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# Multitenant ActiveMQ

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**A P A C H E C O N**  
NORTH AMERICA

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@hgz

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# Intro

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Top Level Project since Jan 17th, 2007.

Apache ActiveMQ is fast, supports many **Cross Language Clients and Protocols**, comes with easy to use **Enterprise Integration Patterns** and many **advanced features** while fully supporting **JMS 1.1** and J2EE 1.4. Apache ActiveMQ is released under the **Apache 2.0 License**.



# Features

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- ✓ Fast
- ✓ Mature
- ✓ Robust
- ✓ Secure
- ✓ Scalable
- ✓ Extensible



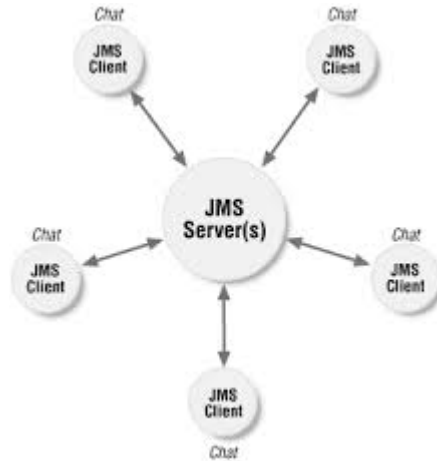
# Product or Framework?

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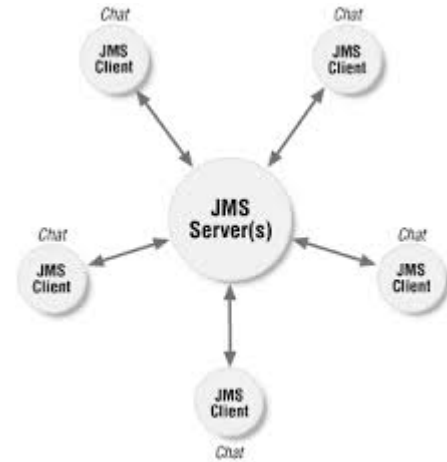
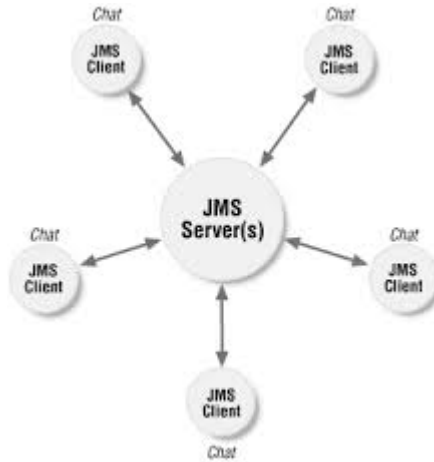
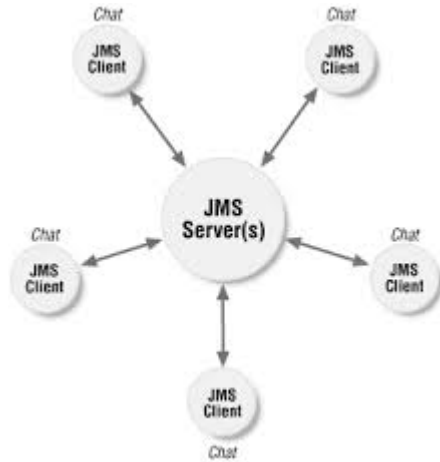
# A JMS Application

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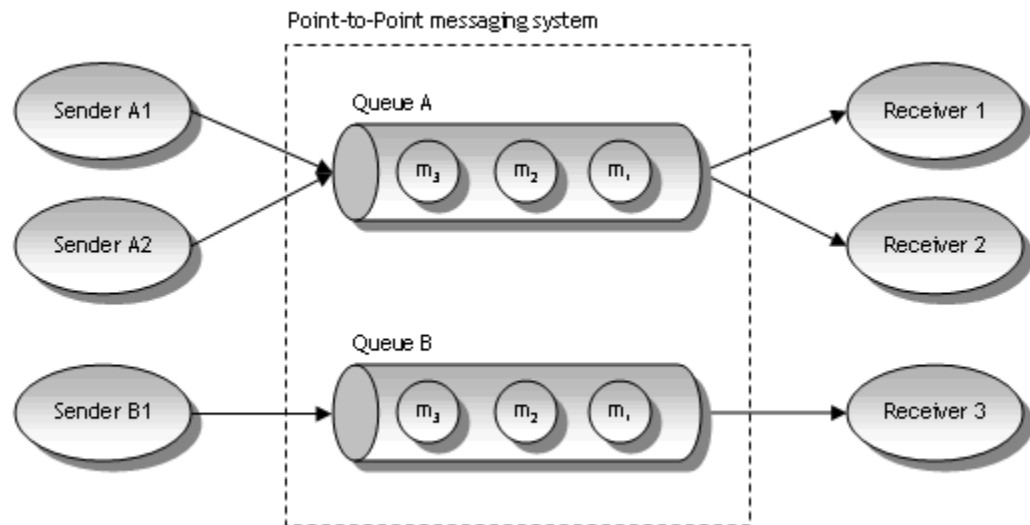
# ... and other JMS Applications

