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TRUSTED SECURITY WITH JBOSS ENTERPRISE APPLICATION PLATFORM

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About the Speakers

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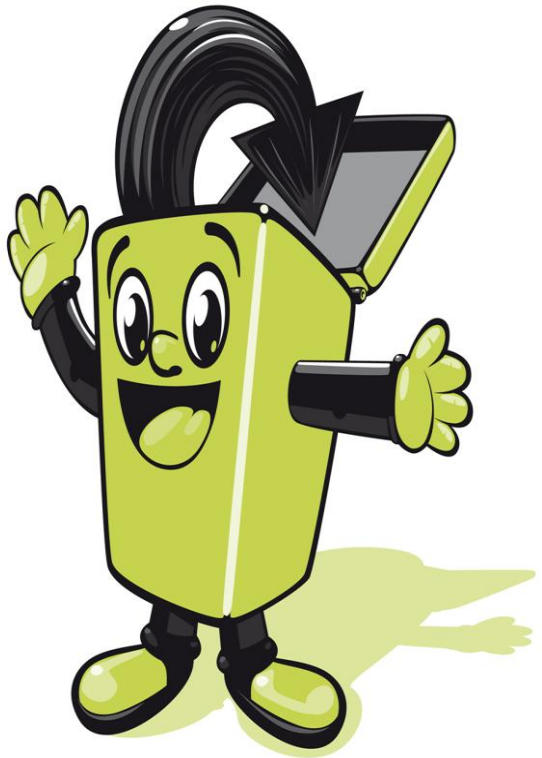
- Your situation and requirements probably differ.
- As always, please test in a non-production environment before using in production.
- We are not responsible for the spontaneous combustion of the known universe or any other undesirable outcomes associated with using what is discussed here.
  - Good Luck!

Agenda

- JBoss EAP 6.0 Security
- PicketLink
- Security Concepts
- Related Specs
- Some Real-World Use-Cases
  - Single Sign-On between two JBoss Applications
  - Integration with a Reverse-Proxy
  - Integration with a third-party STS

JBoss EAP 6.0 Security

- Domain model holds the security configuration
  - Security Domain configuration
- Management Interfaces are secured by default
  - Http Interface
  - Native Interface (CLI)
- PicketLink is available
  - SAML based Single Sign On
  - STS based Identity Propagation



JBoss EAP 6.0 Security

- Domain model holds the security configuration
  - Security Domain configuration

JBoss EAP 6.0 Security – Domain Model

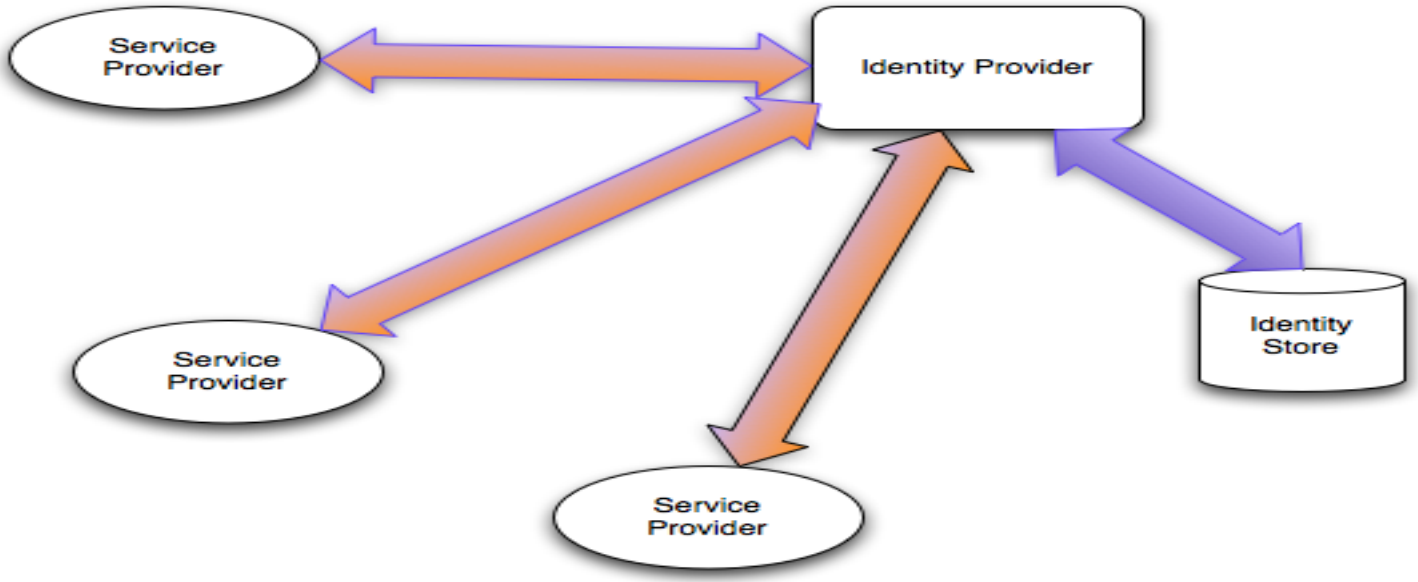
```
<subsystem xmlns="urn:jboss:domain:security:1.0">
   <security-domains>

      ...

      <security-domain name="idp" cache-type="default">
         <authentication>
            <login-module code="UsersRoles" flag="required">
               <module-option name="usersProperties" value="users.properties"/>
               <module-option name="rolesProperties" value="roles.properties"/>
            </login-module>
         </authentication>
      </security-domain>

      <security-domain name="picketlink-sts" cache-type="default">
         <authentication>
            <login-module code="UsersRoles" flag="required">
               <module-option name="usersProperties" value="users.properties" />
               <module-option name="rolesProperties" value="roles.properties" />
            </login-module>
         </authentication>
      </security-domain>

      <security-domain name="sp" cache-type="default">
         <authentication>
            <login-module code="org.picketlink.identity.federation.bindings.jboss.auth.SAML2LoginModule" flag="required"/>
         </authentication>
      </security-domain>

      ...

   </security-domains>
</subsystem>
```


