WebSphere Virtual Member Manager (VMM) and its integration with Custom User Registry

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Technology Services

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Agenda

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- VMM Introduction
- Out-of-Box (OOB) Repositories
- Integration with Custom User Repository
  - In depth look at the System Programming Interface (SPI)
  - Configuration Files
  - Stand-alone configuration
  - Federated configuration
- Property Extension Repository

What is VMM and why use it?

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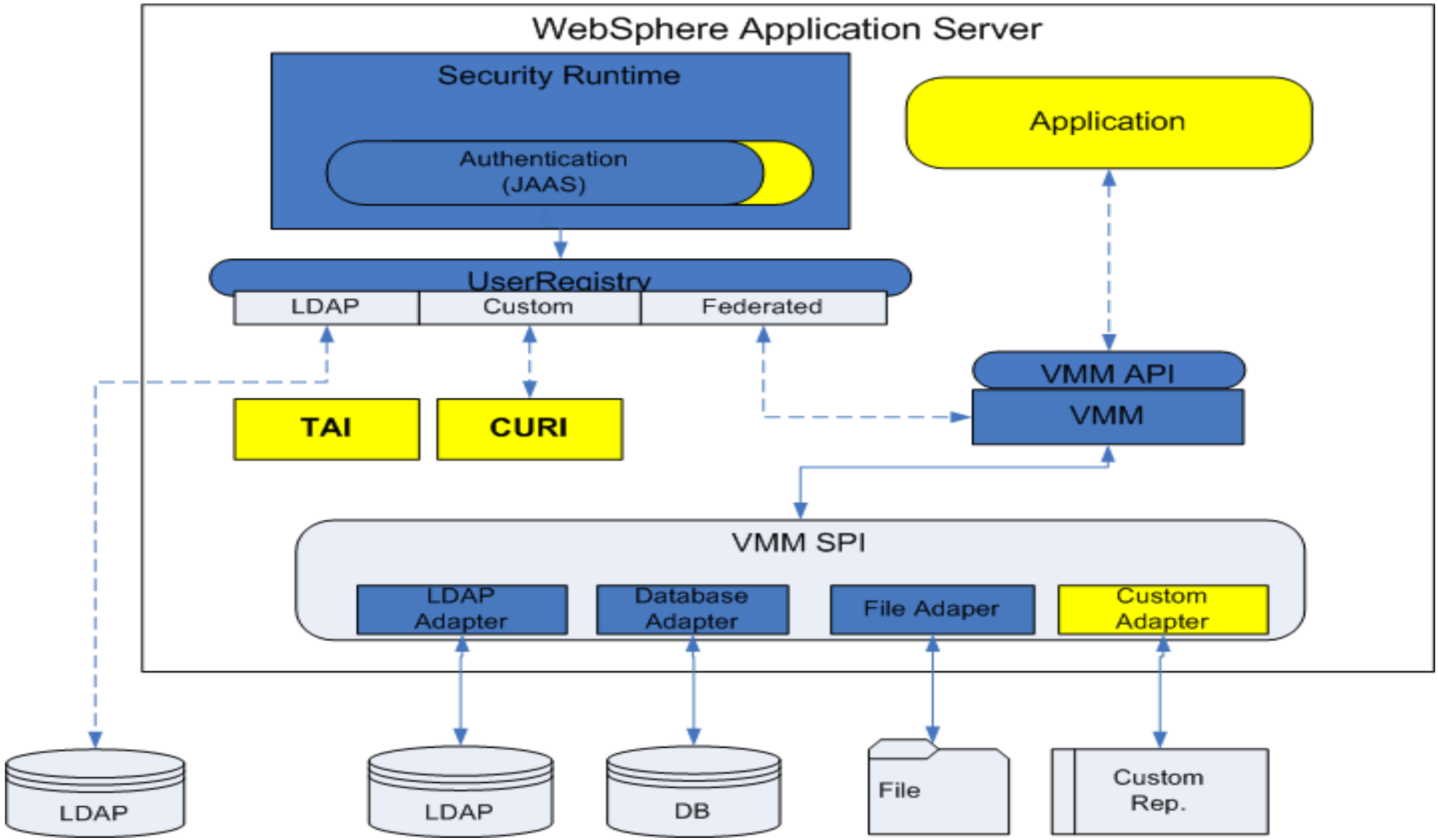
- Component available from WAS 6.1 onwards
- to manage user profile and group information
- Provides a common model for applications to interact with underlying repositories
- Allows multiple repositories to be federated as a single virtual repository

Where does it fit?