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# The problem

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# What we'd like

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# What we got

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# What we really need

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# Options

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# Configuring Brokers

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```
activemq xbean:file:../conf/myConfig.xml
```

```
<beans ... >  
  <bean class="org.springframework.beans.factory.config.PropertyPlaceholderConfigurer"> ... </bean>  
  
  <broker brokerName="localhost" dataDirectory="${activemq.data}"> ...  
    <destinationPolicy> ... </destinationPolicy>  
    <managementContext> ... </managementContext>  
    <persistenceAdapter> ... </persistenceAdapter>  
    <systemUsage> ... </systemUsage>  
    <transportConnectors> ... </transportConnectors>  
    <networkConnectors> ... </networkConnectors>  
    <shutdownHooks> ... </shutdownHooks>  
  </broker>  
</beans>
```

<http://activemq.apache.org/xml-configuration.html>

<http://activemq.apache.org/user-submitted-configurations.html>

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# Configuring brokers

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```
public interface BrokerFactoryHandler {  
    // interface used to create a broker from a URI scheme  
    BrokerService createBroker(Uri brokerUri) throws IOException;  
}
```

```
public class AcnaFactoryHandler implements BrokerFactoryHandler {  
    // ...  
}
```

**Create:** `src/main/resources/META-INF/services/org/apache/activemq/broker/acna`  
`class=org.example.activemq.acna.AcnaBrokerFactory`

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# Discovering brokers

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```
<broker brokerName="one">
  <transportConnectors>
    <transportConnector uri="tcp://localhost:0" discoveryUri="multicast://default"/>
  </transportConnectors>
</broker>
```

---

```
<broker brokerName="two">
  <networkConnectors>
    <ldapNetworkConnector uri="ldap://ldap.example.com:389"
      base="dc=brokers,dc=example,dc=com"
      anonymousAuthentication="true"
      searchFilter="(cn=*)"
      searchScope="SUBTREE_SCOPE" />
  </networkConnectors>
</broker>
```

<http://activemq.apache.org/discovery.html>

<http://activemq.apache.org/discovery-transport-reference.html>

<http://activemq.apache.org/ldap-broker-discovery-mechanism.html>

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# Discovering brokers

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```
public interface DiscoveryAgent extends Service {

    // Sets the discovery listener
    void setDiscoveryListener(DiscoveryListener listener);

    // register a service
    void registerService(String name) throws IOException;

    // A process actively using a service may see it go down before the DiscoveryAgent notices the
    // service's failure. That process can use this method to notify the DiscoveryAgent of the failure
    // so that other listeners of this DiscoveryAgent can also be made aware of the failure.
    void serviceFailed(DiscoveryEvent event) throws IOException;
}
```

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# Transports (protocols)

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- AMQP
- MQTT
- OpenWire
- REST
- RSS and Atom
- Stomp
- WSIF
- WS Notification
- XMPP



(aero)plane(s)



(bi)cycle(s)



boat(s)



bus(es)



car(s)



helicopter(s)



lorry(lorries)



moped(s)



(motor)bike(s)



ship(s)



submarine(s)



tanker(s)



taxi(s)



train(s)



yacht(s)