JBoss EAP 6.0 Security – Management Interfaces

- Secured by default
  - Username/Password via http digest mechanism
- Scripts available to add users to management realm
  - add-user.sh /add-user.bat
  - No default user available

JBoss EAP 6.0 Security – PicketLink

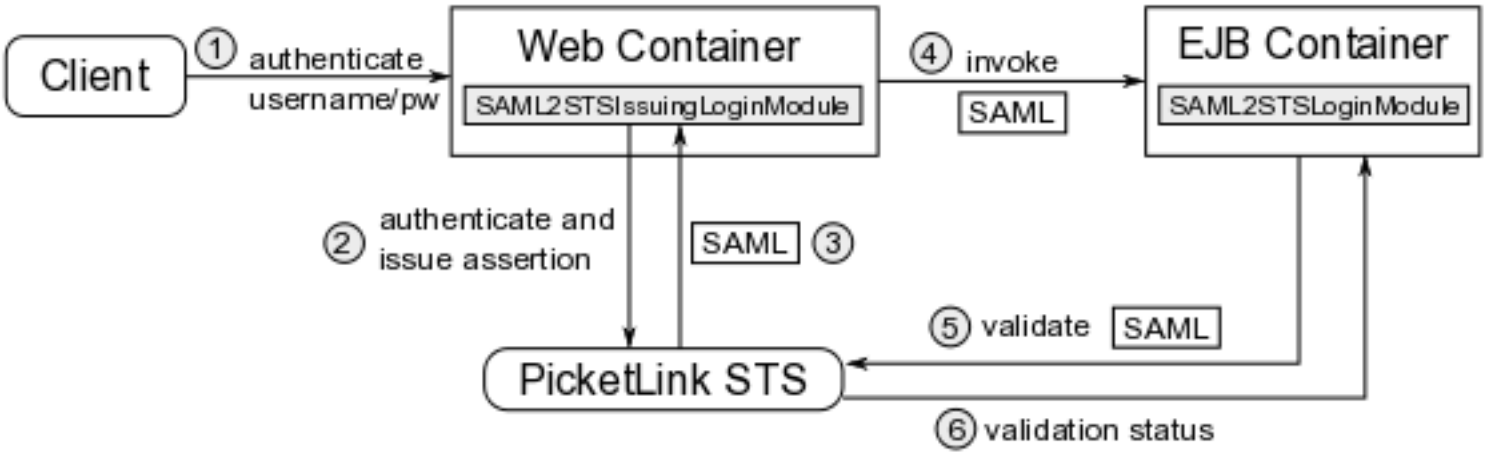
- Provides SAML based Web Browser SSO
  - Identity Provider (IDP)
  - Multiple Service Providers (SP)



SAML WEB BROWSER SSO

JBoss EAP 6.0 Security – PicketLink

- Provides STS based Identity Propagation
  - PicketLink STS
  - STS JAAS Login Modules (act as Clients)



Related Security Concepts

- Security in the Infrastructure
- Standards-Based Security
- Authentication
- Principal
- Subject
- User Repository

More ...