VMM Model

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- Defines common model in the form of Entities and their properties
- Expressed in the form of XML Schema Definition (XSD) files
  - wimdomain.xsd
  - wimdatagraph.xsd
  - wimschema.xsd
  - wimextension.xsd
  - wimxmlextension.xml
- Uses Service Data Object (SDO)

wimdomain.xsd

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```
<!-- properties  -->
<xsd:element name="parent" type="Entity"/>
<xsd:element name="children" type="Entity"/>
<xsd:element name="groups" type="Group"/>
.
<!– Entity -->
<xsd:complexType name="PersonAccount">
<xsd:complexContent>      <xsd:extension base="LoginAccount">
<xsd:group ref="PersonPropertyGroup"/>      </xsd:extension>
</xsd:complexContent>  </xsd:complexType>
```

wimdatagraph.xsd

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```
<xsd:element name="Root" type="RootType"/>

    <xsd:complexType name="RootType">

        <xsd:sequence>

            <xsd:element maxOccurs="unbounded" minOccurs="0"
name="contexts" type="Context"/>                    <xsd:element
maxOccurs="unbounded" minOccurs="0" name="entities" type="Entity"/>
                    <xsd:element maxOccurs="unbounded" minOccurs="0"
name="controls" type="Control"/>                    <xsd:element
ref="schema" minOccurs="0" maxOccurs="1"/>

        </xsd:sequence>

    <xsd:attribute name="validated" type="xsd:boolean" default="false"/>

</xsd:complexType>
```

VMM configuration

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- The main configuration file is called wimconfig.xml
- It contains the following
  - Global VMM configuration data
  - Schema file name and location
  - Supported Entity types
  - Configured repository information
- VMM modifies the file when repository configuration is done via Admin console or wsadmin tasks

OOB Repositories

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- LDAP
  - Microsoft AD, Tivoli Directory Server, Lotus Domino
- Database
  - DB2, Oracle
- File based
- Property Extension Repository

Integration with CUR

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- Provides an SPI
  - com.ibm.wsspi.wim.Repository
- Interface method includes
  - initialize
  - getSchema
  - createSchema
  - get
  - create
  - delete
  - update
  - search
- The custom repository adapter jar should be deployed in the **<install_root>/AppServer/lib/ext**

initialize()

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- public void initialize(DataObject reposConfig) throws WIMException

- called by VMM during server start-up

- takes in DataObject as input and contains config information for the repository as defined in wimconfig.xml

- should not depend on JNDI datasources

initialize() (contd..)

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wimconfig.xml

```
<config:repositories adapterClassName="vmm.adapter.CustomRepositoryAdapter"
id="customRepos" isExtIdUnique="true" supportExternalName="false" supportPaging="false"
supportSorting="false" supportTransactions="false">
<config:CustomProperties name="userMap.uid" value="employeeId"/>
<config:CustomProperties name="userMap.givenName" value="firstName"/>
<config:CustomProperties name="userMap.sn" value="lastName"/>
<config:CustomProperties name="userMap.ibm-primaryEmail" value="email"/>
.
</config:repositories>
```

Code sample

```
public void initialize(DataObject reposConfig) throws WIMException
   {
            .
      List<DataObject> customProps =
reposConfig.getList(ConfigConstants.CONFIG_DO_CUSTOM_PROPERTIES);
      for (DataObject customProp: customProps)
      {
            String propName = prop.getString(ConfigConstants.CONFIG_PROP_NAME);
            .
      }
      …
    }
```

getSchema()

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- public DataObject getSchema(DataObject inRoot) throws WIMException

- called by VMM at the server start-up to get repository specific schema details i.e. the supported entity properties

- DataObject passed in contains control dataobject for specific information requested

getSchema() (contd..)

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Input Dataobject example

```
<?xml version="1.0" encoding="UTF-8"?>
<sdo:datagraph xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:sdo="commonj.sdo" xmlns:wim="http://www.ibm.com/websphere/wim">
<wim:Root>
<wim:controls xsi:type="wim:PropertyDefinitionControl" repositoryId="CustomRepository"
entityTypeName="PersonAccount"/>
</wim:Root>
</sdo:datagraph>
```

Output DataObject example

```
<?xml version="1.0" encoding="UTF-8"?>
<sdo:datagraph xmlns:sdo="commonj.sdo"
xmlns:wim="http://www.ibm.com/websphere/wim">
<wim:Root>
        <wim:schema>
                <wim:propertySchema propertyName="uid"/>
                <wim:propertySchema propertyName="sn"
                .
                .
        </wim:schema>
</wim:root>
<sdo:datagraph>
```

get()

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- public DataObject get(DataObject inputDO) throws WIMException

- Used for retrieving entity or entities information

- common method for getting information for all entity types, i.e. user and group information

- frequently used by VMM and so consider caching

get(contd..)