# Persistence

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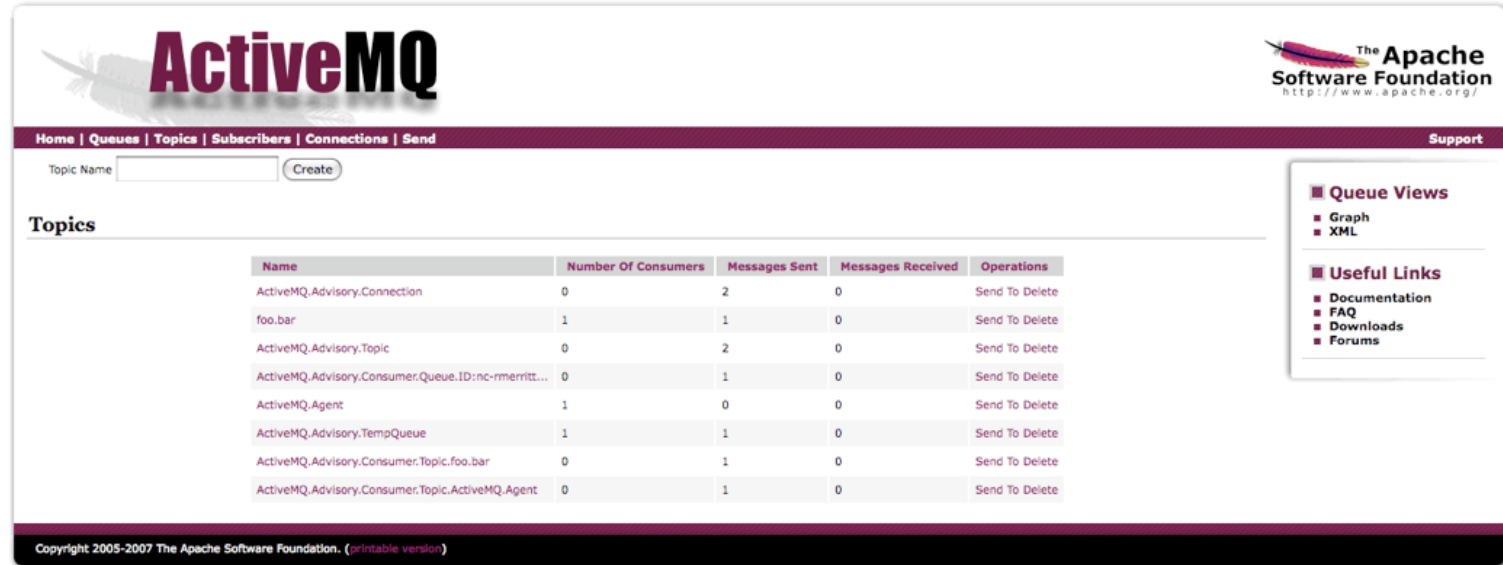
```
<persistenceAdapter>
  <mKahaDB directory="${activemq.base}/data/kahadb">
    <filteredPersistenceAdapters>

      <filteredKahaDB queue="namespace.>">
        <persistenceAdapter> <kahaDB journalMaxFileLength="32mb"/> </persistenceAdapter>
      </filteredKahaDB>

      <filteredKahaDB>
        <persistenceAdapter> <kahaDB enableJournalDiskSyncs="false"/> </persistenceAdapter>
      </filteredKahaDB>

    </filteredPersistenceAdapters>
  </mKahaDB>
</persistenceAdapter>
```

# Management and Monitoring



The screenshot displays the ActiveMQ web console interface. At the top left is the ActiveMQ logo, and at the top right is the Apache Software Foundation logo with the URL <http://www.apache.org/>. A navigation bar contains links for Home, Queues, Topics, Subscribers, Connections, and Send. On the right side of the navigation bar is a Support link. Below the navigation bar, there is a form to create a new topic with a "Topic Name" input field and a "Create" button. The main content area is titled "Topics" and contains a table with the following data:

Name	Number Of Consumers	Messages Sent	Messages Received	Operations
ActiveMQ_Advisory.Connection	0	2	0	Send To Delete
foo.bar	1	1	0	Send To Delete
ActiveMQ_Advisory.Topic	0	2	0	Send To Delete
ActiveMQ_Advisory.Consumer.Queue.ID:nc-rmerritt...	0	1	0	Send To Delete
ActiveMQ_Agent	1	0	0	Send To Delete
ActiveMQ_Advisory.TempQueue	1	1	0	Send To Delete
ActiveMQ_Advisory.Consumer.Topic.foo.bar	0	1	0	Send To Delete
ActiveMQ_Advisory.Consumer.Topic.ActiveMQ_Agent	0	1	0	Send To Delete

On the right side of the console, there are two sections: "Queue Views" with links for Graph and XML, and "Useful Links" with links for Documentation, FAQ, Downloads, and Forums. At the bottom of the page, there is a footer with the text: "Copyright 2005-2007 The Apache Software Foundation. ([printable version](#))".