Related Security Concepts

- LDAP
- Security Token
- Authorization
- Identity Propagation
- Security Token Service(STS)
- SSL

Security in the Infrastructure

- Abstract security details away from application code and deployment descriptors to the greatest extent possible.
- Security should be an administrative task, not a development task.
- Generally, see getting 90% towards this goal on a given implementation.

Standards-Based Security Models

- If there is an industry spec. that provides a solution to a security problem, best approach tends to be to use that standard.
- NOT all implementations(vendor products) are
  - Created equal
  - Easy to use

Authentication

- Process of a remote entity (user or system) proving its identity to the system.
- Can be achieved in a variety of ways.
- In our examples, we will use userid and password(for end-user authentication).
- Token Validation–confirm a security token is valid and trusted
  - Validating digital signature
  - Checking expiration timestamp
  - Checking user exists in a User Repository

Principal

- An entity that can be authenticated.
- Could be a system.
  - Batch job.
  - An application.
  - A computer.
- Could be an end user.
  - A Web application user in our case.

Subject

- Refers Java Authentication and Authorization Service(JAAS) Subject
  - JAAS is the Java API/SPI for implementing authentication and authorization mechanisms.
  - Basis of PicketBox/JBossSX.
- The Subject is a Java object that contains Principal objects, public credentials, and private credentials.
- Accessed through a JAAS Context.
- Application code should refer to the JBoss JAAS Subject for all information about an authenticated user.

User Repository

- A collection of user information known to the system.
- May include: usernames, passwords, groups, group membership, and other attributes
- Examples
  - LDAP
  - Flat file
  - Database
- Master copy of all user and group information within the system.
- This is often an LDAP database.

LDAP

- LDAP—Lightweight Directory Access Protocol.
- A specification.
- Very common User Repository in many organizations.
- Contains
  - User objects (plus attributes)
  - Group objects
  - Mappings that describe group membership.

Security Token

- A self-contained collection of information that systems can pass around that describes a Principal.
- May contain (we'll assume ours does):
  - User ID.
  - List of Groups.
  - Other attributes(maybe from LDAP).
- May utilize:
  - Encryption
  - Digital signature
  - Timestamp
- SAML2 spec addresses.

Authorization

- Process by which the system makes a decision of whether an authenticated principal has permission to access a resource.
- A resource could be:
  - Web Application path (Servlet, JSP, etc)
  - EJB (or EJB method)
  - Web Service
- Will often be based upon:
  - Static information –e.g., LDAP Group membership or a user attribute
  - Dynamic information –e.g., authentication method.

Identity Propagation

- Process by which one system transmits identity of a requestor to another system.
- Identity Propagation usually achieved through some form of token.
- We are using SAML2 tokens in this discussion unless otherwise indicated.

Security Token Service(STS)

- Defined by WS-Trust spec.
- Composed of Web Service(s) that perform operations on Security Tokens(create, delete, renew, transform).
- Client trusts STS.
  - SSL(server certificate)
  - Shared key
  - WS-Security
  - Other mechanisms
- Likewise, client must provide credentials to the STS to establish trust & a principal(for our purposes, the authenticated end user) known to the User Repository.
  - We'll call these the input credentials.

Security Token Service(STS)

