Tutorial: Making and Testing a Schema Change in A&AI in Casablanca Release

NOTE - Please update the changes where you see v11 with v14 in order to test the schema change.

- 1. Set up a development environment as described in AAI Developer Environment Setup Casablanca
- 2. This document will show editing schema files with Eclipse, but Eclipse is not required.
- 3. In this example, we will add 2 new attributes to the cloud-region node type and a new node type called "new-widget" which will be a child node of "cloud-region"
- 4. Adding a new attribute to "cloud-region"5. Open aai/aai-common, aai-schema/src/main/resources/onap/oxm/v11/aai_oxm_v11.xml

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6. Add the following attributes between "complexName" and "resourceVersion":

<xml-element java-attribute="complexName" name="complex-name" type="java.lang.String"> <xml-properties></xml-properties></xml-element>
<pre><xml-property name="description" value="complex name for cloud-region instance. NOTE - THIS FIELD IS NOT CORRECTLY POPULATED."></xml-property> </pre>
<xml-element java-attribute="newAttributeForDemo" name="new-attribute-for-demo" required="true" type="java.lang.String"> <xml-properties></xml-properties></xml-element>
<xml-property name="description" value="Example new attribute for cloud-region instance. "></xml-property>
<xml-element java-attribute="numberAttributeForDemo" name="number-attribute-for-demo" required="true" type="java.lang.
Integer"></xml-element>
<pre><rml-properties></rml-properties></pre>
<pre><xmi-property name="description" value="Example number attribute for cloud-region instance."></xmi-property> </pre>
<xml-element java-attribute="resourceVersion" name="resource-version" type="java.lang.String"></xml-element>
<pre><xml-properties></xml-properties></pre>
<pre><xml-property <="" name="description" pre="" value="Used for optimistic concurrency. Must be empty on create, valid on update and delete."></xml-property></pre>
/>

A Do not try to add a new attribute with 'xml-key="true" because it creates complications when the key value is already set!

Existing classes in the schema will already have an xml-key set.

Compare with the "NewWidget" example below. As a new class in the schema, NewWidget must define a new attribute with the xml-key set.

7. Save the file, and rebuild the libraries and microservices:

here's my example file: aai_oxm_v11.xml

- a. Rebuild aai-common first:
- **b.** \$ cd ~/LF/AAI/aai-common
- c. \$ mvn versions:set -DnewVersion=0.0.1-TEST-SNAPSHOT
- d. \$ mvn clean install
- Should result in BUILD SUCCESS
- e. \$ cd ~/LF/AAI/graphadmin
- f. \$ mvn clean install -Daai.core.version=0.0.1-TEST-SNAPSHOT -Daai.schema.version=0.0.1-TEST-SNAPSHOT Should result in BUILD SUCCESS
- g. \$ cd ~/LF/AAI/resources
- h. \$ mvn clean install -Daai.core.version=0.0.1-TEST-SNAPSHOT -Daai.schema.version=0.0.1-TEST-SNAPSHOT Should result in BUILD SUCCESS
- i. \$ cd ~/LF/AAI/traversal
- mvn clean install -Daai.core.version=0.0.1-TEST-SNAPSHOT -Daai.schema.version=0.0.1-TEST-SNAPSHOT
- j. Should result in BUILD SUCCESS
- 8. Run GenTester, using the target dir under aai-resources:

\$ cd ~/LF/AAI/graphadmin;

java -DAJSC_HOME=. -DBUNDLECONFIG_DIR=src/main/resources/ -Dloader.main=org.onap.aai.schema.GenTester -Dloader.path=. /src/main/resources -Dschema.ingest.file=src/main/resources/application.properties -jar target/aai-graphadmin-*.jar

You should see the following output:

- ---- NOTE --- about to open graph (takes a little while)-----;
- -- loading schema into JanusGraph
- -- loading schema into JanusGraph
- -- Loading new schema elements into JanusGraph --
- -- graph commit
- -- graph shutdown

You can check the logs to see if the graph elements were created successfully and grep for your property cd logs/createDBSchema/; grep 'complex-name' metrics.log

 2018-12-06T04:43:18.061+0000|2018-12-06T04:43:42.960+0000|449b8583-54c1-42bf-8ada-5b75c52d7a13||main
 ||AAI|AAI

 TOOLS|AAI|main|COMPLETE|0|||INFO||127.0.1.1|24899|localhost||org.onap.a
 ai.dbgen.SchemaGenerator||||||||co=DBGenTester:Creating PropertyKey: [complex-name], [String], [SINGLE]

 2018-12-06T04:43:18.061+0000|2018-12-06T04:43:42.960+0000|449b8583-54c1-42bf-8ada-5b75c52d7a13||main
 ||AAI|AAI

 TOOLS|AAI|main|COMPLETE|0|||INFO||127.0.1.1|24899|localhost||org.onap.a
 ||AAI|AAI

 ai.dbgen.SchemaGenerator|||||||Co=DBGenTester:Add index for PropertyKey: [complex-name]
 ||AAI|AAI

9. Start the "resources" microservice

- a. Resources runs on port 8447. Go to the resources directory
- \$ cd ~/LF/AAI/resources
- **b.** Set the debug port to 9447
- \$ export MAVEN_OPTS="-Xms1024m -Xmx5120m -XX:PermSize=2024m -Xdebug -Xnoagent -Djava.compiler=NONE -Xrunjdwp: transport=dt_socket,address=9447,server=y,suspend=n"
- c. Start the microservice
- \$ mvn -pl aai-resources -P runAjsc -Daai.core.version=0.0.1-TEST-SNAPSHOT -Daai.schema.version=0.0.1-TEST-SNAPSHOT