# Diagnosis

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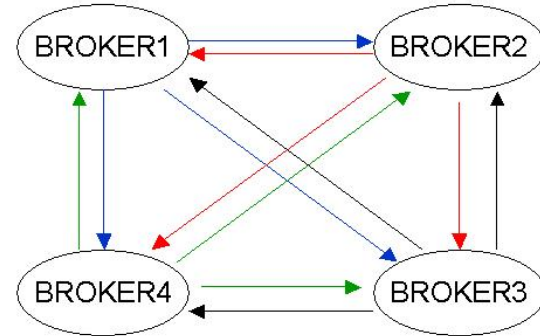
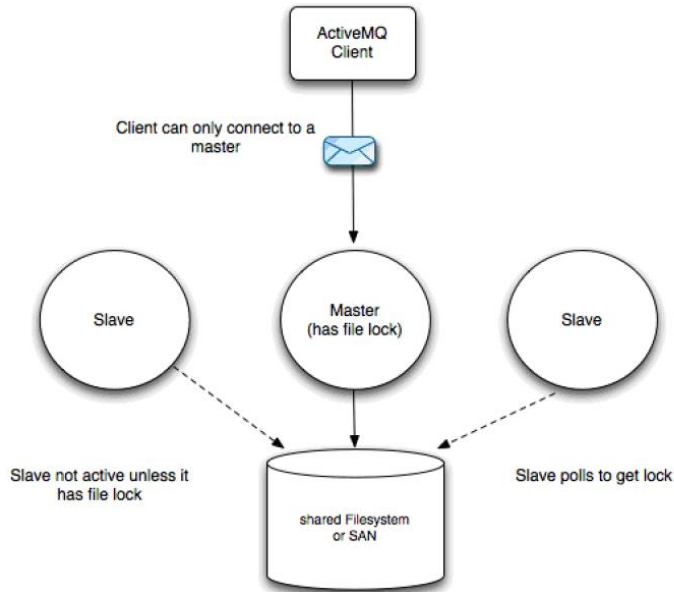
# Intermezzo

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**DEMO**

# Broker Topologies

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<http://activemq.apache.org/masterslave.html>

<http://activemq.apache.org/networks-of-brokers.html>

# Plugins

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```
<broker brokerName="broker">
  <plugins>
    <runtimeConfigurationPlugin checkPeriod="15000" />
    <timeStampingBrokerPlugin zeroExpirationOverride="30000" ttlCeiling="60000" />