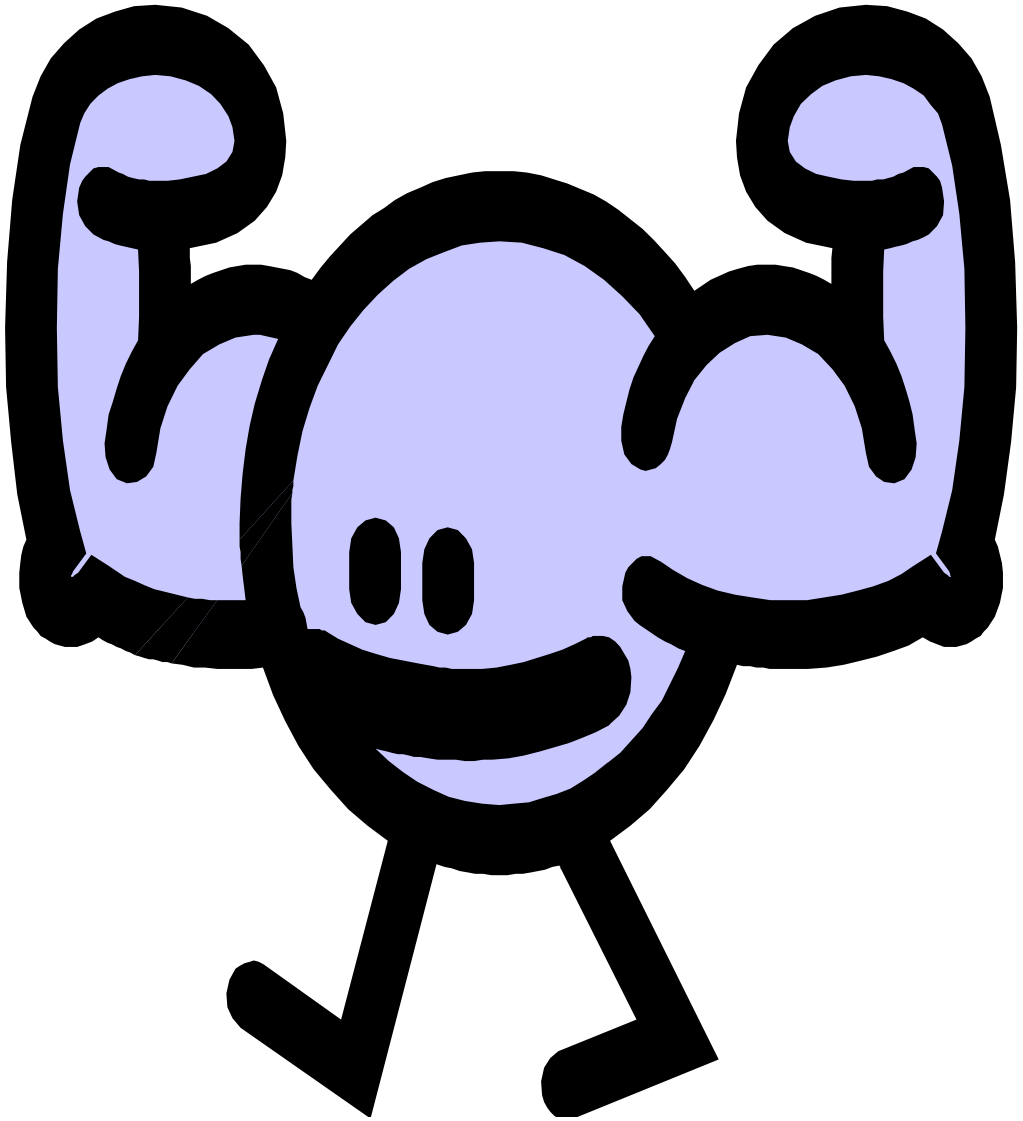
- STS provides assertions about the principal described by input credentials in the form of a Security Token.
  - We'll call this the output credential.
- This output credential should be in a format that all nodes (or at least most of them) in the distributed system understand.
- The STS can be used for all token transformations.
  - Central management of digital signature keys/certificates for security tokens.
  - Central management of
    - token generation.
    - token transformations.

SSL—Secure Sockets Layer

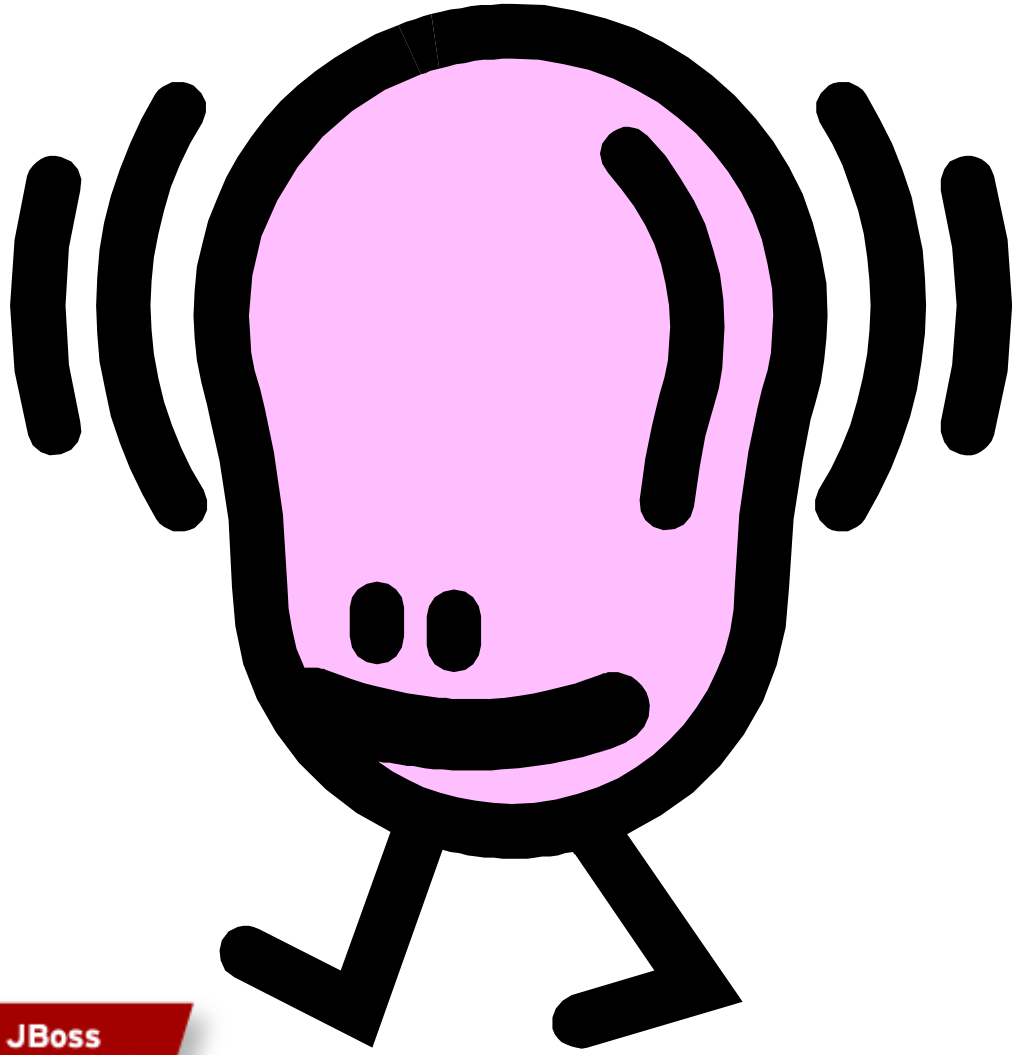
- Secure Sockets Layer (SSL) provides transport-layer security between each tier of a distributed system.
- Provides for integrity and confidentiality
- Mutually Authenticated SSL refers to the requirement of the client presenting a valid x509v3 certificate.
- Could also use alternatives (such as WS-Security Integrity & Confidentiality for SOAP Web Services)

