



# Metro 2.0 – the advanced SOAP web services stack in GlassFish

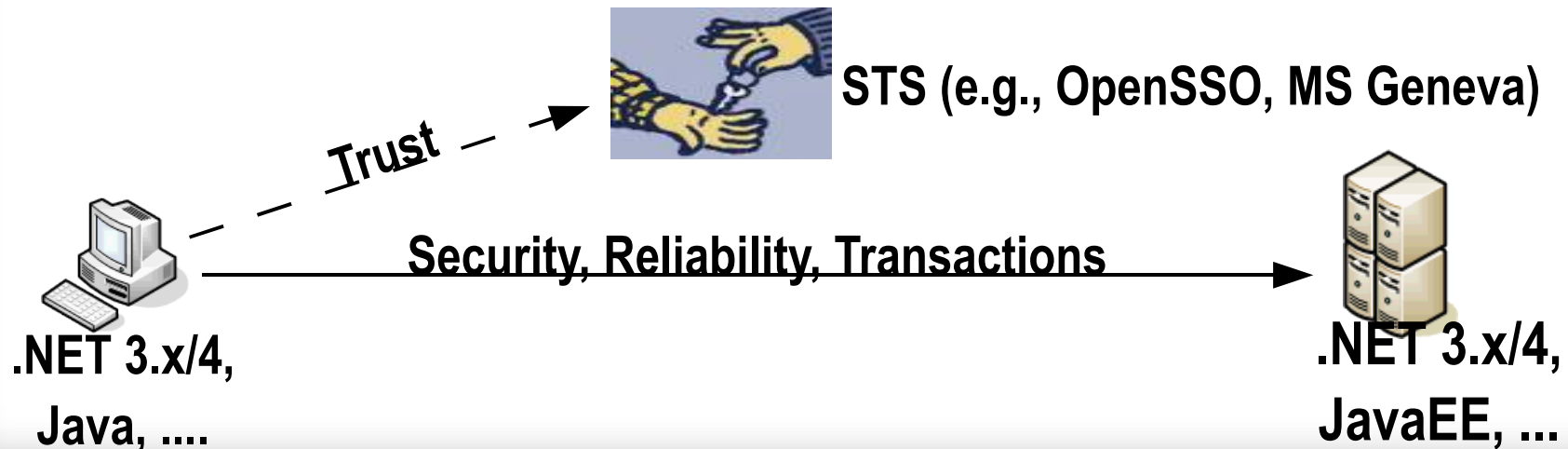
[metro.dev.java.net](http://metro.dev.java.net)

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Architect, Project Metro



# Metro – SOAP-based Web Services Stack

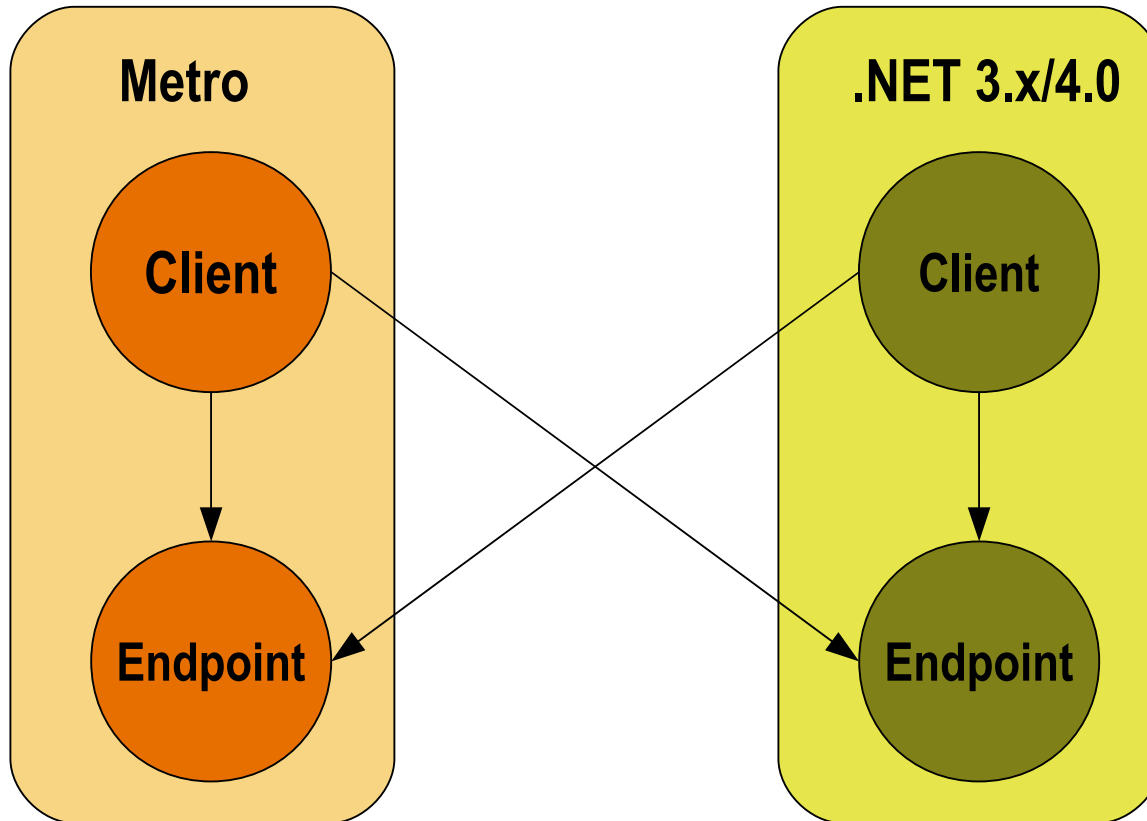
- Built into: GlassFish, Java CAPS, OpenSSO
- Works with any servlet 2.5 compliant web container
  - > WebLogic, WebSphere, JBoss, Tomcat, ...
  - > Also standalone
- Advanced Interoperability with .NET 3.x/4.0



# Metro: main features

- JAX-WS 2.2 (new version)
  - > autogen JAXB beans (new)
- Security
  - > password derived keys (new)
  - > @RolesAllowed (new)
- Identity
  - > SSO for services (new)
  - > Identity delegation (new)
- Reliable Messaging
  - > persistent (new)
- Atomic Transactions
- Centralized config (new)
- Monitoring (new)
- NetBeans support
- Eclipse support (new)
- Extensible
- Standards-based
  - > addressing metadata (new)
  - > WS-MakeConnection (new)

# Metro Interoperability



# Metro SOAP Web Services Stack

JAX-WS Tooling, NetBeans & Studio Support Software

## Security

Secure Conv.  
Trust  
XWSS

## Reliability

Reliable-  
Messaging

## Transactions

Atomic-  
Transactions  
Coordination

## Metadata

WSDL  
MEX  
Policy

SOAP Based Messaging (WSA, MTOM)

