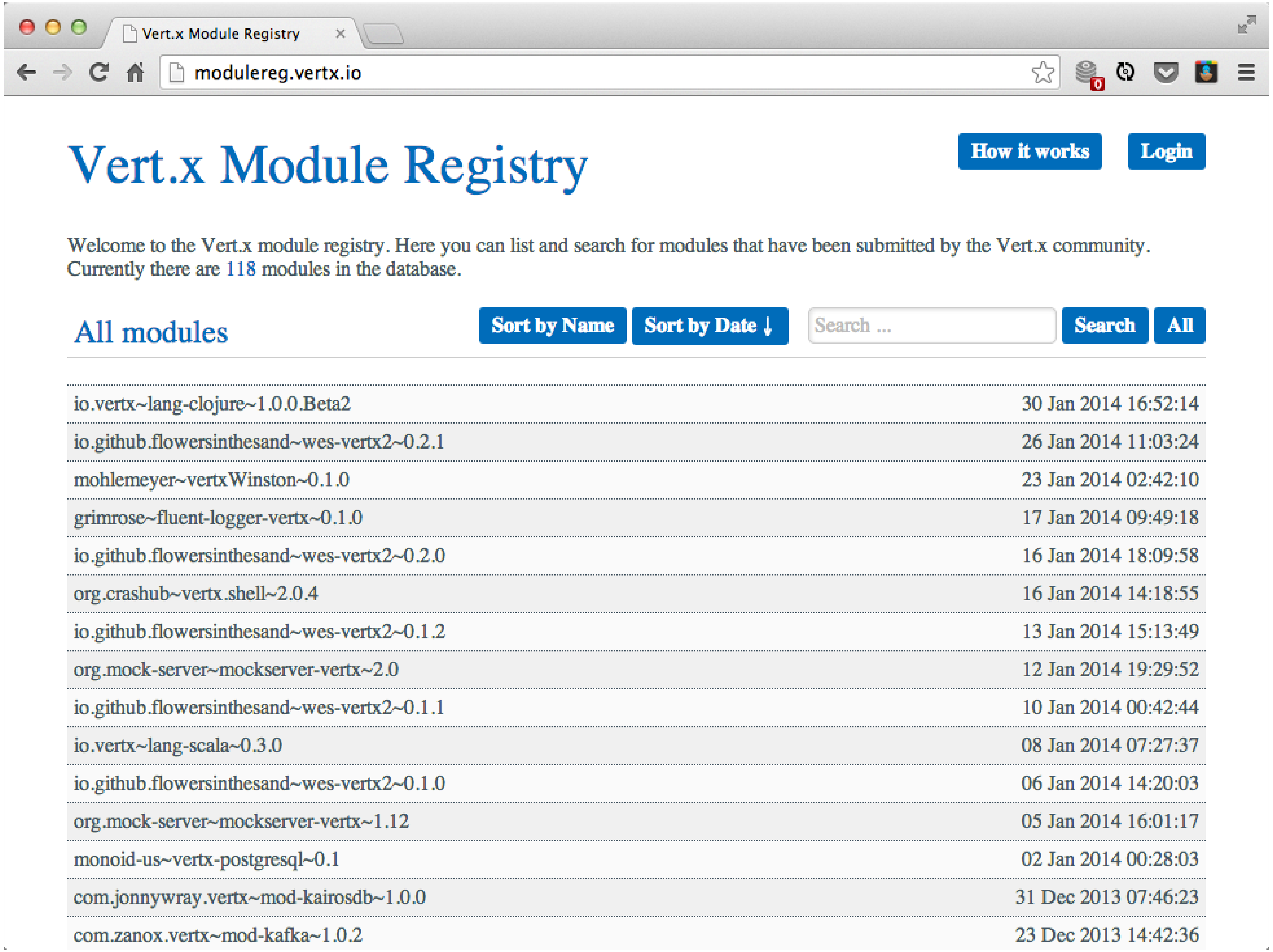
Demo

An ecosystem of modules

- Sharing modules encourages reuse
- Modules can be pushed to any Maven or Bintray repository
- Vert.x can resolve modules at build time or run time
- Encourage an ecosystem of modules
- Register your modules in the registry
- Modules are the lego bricks to create your application

It's all about the modules

MongoDB
Redis
MySQL/PostgreSQL
SMTP
JDBC
Jersey
Promises
Guice
Spring
Vertigo
Metrics
Facebook
Yoke
Kafka
BSON
work-queue
NoDyn
GCM
SocketIO
Sessions
Via
RxJava



Vert.x Module Registry

Welcome to the Vert.x module registry. Here you can list and search for modules that have been submitted by the Vert.x community. Currently there are 118 modules in the database.

All modules

io.vertx~lang-clojure~1.0.0.Beta2	30 Jan 2014 16:52:14
io.github.flowersinthesand~wes-vertx2~0.2.1	26 Jan 2014 11:03:24
mohlemeyer~vertxWinston~0.1.0	23 Jan 2014 02:42:10
grimrose~fluent-logger-vertx~0.1.0	17 Jan 2014 09:49:18
io.github.flowersinthesand~wes-vertx2~0.2.0	16 Jan 2014 18:09:58
org.crashub~vertx.shell~2.0.4	16 Jan 2014 14:18:55
io.github.flowersinthesand~wes-vertx2~0.1.2	13 Jan 2014 15:13:49
org.mock-server~mockserver-vertx~2.0	12 Jan 2014 19:29:52
io.github.flowersinthesand~wes-vertx2~0.1.1	10 Jan 2014 00:42:44
io.vertx~lang-scala~0.3.0	08 Jan 2014 07:27:37
io.github.flowersinthesand~wes-vertx2~0.1.0	06 Jan 2014 14:20:03
org.mock-server~mockserver-vertx~1.12	05 Jan 2014 16:01:17
monoid-us~vertx-postgresql~0.1	02 Jan 2014 00:28:03
com.jonnywray.vertx~mod-kairosdb~1.0.0	31 Dec 2013 07:46:23
com.zanox.vertx~mod-kafka~1.0.2	23 Dec 2013 14:42:36

Fat jars

- Build module into self contained "fat" executable jar
- Convenient for devops
- Fairly small overhead ~ 4.7 MB

```
vertx pulldeps io.vertx~example-web-app~1.0
vertx fatjar io.vertx~example-web-app~1.0
java -jar example-web-app-1.0-fat.jar
```

Demo

High Availability

- Automatic failover of deployed modules
- Nodes can be logically grouped
- Network partition detection (quorum)

Demo

Developing with Vert.x

- Vert.x is IDE and build system agnostic
- Can just use a text editor if you like
- Maven archetype
- Gradle template
- Debug and test in IDE
- Module auto-redeploy during development

Demo

Summary

- Write apps as set of loosely coupled components that live *anywhere* where you want
- Polyglot – use the language(s) you want
- Simple concurrency – wave goodbye to most race conditions
- Modules – a library of lego bricks to build apps with
- High availability
- Ease of development

Project Info

- Independent Community Project
- The main project is an Eclipse Foundation project
- All code is on GitHub
- 100% open source (ASL 2.0 + Creative Commons)
- One of the most popular Java projects on GitHub

Get involved!

- Loads more to do
- Very active and growing community
- Find us on GitHub
  https://github.com/vert-x
- Google group: vertx
- IRC channel: #vertx on freenode.net

Q & A