Relevant Specs

- HTTP
- SAML2
- WS-Trust
- WS-Security
- SSL/TLS
- X509
- JAAS
- Many minor ones…



Real-World Use Cases



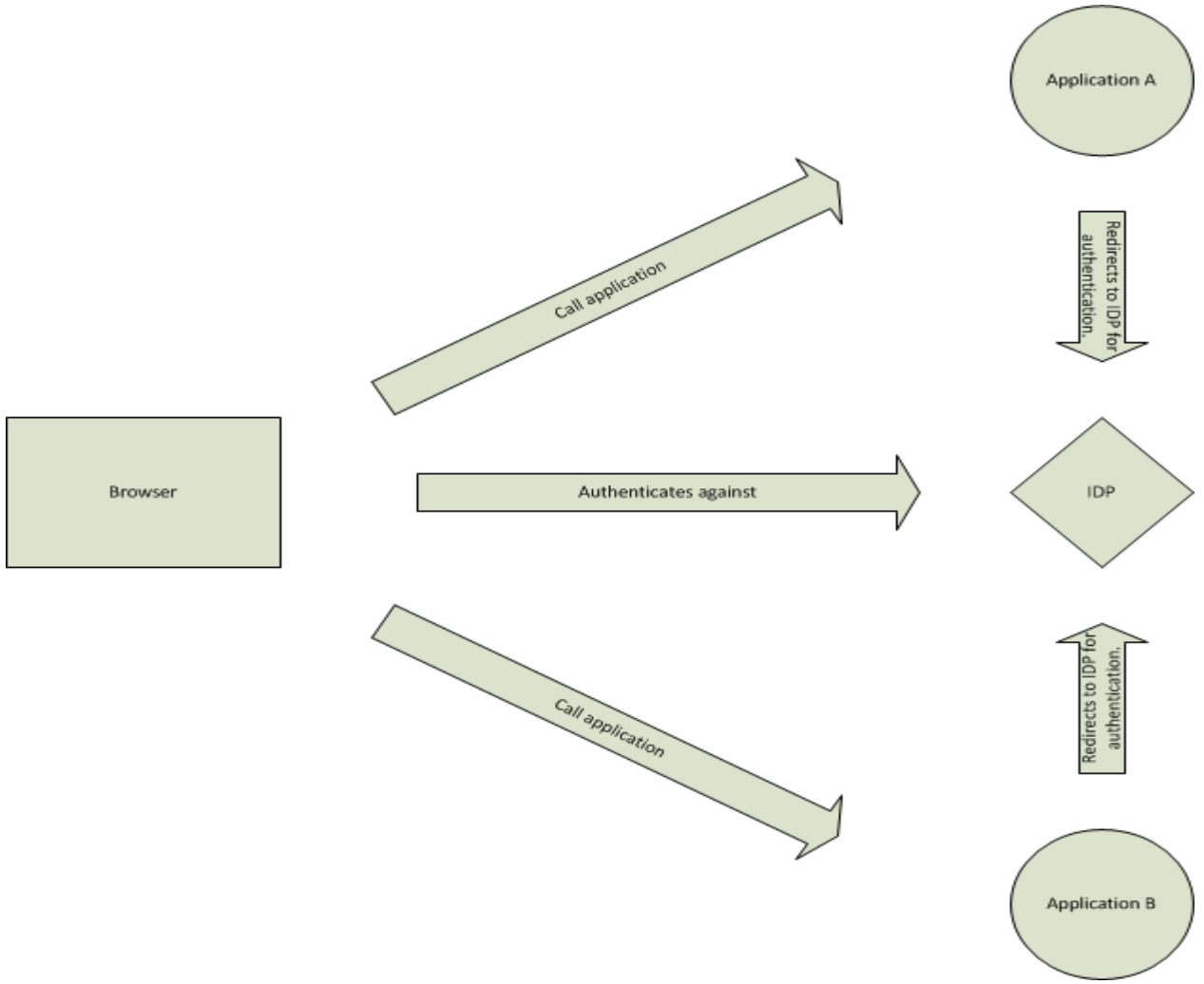
Real-World Use-Cases

- An assortment of use-cases from clients Nova Ordis, LLC has worked with.
- One of my former coworkers covered several interesting use cases at JBossWorld last year.