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Inout DataObject example

```
<?xml version="1.0" encoding="UTF-8"?>
<sdo:datagraph xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:sdo="commonj.sdo" xmlns:wim="http://www.ibm.com/websphere/wim">
<wim:Root>
<wim:entities>
<wim:identifier uniqueName="uid=12345678,o=rbs"/>
</wim:entities
<wim:controls xsi:type="wim:PropertyControl">
<wim:properties>ibm-primaryEmail</wim:properties>
<wim:properties>uid</wim:properties>
</wim:controls>
</wim:Root>
</sdo:datagraph
```

Output DataObject example

```
<?xml version="1.0" encoding="UTF-8"?>
<sdo:datagraph xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:sdo="commonj.sdo" xmlns:wim="http://www.ibm.com/websphere/wim">
<wim:Root>
<wim:entities xsi:type="wim:PersonAccount">
<wim:identifier externalName="uid=12345678,o=rbs" repositoryId="CustomRepos"
externalId="uid=12345678,o=rbs" uniqueName="uid=12345678,o=rbs"/>
<wim:uid>12345678</wim:uid>
<wim:ibm-primaryEmail>kshitiz.tiwari@rbs.co.uk</wim:ibm-primaryEmail>
</wim:entities>
</wim:Root>
</sdo:datagraph>
```

search()

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- public DataObject search(DataObject inputDO) throws WIMException

- used to find entries in the repository matching the search expression

- The input data graph contains searchControl data object that contains the entity type to search and also the search expression

search() (contd..)

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Input DataObject example

```
<?xml version="1.0" encoding="UTF-8"?>
<sdo:datagraph xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:sdo="commonj.sdo" xmlns:wim="http://www.ibm.com/websphere/wim">
<wim:Root>
<wim:controls xsi:type="wim:SearchControl" countLimit="0" expression="@xsi:type='PersonAccount' and
uid=&amp;quot;12345678*&amp;quot;“ timeLimit="600000">
<wim:properties>cn</wim:properties>
<wim:properties>uid</wim:properties>
<wim:searchBases>o=rbs</wim:searchBases>
</wim:controls>
</wim:Root>
</sdo:datagraph>
```

Output dataobject example

```
<?xml version="1.0" encoding="UTF-8"?>
<sdo:datagraph xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:sdo="commonj.sdo" xmlns:wim="http://www.ibm.com/websphere/wim">
<wim:Root>
<wim:entities xsi:type="wim:PersonAccount">
<wim:identifier externalId="uid=12345678,o=rbs" externalName="uid=12345678,o=rbs"
repositoryId="CustomRepos" uniqueName="uid=12345678,o=rbs"/>
<wim:principalName>uid=12345678,o=rbs</wim:principalName>
<wim:uid>12345678</wim:uid>
<wim:cn>Kshitiz Tiwari</wim:cn>
</wim:entities>
</wim:Root>
</sdo:datagraph>
```

login()

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- Public DataObject login(DataObject root) throws WIMException
- Used to authenticate a user
- Authentication can be either using principal name and password or client certificate
- Does not need to be implemented if WAS not configured for VMM federated repository, i.e. VMM is not used for security

create/update/delete()

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- Provides methods to manage users and groups in the repository
- The methods take in the DataObject containing the entity to be modified and returns the DataObject with the modified entity with its identifier
- Does not need to be supported if repository is read only and should throw VMM exception **OperationNotSupportedException**

createSchema ()

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- Public DataObject createSchema(DataObject root) throws WIMException
- Used to create new entity and property types
- VMM updates the wimxmlextension.xml file before calling the adapter method
- Does not need to be supported and should throw VMM exception **com.ibm.websphere.exception. OperationNotSupportedException**