    <jaasAuthenticationPlugin configuration="LdapConfiguration" />
    <authorizationPlugin>
      [...]
    </authorizationPlugin>
  </plugins>
</broker>
```

(\*) Need to provide the LdapConfiguration in the JAAS login.config

(\*\*) The ootb ldap authn/authz is not sufficient to infer the 'zone' (destination namespace)

<http://activemq.apache.org/runtime-configuration.html>

<http://activemq.apache.org/timestampplugin.html>

<http://activemq.apache.org/security.html>

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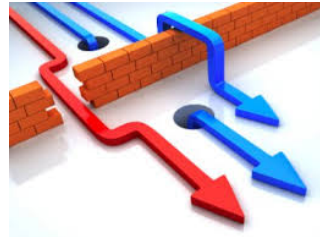
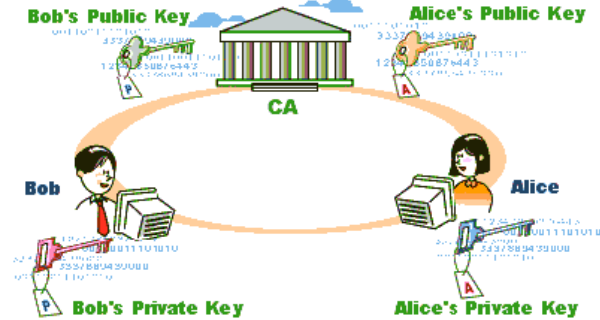
# Infrastructure (platform)

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# Securing Brokers

- ✓ nio+ssl
- ✓ https
- ✓ Idaps (auth)
  
- ✓ CA
- ✓ Logging
- ✓ Non Repudiation
- ✓ IDC
- ✓ Malware Analysis



splunk™





# Networking

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The network is reliable



Latency isn't a problem



Bandwidth isn't a problem



The network is secure



Topology won't change



The administrator will know what to do



Transport cost isn't a problem



The network is homogeneous



The system is atomic/monolithic



The system is finished



Business logic can and should be centralized

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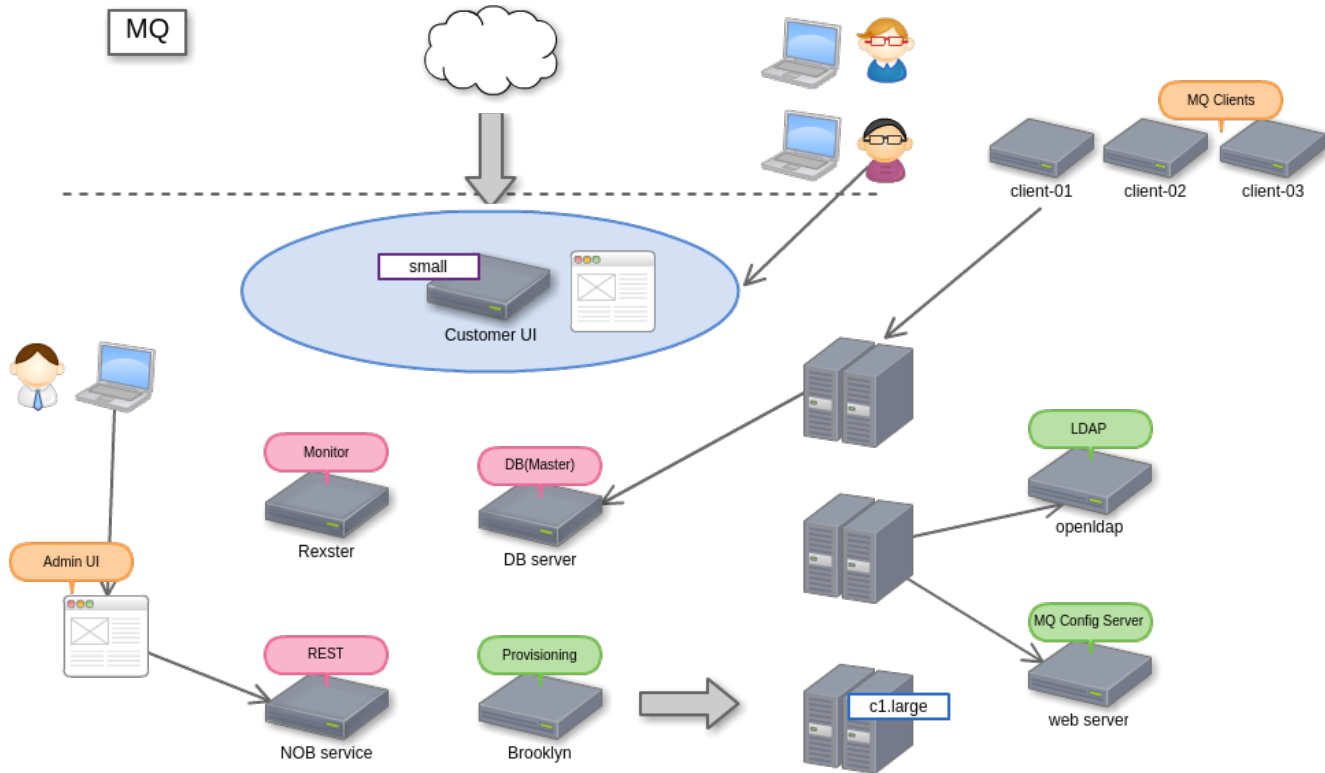
# SilkMQ

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Projects		<a href="#">+ New Project</a>			
<b>project 1</b> small traffic	 <b>291</b> total messages	<b>12</b> Queues	<b>1</b> Topics	<b>3</b> Clients	 
<b>project 2</b> medium traffic	 <b>1002</b> total messages	<b>30</b> Queues	<b>12</b> Topics	<b>5</b> Clients	 
<b>project 3</b> huge traffic	 <b>232,543</b> total messages	<b>394</b> Queues	<b>65</b> Topics	<b>14</b> Clients	 

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# Multitenant Deployment



# Apache Brooklyn

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## CAMP

Cloud Applications Management  
for Platforms

## TOSCA

Topology and Orchestration  
Specification for Cloud Applications



apache **brooklyn**

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# Brooklyn Blueprint

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services:

- name: 06b399a3-a691-4850-9af4-43c2e8ecc07b  
type: brooklyn.entity.messaging.activemq.ActiveMQBroker

brooklyn.config:

version: 5.11.1

activemq.brokerName: 06b399a3-a691-4850-9af4-43c2e8ecc07b

activemq.customConfigurationUrl: >

<http://ec2-52-1-249-64.compute-1.amazonaws.com/nob/06b399a3-a691-4850-9af4-43c2e8ecc07b.xbean>

---

# 1

Brooklyn JS REST client - Mozilla Firefox

localhost:8081/#v1/applications/PBSsyt

brooklyn™

Home Applications Catalog Script ? admin | Log out

### Applications

test


- 06b399a3-a691-4850-9af4-43c2e8ecc07c
- 1aea99ca-2975-4d94-96e0-97b1729c41a
- 2f8e7445-063e-4e22-8f5e-60529be041b

Summary Sensors Effectors Policies Activity Advanced

Task	Submitted	Status
add children	Today at 7:03 PM	In progress
add children	Today at 7:02 PM	In progress
add children	Today at 7:02 PM	In progress
add children	04/07/2015	Completed

Showing 1 - 4 of 4 ( 25 / page )

# Deploying Brokers

 AWS ▾ Services ▾ Edit ▾

Launch Instance Connect Actions ▾