JAXB Based XML Data Binding (XSD, XPATH)

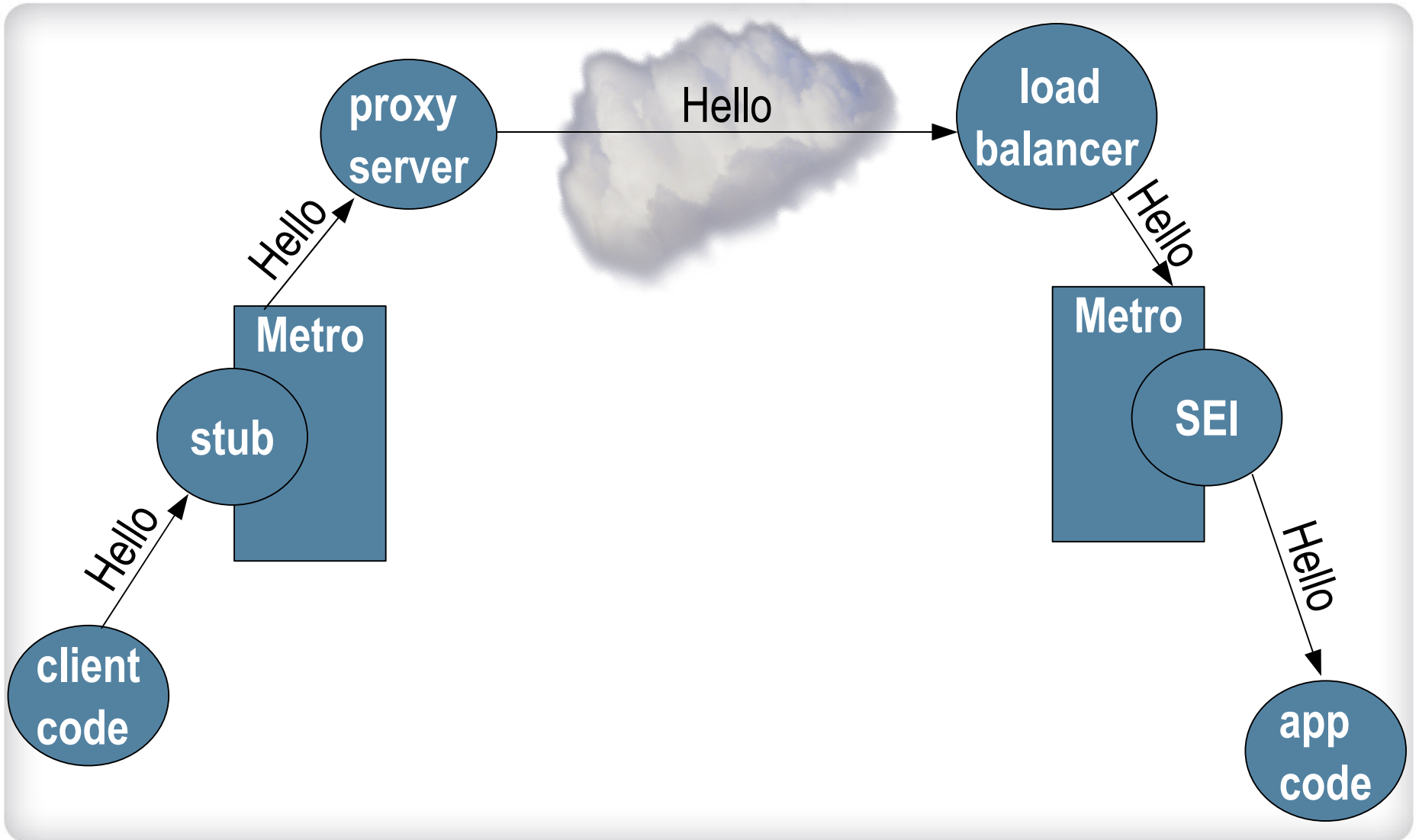
HTTP

TCP

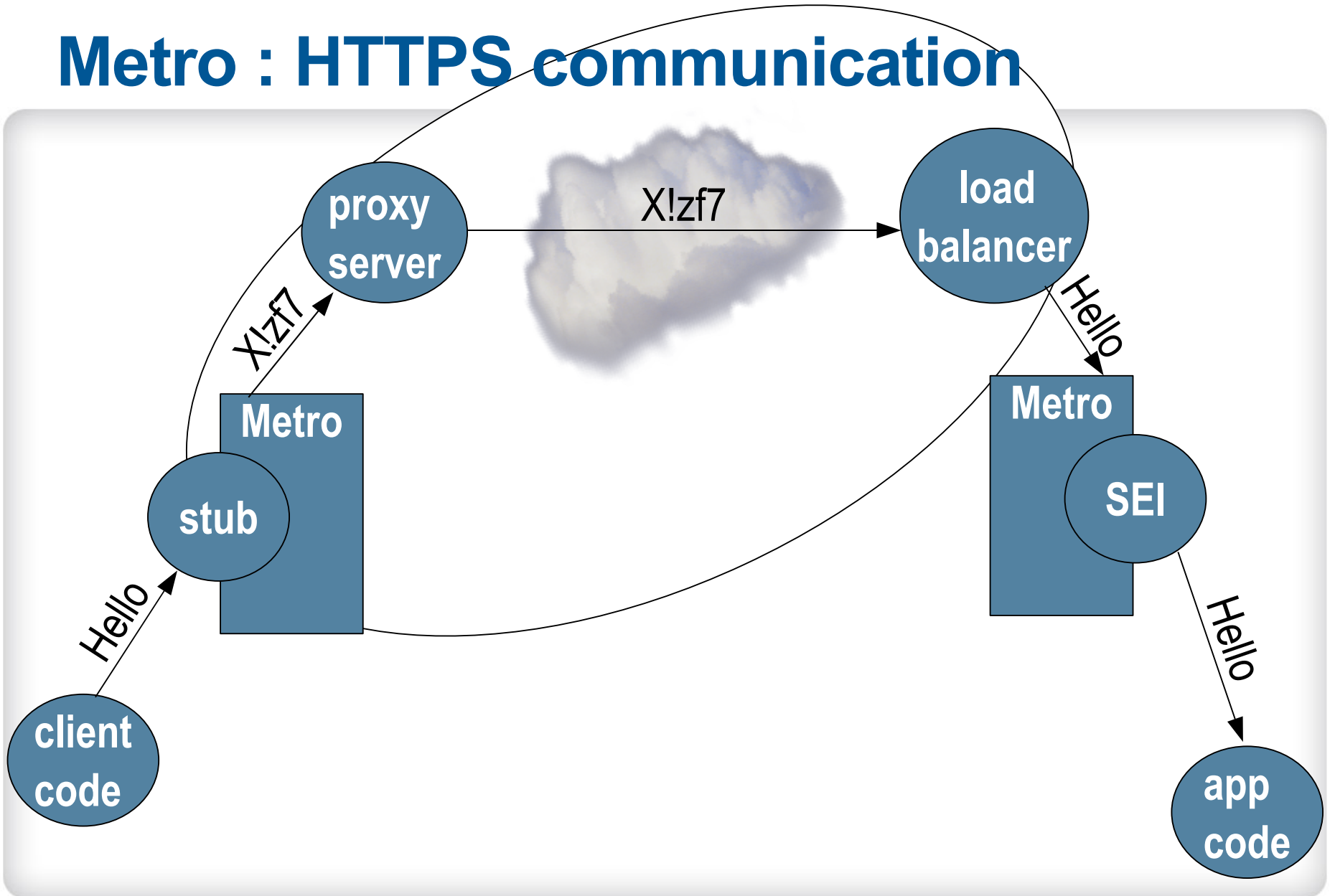
SMTP

# Metro : Security

# Metro : clear text communication

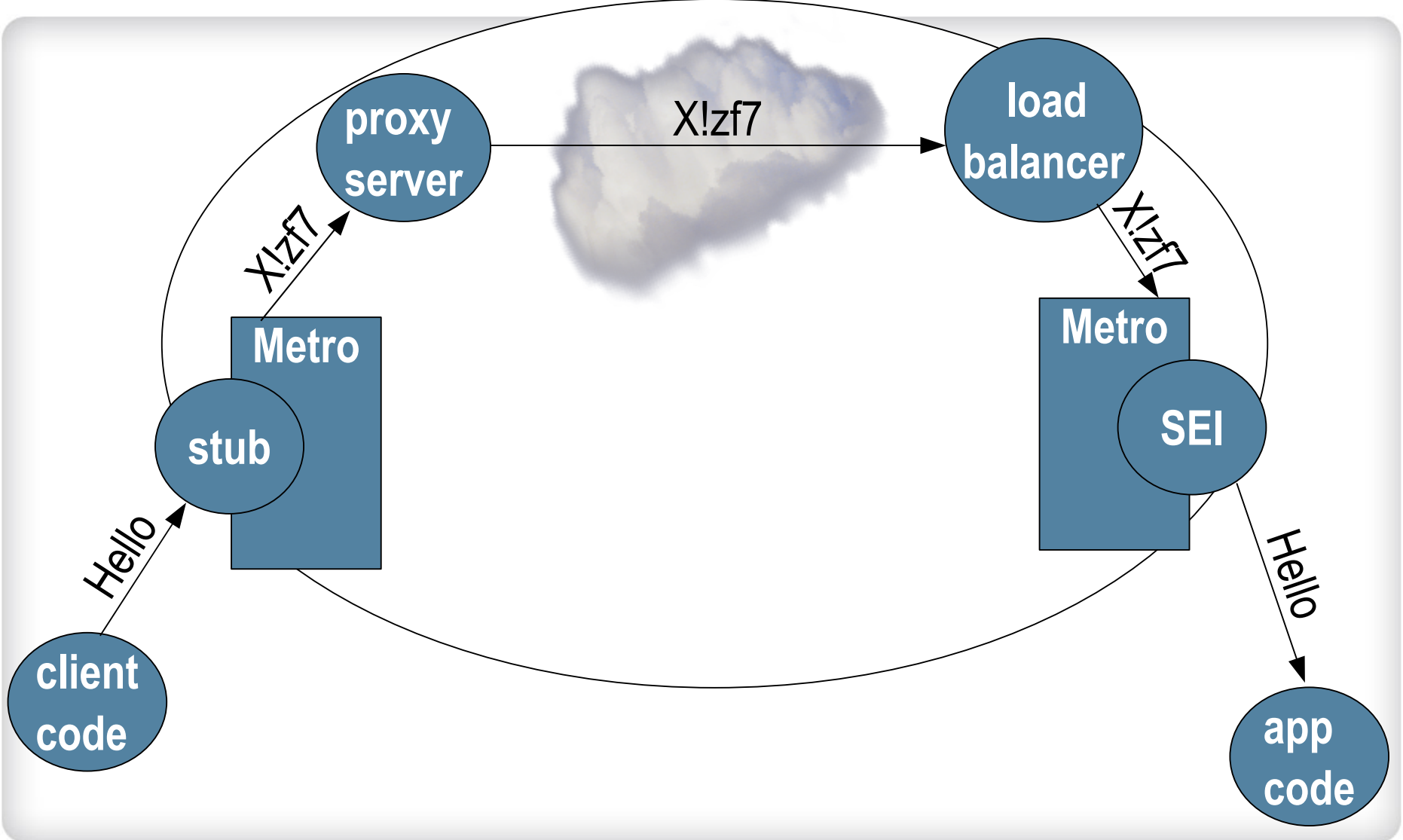


# Metro : HTTPS communication

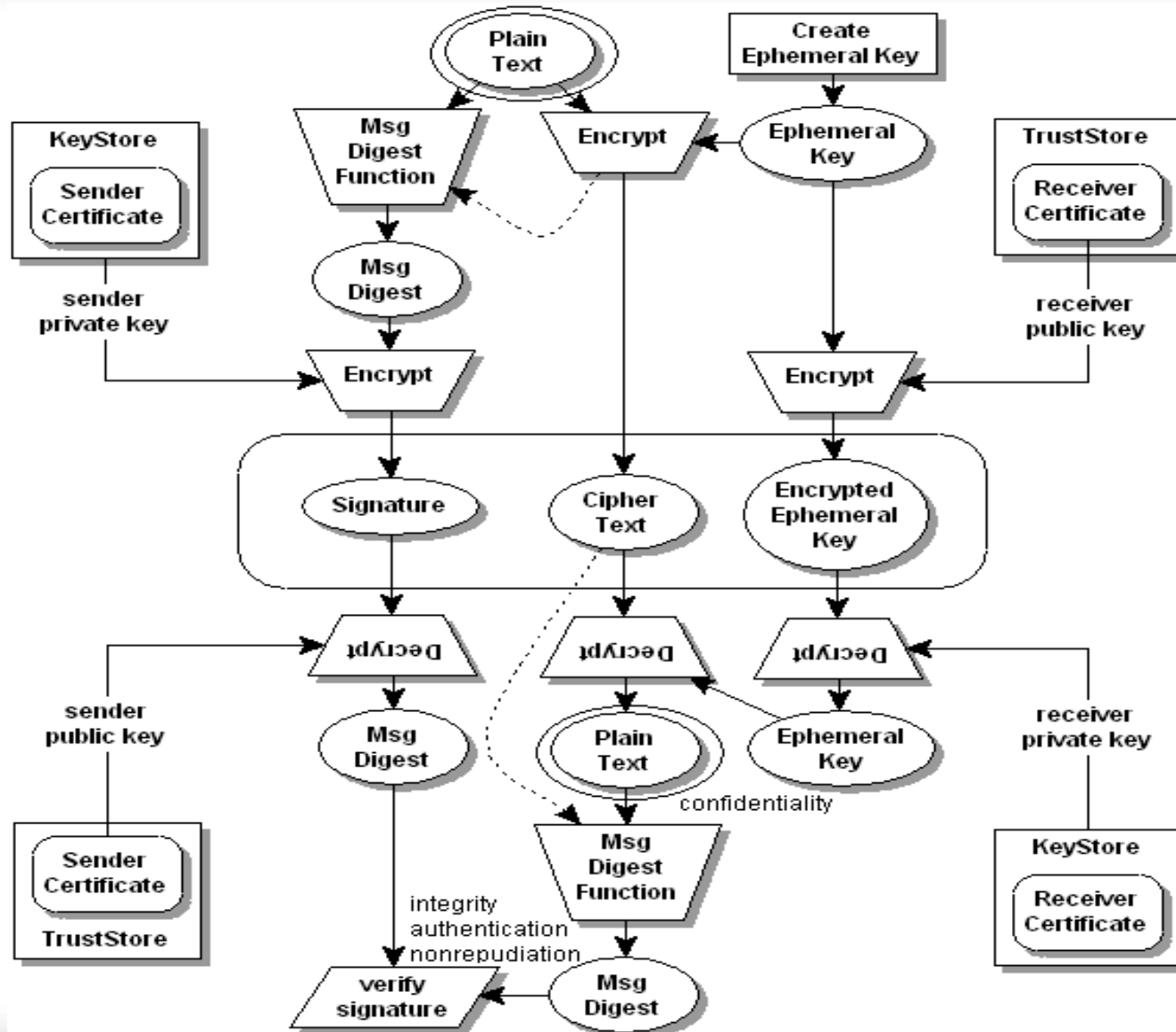




# Metro : end-to-end secure comm



# Metro: mutual certificates security



# Metro: creating a web service

```