VMM with a stand-alone CUR

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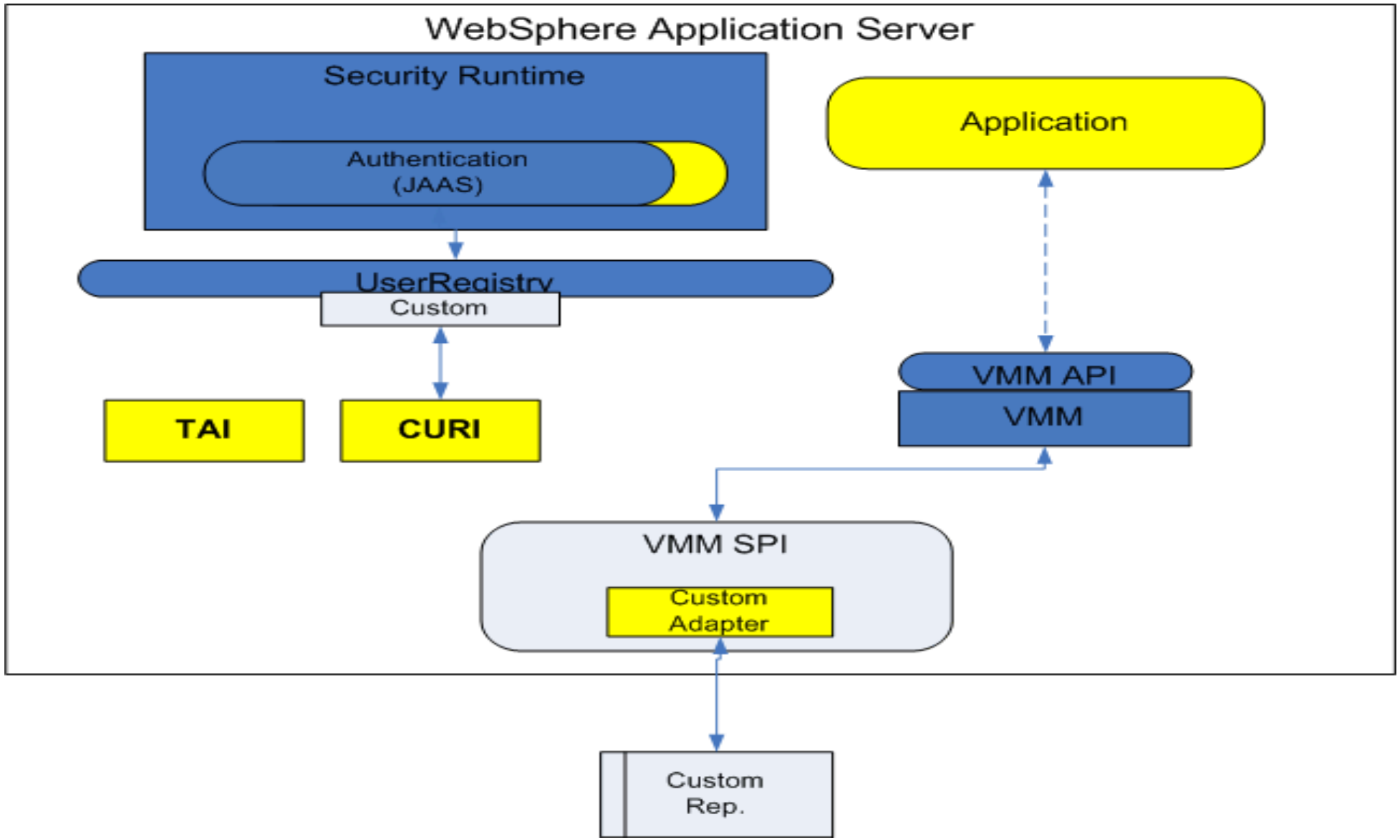
- Need to implement CURI
- VMM is not used for authentication
- Configuration does not allow the use of Property Extension Repository

VMM with a stand-alone CUR



VMM with a federated CUR

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- CURI is not required
- All UserRegistry operations are dispatched to VMM
- Allows use of Property Extension Repository