Filter by tags and attributes or search by keyword

<input type="checkbox"/>	Name ▾	Instance ID ▾	Instance Type ▾	Availability Zone ▾	Instance State ▾	Status Checks ▾
<input type="checkbox"/>	brooklyn-nny...	i-7c5be781	t2.micro	us-east-1a	running	2/2 checks ...
<input type="checkbox"/>	nob-base-1	i-8ae73277	t2.micro	us-east-1a	running	2/2 checks ...
<input type="checkbox"/>	brooklyn-qa4...	i-d461dd29	t2.micro	us-east-1a	running	2/2 checks ...
<input type="checkbox"/>	brooklyn-claz...	i-b05ae64d	t2.micro	us-east-1a	running	2/2 checks ...
<input type="checkbox"/>	brooklyn-imo...	i-9561dd68	t2.micro	us-east-1a	running	2/2 checks ...
<input type="checkbox"/>	brooklyn-y5f...	i-9267db6f	t2.micro	us-east-1a	running	2/2 checks ...

# 02

The screenshot shows the Brooklyn JS REST client interface in a Mozilla Firefox browser window. The browser address bar shows the URL `localhost:8081/#v1/applications/PBSyst`. The interface has a dark header with the "brooklyn" logo and navigation tabs for Home, Applications (selected), Catalog, Script, and admin | Log out. Below the header, there are tabs for Summary, Sensors, Effectors, Policies, Activity, and Advanced. The main content area displays details for an application named "test".

On the left, a list of application instances is shown:

- 06b399a3-a891-4850-9af4-43c2e8ecc07b
- 1aea99ca-2975-4d94-96a3-97b1729c41a
- 2f8e7445-083e-4e22-8f5e-80529be8041b

The selected instance details are shown on the right:

**Summary**

Name: start  
ID: L4gxegB  
Submitted: 14 Apr 2015 19:02:44:394 6 minutes ago  
Started: 14 Apr 2015 19:02:44:395 6 minutes ago  
Submitted by: test add (parallel)

**Children Tasks**

Task	Submitted	Status
provisioning (AWS Virginia)	Today at 7:02 PM	Completed
pre-start	Today at 7:08 PM	In progress
start (processes)	-	Not submitted
post-start	-	Not submitted

Showing 1 - 4 of 4 ( 25 / page )



# 03

The screenshot shows the Brooklyn JS REST client interface in a Mozilla Firefox browser. The browser address bar shows the URL `localhost:8081/#v1/applications/PBSsy...`. The interface has a dark header with the Brooklyn logo and navigation links: Home, Applications (highlighted), Catalog, Script, and admin | Log out.

The main content area is titled "Applications" and features a sidebar with a tree view under "test" containing three application IDs:

- 00b398a3-a061-4850-8a14-43c2e8ecc07b
- 1aea99ca-2975-4d94-98e3-97b1729c41a
- 2f8e7445-083e-4e22-8f5e-60529be8041b

The right-hand pane shows the details for the selected application, with tabs for Summary, Sensors, Effectors, Policies, Activity, and Advanced. The "Summary" tab is active, displaying a table of key-value pairs:

Name	Value
host.address	52.4.192.104
host.name	ec2-52-4-192-104.compute-1.amazonaws.com
host.sshAddress	brooklyn-chicago@ec2-52-4-192-104.compute-1.amazonaws.com
host.subnet.address	172.31.44.135
host.subnet.hostname	ec2-52-4-192-104.compute-1.amazonaws.com
service.isUp	false
service.notUp.indicators	{"service.process.IsRunning": "No information on whether service is running"}
service.state	STARTING
service.state.expected	starting @ 1428027384385 / Tue Apr 14 12:02:44 EDT 2015
softwareservice.provisioningLocation	{"type": "brooklyn.location.Location", "id": "N8WV9v1R"}