package foo;

import javax.jws.WebService;

@WebService()
public class MyService {

    public String echo(final String x) {
        return "echo: " + x;
    }
}
```

# Metro: adding security using NetBeans

## ServicePortBinding

Version Compatibility: .NET 3.5 / METRO 1.3 (requires METRO 1.3 or higher)

Optimize Transfer Of Binary Data (MTOM)

Reliable Message Delivery

Deliver Messages In Exact Order

Advanced...

Secure Service

Security Mechanism: Mutual Certificates Security

Mutual certificates

- ✓ Mutual Certificates Security
- Symmetric Binding with Kerberos Tokens
- Transport Security (SSL)
- Message Authentication over SSL
- SAML Authorization over SSL
- Endorsing Certificate
- SAML Sender Vouches with Certificates
- SAML Holder of Key

Use Development

Keystore...

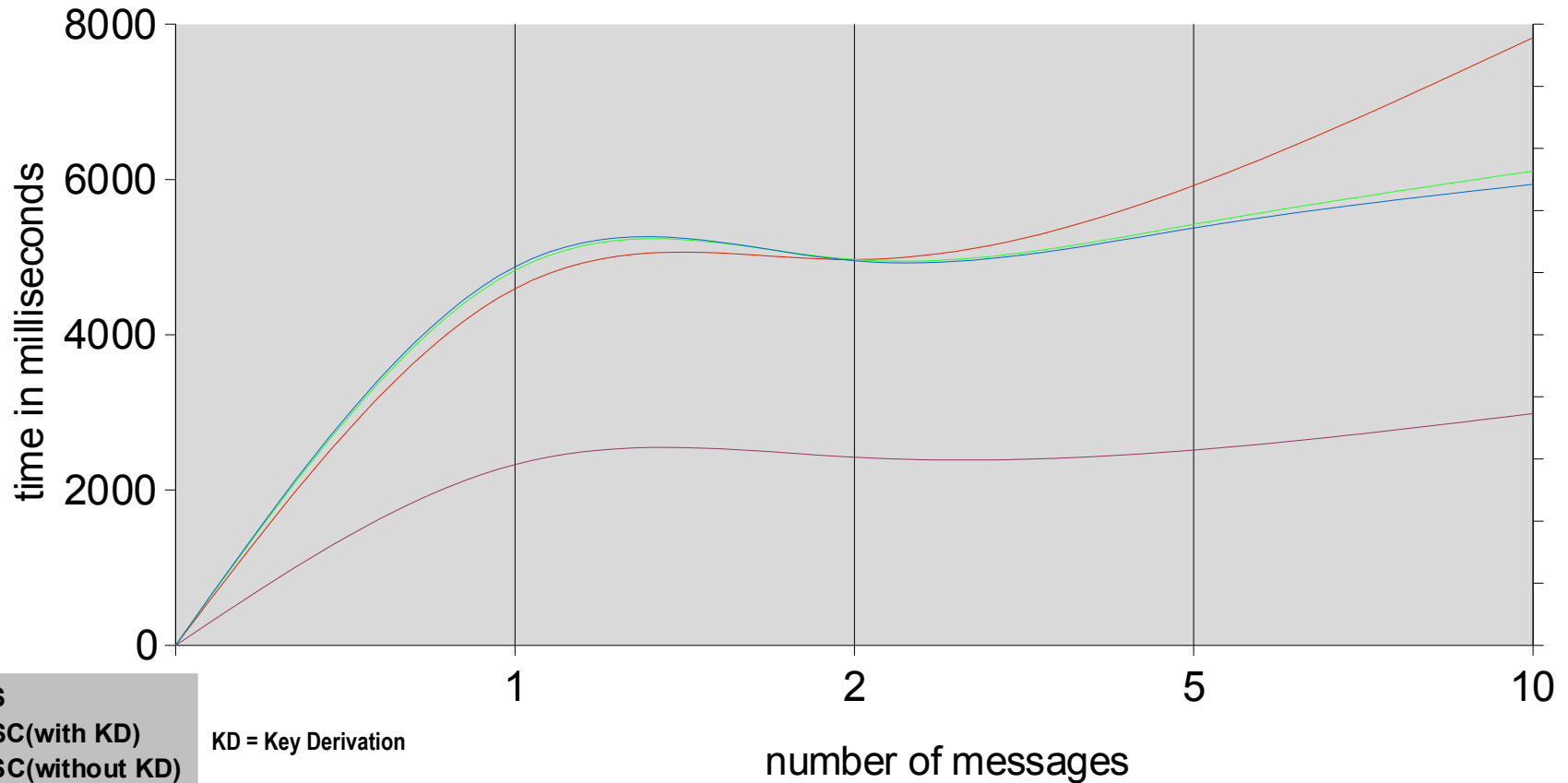
Validators...