  - I'm intentionally covering different use cases.
- Use Cases
  - SSO between Web Applications
  - Integration with a Reverse Proxy
  - Integration with a third-party STS

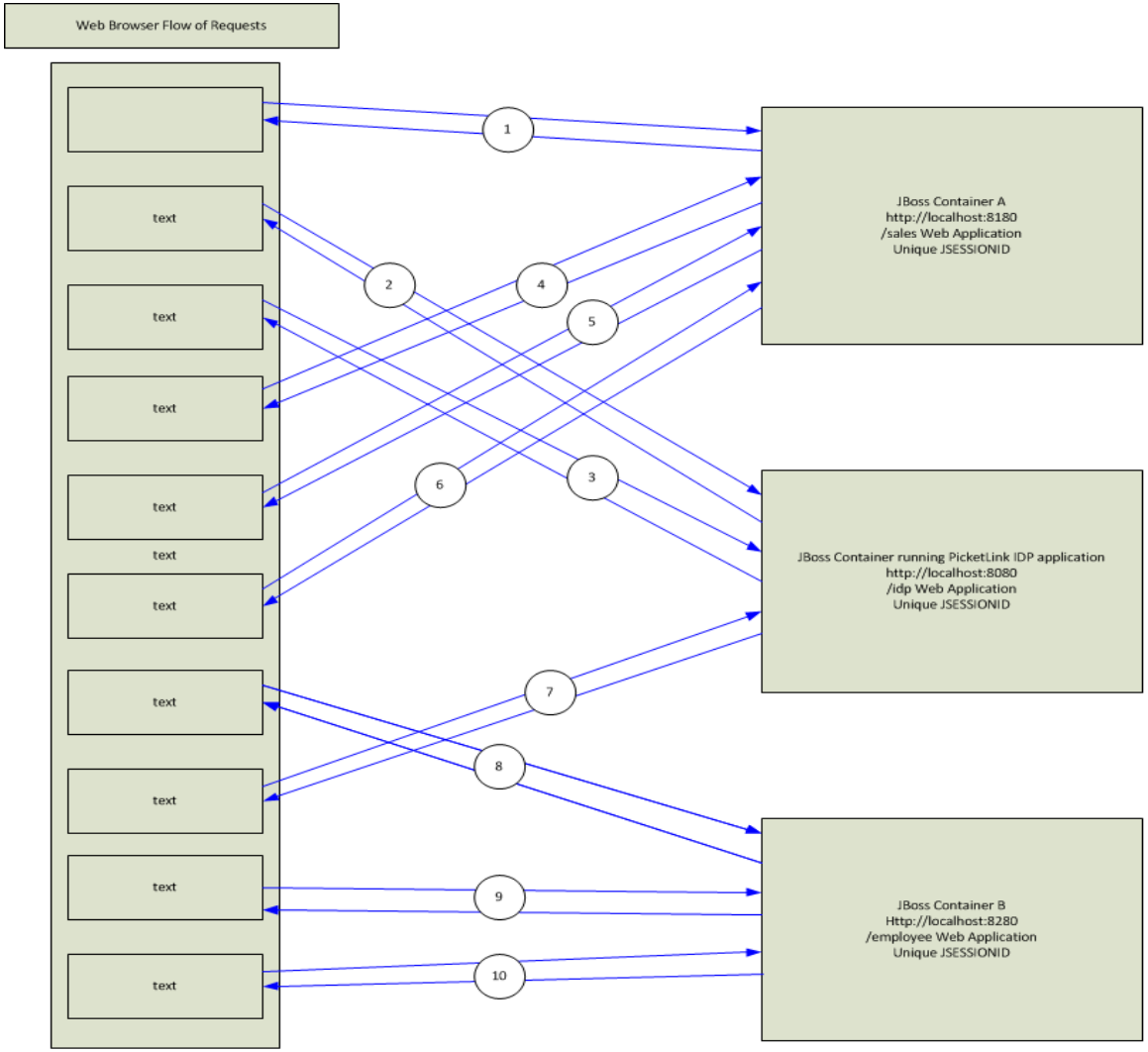
Use Case 1: Single Sign-On between two JBoss Applications