At the bottom of the summary pane, it indicates "Showing 1 - 10 of 10 (of 30)" and "25 / page".

# 04

The screenshot shows the Brooklyn JS REST client interface in a Mozilla Firefox browser. The browser address bar shows the URL `localhost:8081/#v1/applications/PBSsyevs/entities`. The interface has a dark header with the Brooklyn logo and navigation buttons for Home, Applications, Catalog, Script, and admin | Log out. The main content area is split into two panes. The left pane shows a tree view of applications under a 'test' folder, with three items listed: `00b389a3-a081-4890-8a14-43c2e8ecc07b`, `1aea99ca-2975-4d94-98e3-97b1729c41a`, and `2f8e7445-083e-4e22-8f5e-60529be8041b`. The right pane shows a detailed view of the selected application, displaying a table of configuration properties.

Name	Value
activemq.brokerName	00b389a3-a081-4890-8a14-43c2e8ecc07b
activemq.jetty.port	8161
activemq.templateConfigurationUrl	classpath://brooklyn/entity/messaging/activemq/activemq
download.uri	\${driver.mirrorUri}\${version}/apache-activemq-\${version}
expandedInstall.dir	/home/users/brooklyn-chicago/brooklyn-managed-proces
host.address	52.4.182.164
host.name	ec2-52-4-182-164.compute-1.amazonaws.com
host.sshAddress	brooklyn-chicago@ec2-52-4-182-164.compute-1.amazonav
host.subnet.address	172.31.44.135
host.subnet.hostname	ec2-52-4-182-164.compute-1.amazonaws.com
install.dir	/home/users/brooklyn-chicago/brooklyn-managed-proces
jmx.context	jmxrmi
jmx.direct.port	31001
jmx.password	
jmx.user	admin
log.location	/home/users/brooklyn-chicago/brooklyn-managed-proces
openwire.port	81616
rmi.registry.port	1088
run.dir	/home/users/brooklyn-chicago/brooklyn-managed-proces

# 05

The screenshot shows the Brooklyn JS REST client interface in a Mozilla Firefox browser. The browser's address bar displays the URL `localhost:8081/#v1/applications/PBSsyevs/entitie`. The interface features a dark header with the Brooklyn logo and navigation buttons for Home, Applications (highlighted), Catalog, Script, and admin | Log out.

The main content area is titled "Applications" and includes a sidebar with a list of application IDs. The selected application, `990844fe-544d-420f-b19f-75acae973272`, is shown in a detailed view with the following information:

- Summary** (selected tab):
  - Status**: STARTING
  - Service Up**: false
  - Type**: `brooklyn.entity.messaging.activemq.ActiveMQBroker`
  - ID**: `MnUppbZn`
  - Catalog Item**: `com.cheepee orbweaver.brooklyn.ActiveMQNobApplication:0.0.0.SNAPSHOT`
- Blueprint**:

```
---
services:
- name: 990844fe-544d-420f-b19f-75acae973272
  type: brooklyn.entity.messaging.activemq.ActiveMQBroker
  brooklyn.config:
  version: 5.11.1
  activemq.brokerName: 990844fe-544d-420f-b19f-75acae973272
  activemq.customConfigurationUrl: http://ec2-52-1-249-64.compute-1.amazonaws.com/nob//990844fe-544d-420f-b19f-75acae973272.xbean
```
- Config**: (empty)

# Q&A

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# Thanks!

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APACHECON  
NORTH AMERICA



Ciprian Ciubotariu  CMoH

Alexandru Zbarcea  azbarcea



<http://www.cloudsoftcorp.com/>



<http://busymachines.com/>



<http://spectrsys.com>