Advanced...

# Option: Secure Conversation

Use: increase performance/security on multiple msgs

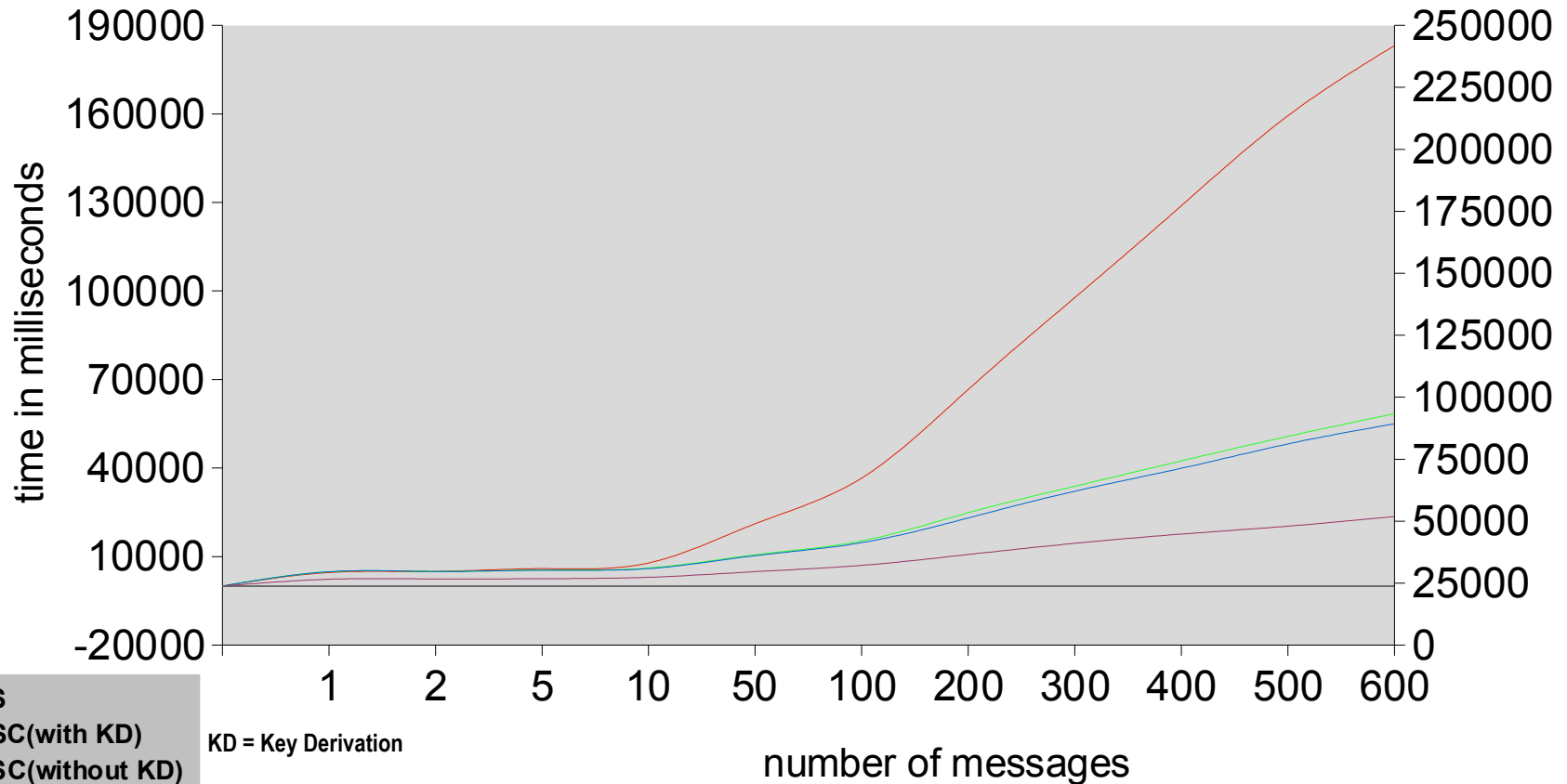
## WSS vs WSSC vs TLS



# Option: Secure Conversation

Use: increase performance/security on multiple msgs

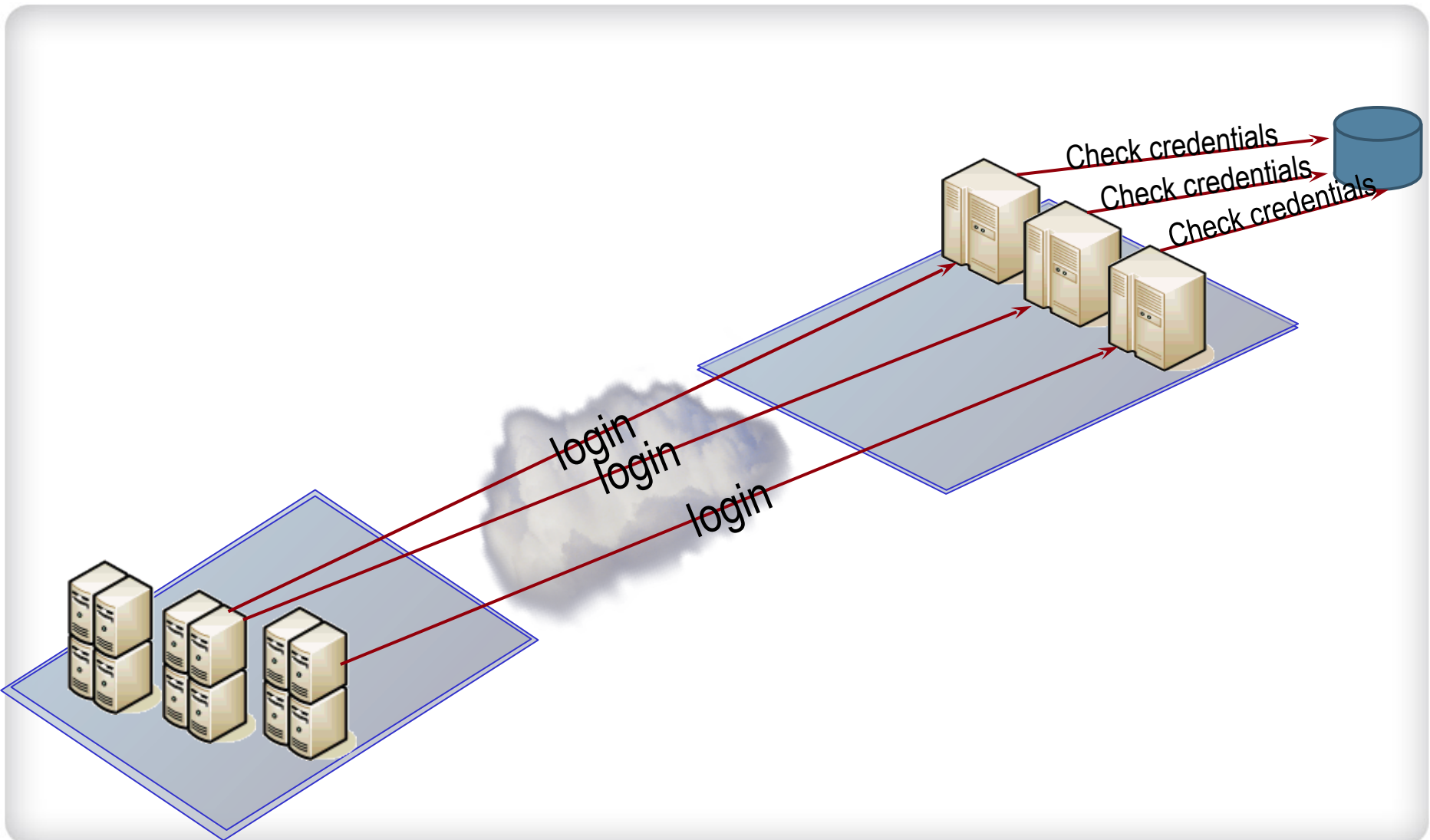
## WSS vs WSSC vs TLS



(note: baseline is plain text)