- SSO = Log in once; have access to many applications.
- Doesn't have to be JBoss container specific.
  - Very powerful.
- Could be within a trusted security realm or between two different security realms (federation).
- Described in https://community.jboss.org/wiki/SAMLWebBrowserSSOOnJBossAS70
- Going to describe the interaction between browser app A, IDP, and App B.
- Note, these web applications could be hosted on any web platform
  - WebSphere, Weblogic, .NET, etc.

Single Sign On Details



Browser->Container Interaction



1	Request: GET /sales/ Response: 302 Redirect /idp/?SAMLRequest=blah
2	Request:GET /idp/?SAMLRequest=blah Response: 200 (Login Form)
3	Request: POST /idp/j_security_check Response: 302 redirect /idp/?SAMLRequest=blah
4	Request: GET /idp/?SAMLRequest=blah Response: 302 redirect /sales/?SAMLResponse=blah
5	Request: GET /sales/?SAMLResponse=blah Response: 200 (welcome page for sales app)
6	Request: GET /sales/piechart.gif Response: 200 image (or 304 not modified on subsequent calls)
7	Request: GET /employee/ Response: 302 Redirect /idp/?SAMLRequest=blah
8	Request: GET /idp/?SAMLRequest=blah Response: 302 Redirect /employee/?SAMLResponse=blah
9	Request: GET /employee/?SAMLResponse=blah Response: 200 (welcoem page for employee app)
10	Request: GET /employee/careermap.png Response: 200 image (or 304 not modified on subsequent calls)

- All applications direct login requests to the IDP application.
- User tries to log into application A and redirects them to the IDP.
- The IDP provides a login page and relies upon JEE Security + Form Based authentication.
- User establishes a session with the IDP application that is tracked through a JSESSIONID cookie.
- IDP application returns a SAML token to the calling application(through a 302 redirect)
- Application A validates the SAML token (how?) COME_BACK
- A Security Context is created for the User A for Application A.
- The user can now access paths within Application A that he is allowed to access.
- If the user in the same authenticated browser session wishes to access Application B, Application B will also provide a redirect to the IDP.
- Since the user's browser has an authenticated session against the IDP application, the user will be issued a SAML token and redirected to the original path.
- A Security Context is created for the User on Application B.
- The user uses applications as needed.
- The Global Logout feature is used to log out of all application.
- Browser is closed.

Recommendations

- Use SSL for all network communication.
- Logging out of one application should trigger a call to the Global Logout feature of PicketLink IDP.

Notes

- Centralizes authentication of web applications.
- IDP application security configuration can be tweaked to implement the desired authentication.
  - LdapLoginModule for connection to LDAP/AD, for example.
  - SPENGO Login Module and TomCat Authenticator for SSL to the IDP(log in once to the workstation).
  - Can be used with any JAAS Login Module that is compatible with JBoss.