VMM with a federated CUR

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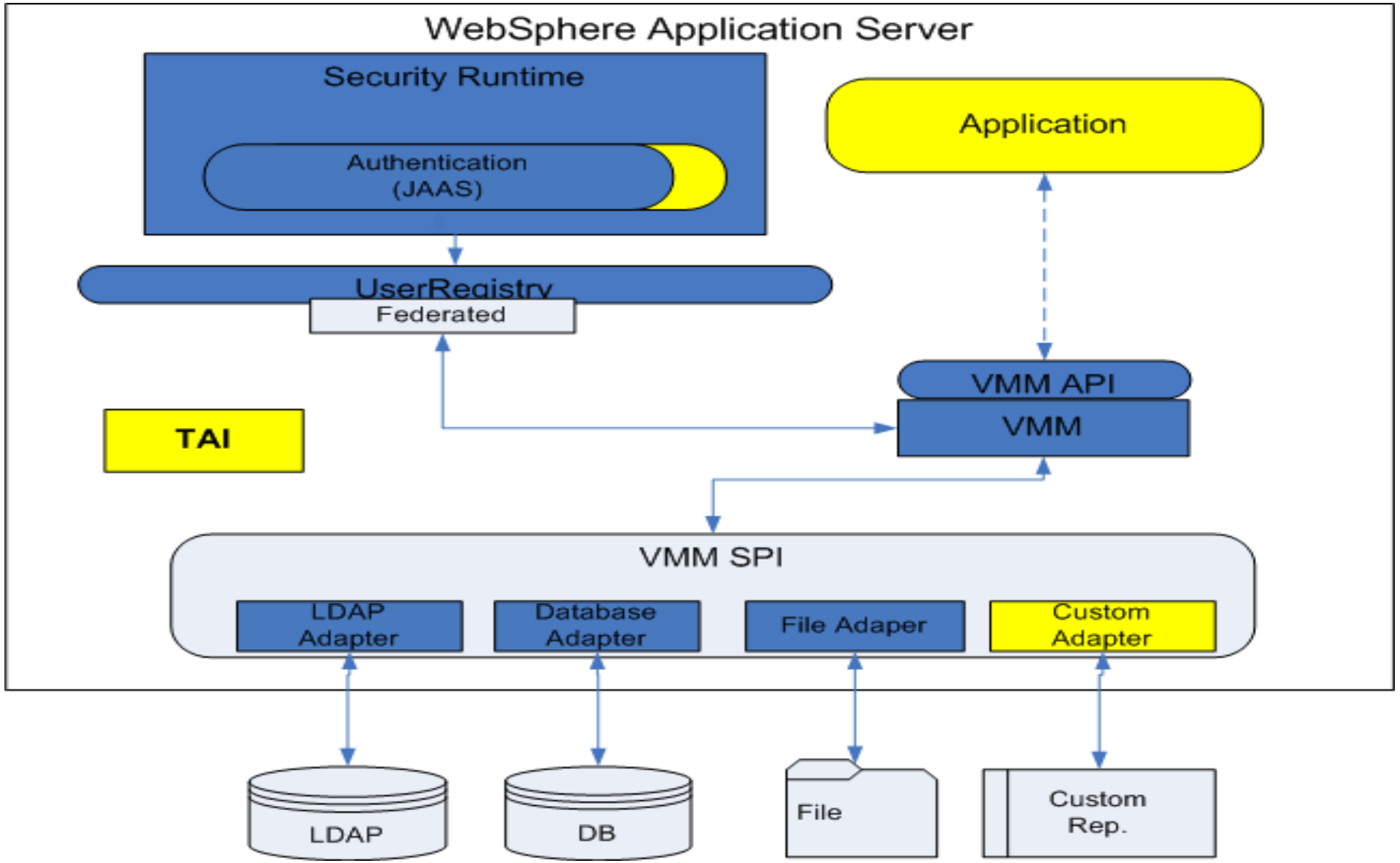

Property Extension Repository

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- OOB extension provided by IBM
- Previously known as look-aside-database
- Used to store additional properties outside of the main repository
- Can only be a database repository irrespective of the main repository type

Summary

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- VMM overview
  - ✓ What is it
  - ✓ Why use it
  - ✓ Where it fits
- Out-of-Box (OOB) Repositories
- Integration with Custom User Repository
  - ✓ Looked at the System Porgramming Interface (SPI)
  - ✓ Methods and their purpose with in/out datagraph examples
  - ✓ Stand-alone configuration
  - ✓ Federated configuration
  - ✓ Property Extension Repository

References

- WAS Info centre VMM documentation

http://pic.dhe.ibm.com/infocenter/wasinfo/v8r0/topic/com.ibm.websphere.wim.doc/welcome.html

- IBM Developerworks white paper on VMM

http://www.ibm.com/developerworks/websphere/zones/portal/proddoc/dw-w-userrepository/index.html

Q&A