# Metro : Identity

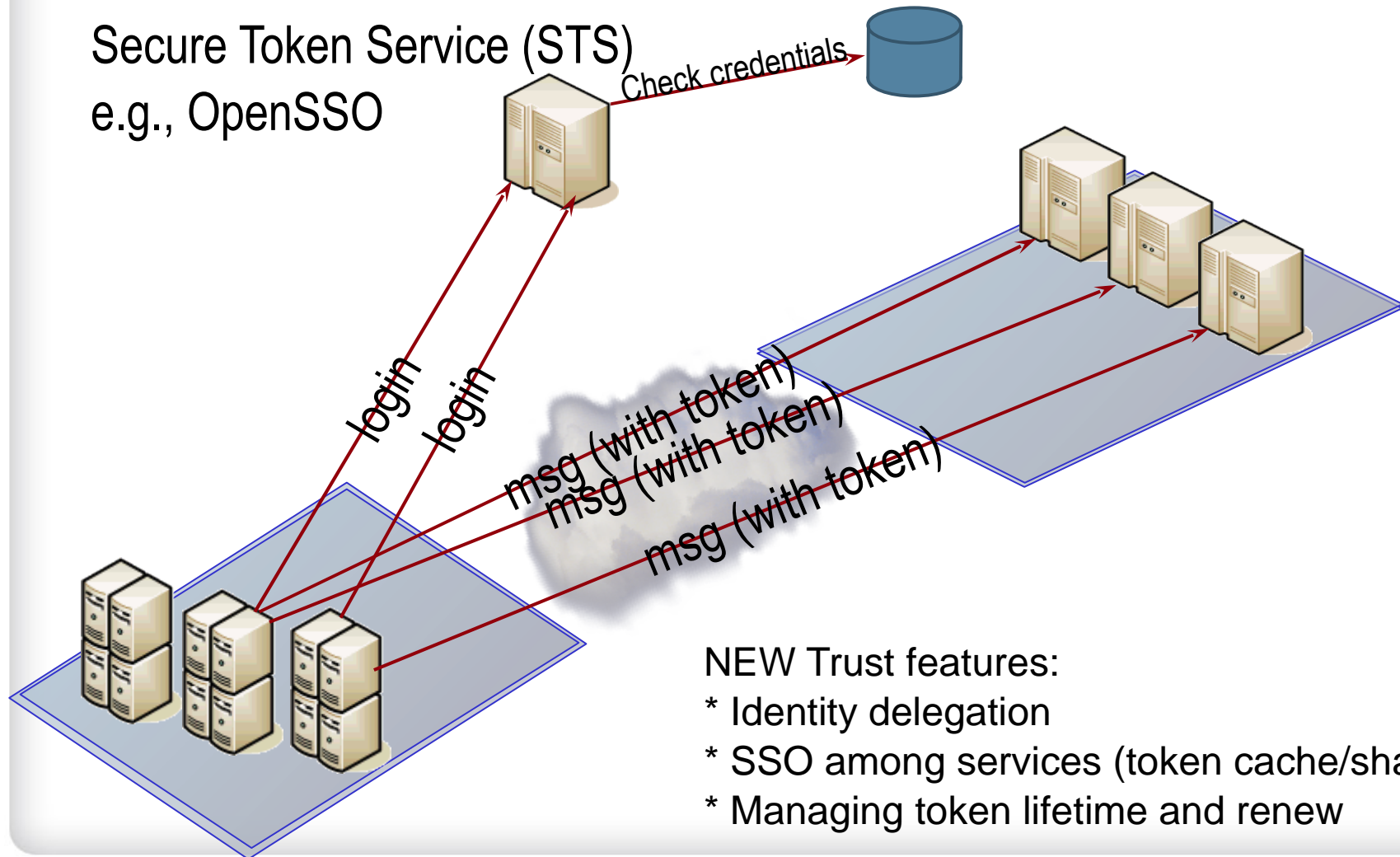
# Metro : authentication





# Metro : 3<sup>rd</sup> party authentication

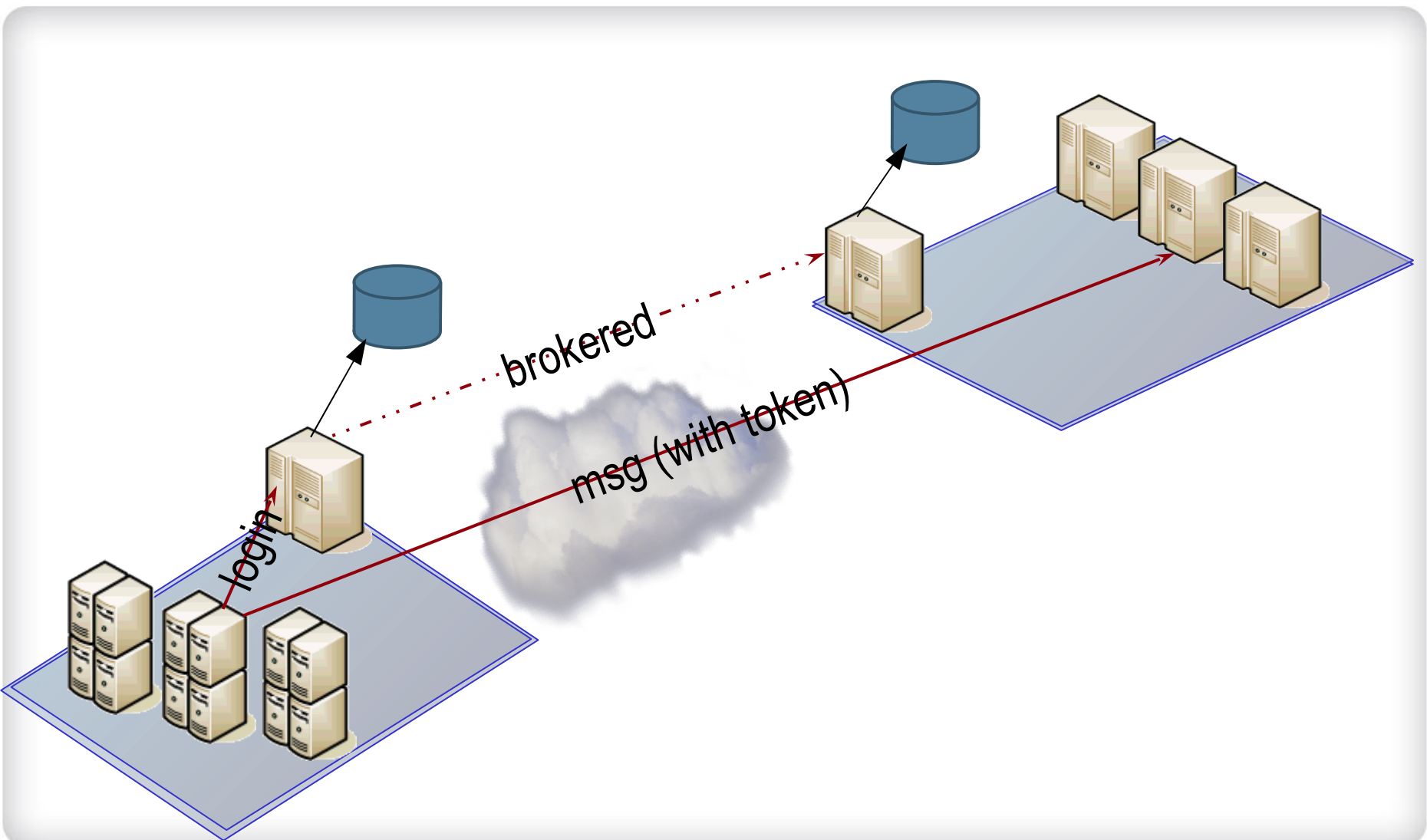
Secure Token Service (STS)  
e.g., OpenSSO



NEW Trust features:

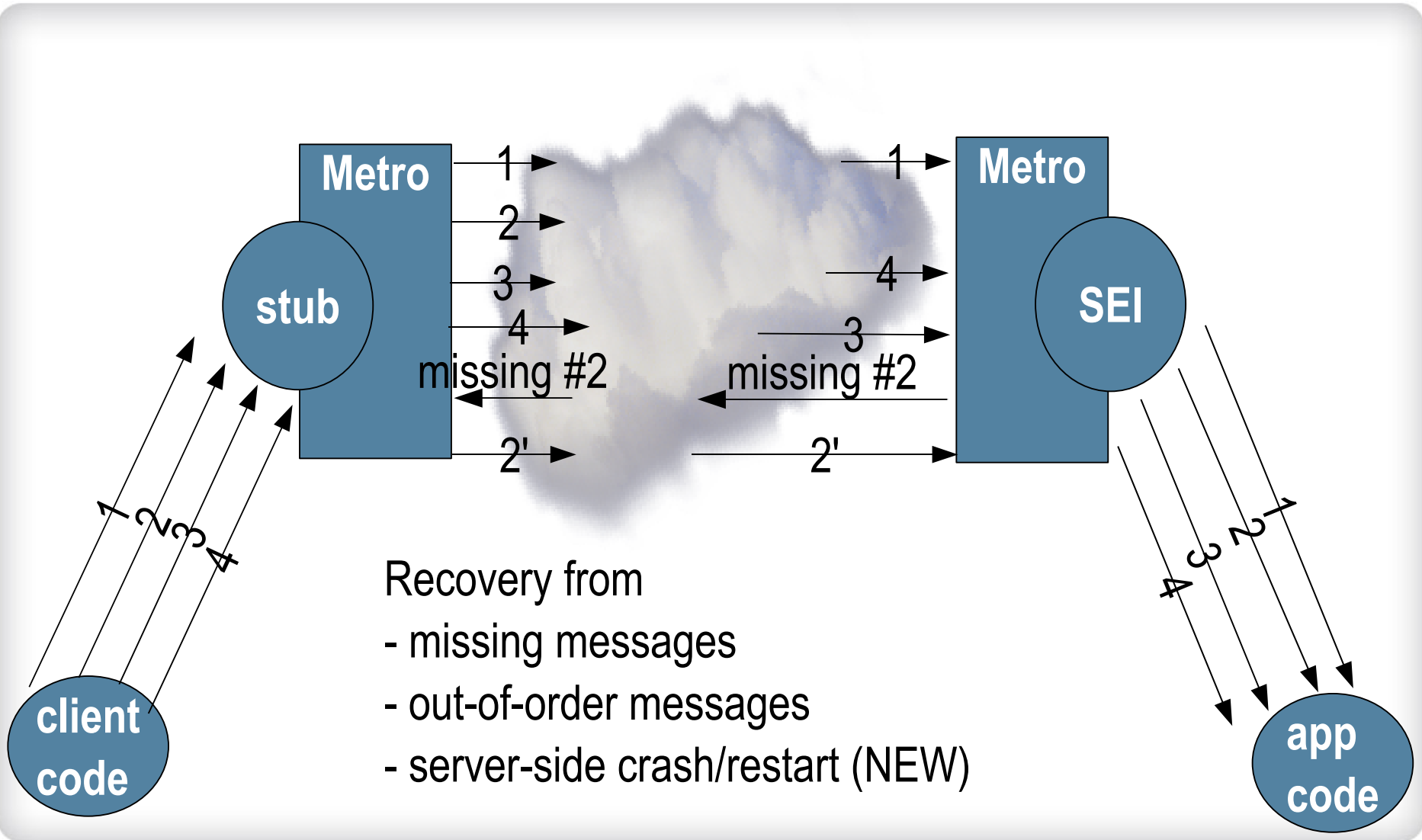
- \* Identity delegation
- \* SSO among services (token cache/sharing)
- \* Managing token lifetime and renew

# Metro : brokered trust



# Metro : Reliable Messaging

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- Recovery from
- missing messages
  - out-of-order messages
  - server-side crash/restart (NEW)

# Metro : Atomic Transactions

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```
UserTransaction ut = context.getUserTransaction();
```