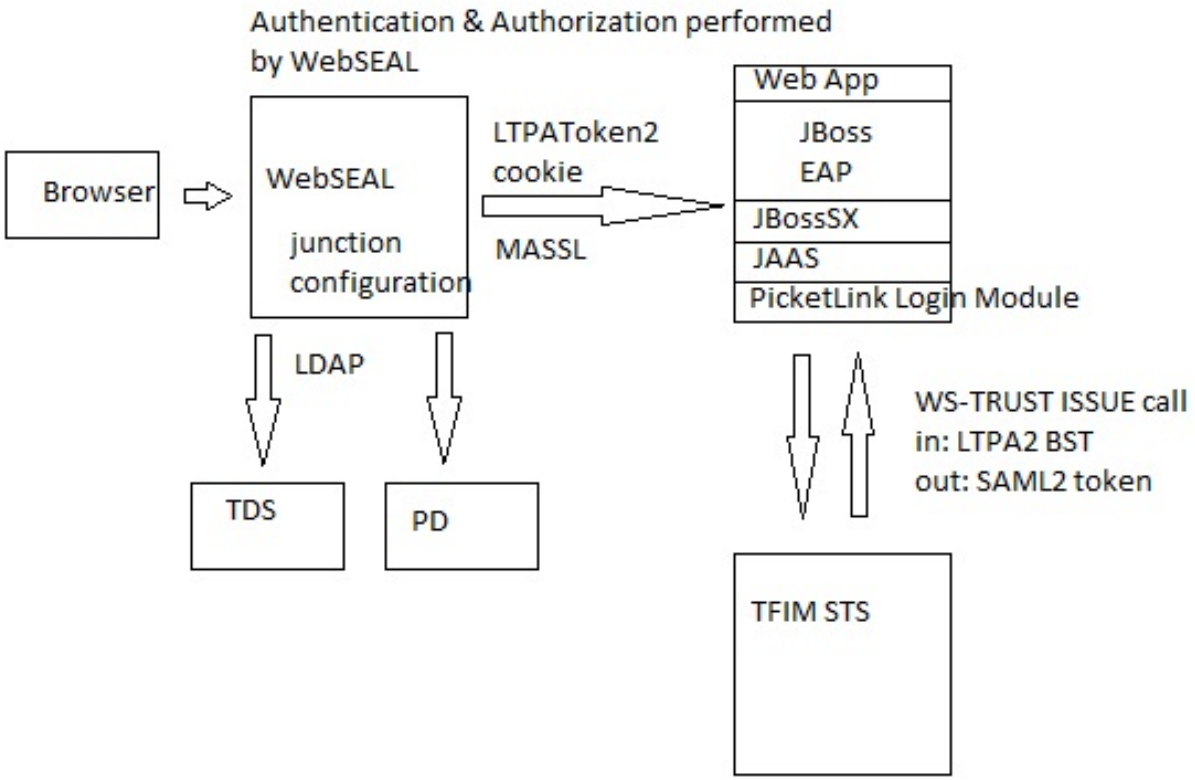
Use Case 2: Integration with a Reverse-Proxy

- A Reverse Proxy handles the authentication and authorization of web traffic within an organization.
  - Can integrate with just about any web application.
  - Sits between users and web application tiers.
  - Abstracts authentication and authorization away from application server tier.
- Can pass the authenticated identity to the web application.
  - Web application tier can use this to build its own native representation of a user's security session (ie, JBoss JAAS Subject in our case).
  - Doing this securely can be complex.
- An example of a reverse proxy would be IBM WebSphere ® Tivoli Access Manager ® (TAMeb/WebSEAL).
- This was originally implemented with PicketLink 1.x on JBoss EAP 5.1.0.
  - Some PicketLink components may not be battle hardened migrated in JBoss EAP 6.x and PicketLink 2.x.

Use of IBM TFIM STS

- PicketLink implements a client API for making WS-Trust calls.
- PicketLink provides a JAAS Login Module called SAML2STSIssuingLoginModule.
  - Can make calls to a WS-Trust compliant Security Token Service(STS).
- SAML2STSIssuingLoginModule can be configured to pull a token out of an HTTP Header or Cookie.
  - WebSEAL has the ability to pass several types of tokens.
  - Used ivcred HTTP Header and LTPAToken2 cookie(contains an LTPAv2 token).
    - Both are proprietary IBM formats.

Integration with a Reverse-Proxy (cont.)



Reverse Proxy Integration Notes

- Want secure communication between WebSEAL® and JBoss EAP
  - Secure Identity Propagation
  - Limiting who can connect to the Application Server
  - Transport layer security (Mutually Authenticated SSL)
- This system allows JBoss to build a JAAS Subject based upon the contents of an LTPAv2 token.
  - Effectively provides support for using LTPAv2 tokens in JBoss.

More Information

- If you are interested in knowing more about how to make this work, please contact me(RCBJ).
  - I have a white paper that was prepared on this topic.

Use Case 3: Integration with a third-party STS

- Actually, demonstrated with the Reverse-Proxy use-case.
  - PicketLink SAML2STSIssuingLoginModule was modified to communicate with the IBM Websphere TFIM STS.
    - Support for LTPA2 token and ivcred token passed from WebSEAL added to Login Module.
  - PicketLink is fully WS-Trust spec-compliant.
    - No changes needed for basic communication.
- These changes have not yet been battle hardened in EAP 6.0

Questions?

Thank You

- Thank You

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