```
try {  
    ut.begin();  
    accountA.withdraw(amount);  
    accountB.deposit(amount);  
    ut.commit();  
} catch (Exception ex) {  
    ut.rollback();  
}
```

**all or nothing**

# Metro : Monitoring & Management

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Java Monitoring & Management Console

Connection Window Help

pid: 34711 glassfish.jar --domain domain1 --domaindir /Applications/NetBeans/glassfish-v3-b74-11\_23\_2009/glassfish/domains/domain1

Overview Memory Threads Classes VM Summary **MBeans**

- ▶ JMIImplementation
- ▼ amx
  - ▶ J2EEDomain
  - ▶ J2EEServer
  - ▶ JDBCDataSource
  - ▶ JDBCDriver
  - ▶ JDBCResource
  - ▶ JVM
  - ▶ Servlet
  - ▼ WSEndpoint
    - ▼ /mon/server-mon[server]
      - ▼ /RMSERVICE-RMSERVICE-RMSERVICEPORT
        - ▶ **Attributes**
        - ▶ Notifications
        - ▶ /Service-MyServiceService-MyServicePort
  - ▼ WSRMSCSessionManager
    - ▼ /mon/server-mon[server]/WSEndpoint[/RMSERVICE]
      - ▶ RM\_SC\_SessionManager
  - ▼ WSRMSequenceManager
    - ▼ /mon/server-mon[server]/WSEndpoint[/RMSERVICE]
      - ▶ RMSequenceManager
- ▶ WebModule
- ▶ access-log
- ▶ admin-service
- ▶ application
- ▶ application-ref
- ▶ applications
- ▶ audit-module
- ▶ auth-realm
- ▶ bulk-access
- ▶ config
- ▶ config-tools

Attribute values

Name	Value
Children	javax.management.ObjectName[2]
Name	/RMSERVICE-RMSERVICE-RMSERVICEPORT
Parent	amx:pp=/mon,type=server-mon,name=server
addressingVersion	W3C
bindingID	http://schemas.xmlsoap.org/wsdl/soap/http
container	org.glassfish.webservices.JAXWSCContainer@21cfa61c
dumpHTTPMessages	true

Tabular Navigation

Composite Navigation 1/2

features

Name	Value
enabled	true
ID	com.sun.xml.ws.rm.ReliableMessagingFeature

jaxwsRuntimeVersion JAX-WS RI 2.2-11/25/2009 12:36 PM(carr)-

policy ServiceMap={} EndpointMap={PolicyMapKey({http://foo/}RMSERVICE, {http://foo/}RM...

portName {http://foo/}RMSERVICEPORT

seiModeWSDLLocation

serviceDefinitionImports file:/RMSERVICEService\_schema1.xsd

serviceDefinitionURL file:/RMSERVICEService.wsdl

serviceName {http://foo/}RMSERVICEService

soapVersionHttpBindingID http://schemas.xmlsoap.org/wsdl/soap/http

wsdlEndpointAddress REPLACE\_WITH\_ACTUAL\_URL

wsdlPortTypeName {http://foo/}RMSERVICE



# Metro Management using jmxterm

```
$>open localhost:8686
```

[www.cyclopsgroup.org/projects/jmxterm](http://www.cyclopsgroup.org/projects/jmxterm)

```
$>beans
```

```
amx:name=/RMService-RMServiceService-RMServicePort,pp=...
```

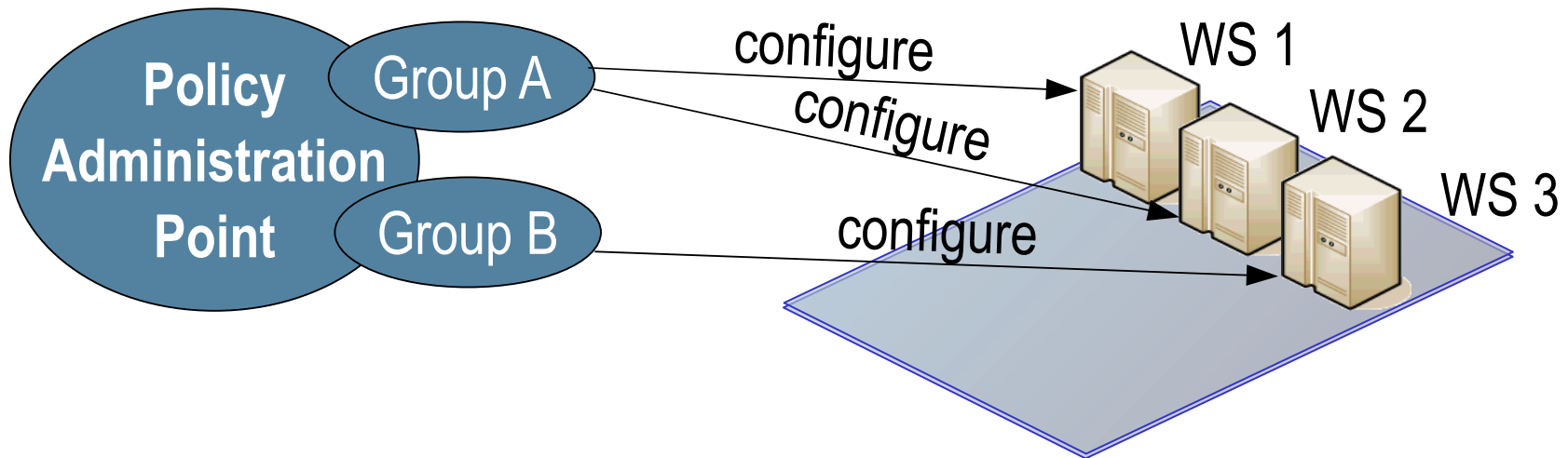
```
$>bean amx:name=/RMService-RMServiceService-RMServiceP...
```

```
$>get features
```

```
features = [ {  
  enabled = true;  
  iD = com.sun.xml.ws.rm.ReliableMessagingFeature;  
}, {  
  enabled = true;  
  iD = http://www.w3.org/2005/08/addressing/module;  
}];
```

```
$>set dumpHTTPMessages true
```

# Metro : centralized web service configuration management



# Metro Interoperability via Standards

- Basic Web Services
  - > JCP: JAX-WS 2.2 & JAXB 2.2
  - > W3C: SOAP 1.1/1.2, WSDL 1.1, WS-Addressing, MTOM
  - > WS-I: Basic Profile 1.x, 2.0, SSBP 1.0, AP 1.0, BSP 1.0
- Enterprise Web Services
  - > Oasis: WS-Security, WS-SecureConversation, WS-Trust, WS-SecurityPolicy, WS-ReliableMessaging, WS-MakeConnection, WS-AtomicTransactions, WS-Coordination
  - > W3C: WS-Addressing, WS-Policy, WS-Transfer
  - > WS-MetadataExchange
- (Same specs implemented by MS .NET)

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# Metro SOAP Web Services stack in GlassFish v3

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