10. Start the "traversal" microservice

- a. Traversal runs on port 8446. Go to the traversal directory \$ cd ~/LF/AAI/traversal
- **b.** Set the debug port to 9446
- \$ export MAVEN_OPTS="-Xms1024m -Xmx5120m -XX:PermSize=2024m -Xdebug -Xnoagent -Djava.compiler=NONE -Xrunjdwp: transport=dt_socket,address=9446,server=y,suspend=n"

- c. Start the microservice
- \$ mvn -pl aai-traversal -PrunAjsc -Daai.core.version=0.0.1-TEST-SNAPSHOT -Daai.schema.version=0.0.1-TEST-SNAPSHOT Should see something like this: Traversal Microservice Started
- 11. Start the "graphadmin" microservice
 - a. Graphadmin runs on port 8449. Go to the graphadmin directory \$ cd ~/LF/AAI/graphadmin
 - b. Set the debug port to 9449
 - \$ export MAVEN_OPTS="-Xms1024m -Xmx5120m -XX:PermSize=2024m -Xdebug -Xnoagent -Djava.compiler=NONE -Xrunjdwp: transport=dt_socket,address=9449,server=y,suspend=n"
 - c. Start the microservice

\$ mvn -PrunAjsc -Daai.core.version=0.0.1-TEST-SNAPSHOT -Daai.schema.version=0.0.1-TEST-SNAPSHOT Should see something like this: GraphAdmin Microservice Started

12. Get an example cloud-region object, postman: Cloud-Region Example.postman_collection.json



You should see the new attributes on the example object, as highlighted in the red rectangle above

- 13. Copy and paste the example object. Note that the following attributes need to be removed from your new object, if present in the example data:
 - a. model-invariant-id (this is a foreign key to SDC model data, which will not exist in this tutorial)
 - b. model-customization-id (this is a foreign key to SDC model data, which will not exist in this tutorial)
 - c. model-version-id (this is a foreign key to SDC model data, which will not exist in this tutorial)
 - d. resource-version (this value must be empty when creating a new object)
- 14. PUT your new object data to persist the new attributes. Use this postman collection during the next 2 steps as well.

8	Postman			
	Runner Import 📑	Builder	Team Library	😒 🙆 SYNC OFF 🛛 Sign In 🔺 👂 🛡
	Filter History Collections	https://127.] https://127.] https://127.] https://127.] https://127.]	Add Custon Add Generit Execute Nar Cloud-Regic https: ×	+ local V 💿 🔅
All	Me Team	PUT V https://127.0.0.1:8443/aai/v11/cloud-infrastr	ucture/cloud-regions/cloud-region/example-cloud-owner-val-4	44086/ex Params Send Y Save Y
	Add Instances for Named Query 2 requests	Authorization Headers (5) Body • Pre-request Scri	Value	Code Description Bulk Edit Presets
	Add Widget Models 1 request	Content-Type X-TransactionId	application/xml 9999	
	Cloud-Region Example 1 request	X-FromAppId Real-Time	Jimmy-postman true	
GET	Cloud-Region Example	Authorization	Basic QUFJOkFBSQ== Value	
	Execute Named Query 1 request	Body Cookies Headers (23) Tests		Status: 201 Created Time: 5556 ms
POST	Execute Named Query	Pretty Raw Preview JSON V		ū q.
	NamedQuery 1			
1	Postman Echo 37 requests			

15. Check the object by doing a GET: GET Cloud-Region (no depth param) in postman collection

	Postman				
	Runner Import 📮	Builder		😒 🙆 SINC OFF	Sign In 🌲 🔑 💙
	Filter	https://127. https://127. https://127. https://127. Attps://127. Attps://127.	Add Custon Add Generi Execute Na Cloud-Regic PUT C •	+ local	、 ② 貸
	History Collections	▶ PUT Cloud-Region			Examples (0) 👻
All	Me Team	GET V https://127.0.0.1:8443/aai/v11/cloud-infrastr	ucture/cloud-regions/cloud-region/example-cloud-owner-val-4	14086/ex Params	Send 🗡 Save 🗡
	2 requests	Authorization Headers (5) Body Pre-request Script	Tests		Code
	Add Widget Models	Key	Value	Description	•••• Bulk Edit Presets 🔻
	1 request	Content-Type	application/xml		
10	Cloud-Region Example	E X-TransactionId	9999		×
	1 request	X-FromAppId	jimmy-postman		
027	Cloud-Region Example	Real-Time	true		
	Execute Named Query	Authorization	Basic QUFJOkFBSQ==		
	1 request				
POST	Execute Named Query	Body Cookies Headers (22) Tests			Status: 200 OK Time: 123 ms
-	NamedQuery 1 request	Pretty Raw Preview XML V			🗋 Q Save Response
	Postman Echo 37 requests	<pre>1 k7xml version="1.0" encoding="UFF-0">> 2 - <cloud-region xmlns="http://org.opencomp.asi.inventor 3 <cloud-wersexample-cloud-owner-val-44086</cloud- 4 <cloud-region-id-scample-cloud-owner.val-44086</cloud- 5 <cloud-region-id-scample-cloud-r</td><td>y/v11"> owner> pe></cloud-region></pre>			
	Put/Get Cloud-Region 1 request	Control of the con	-ss/i4/domer-derinde-type> vul.138/cloud-region-version> tity-url> lex-name> lex-name> demo-vul-4845 -for-demo>		
		14			

16. Add the depth parameter: GET Cloud-Region (depth = all) in postman collection

	Runner Import 📑	Build	Jer Team Library	😒 🧿 sinc off	Sign In 🔺 差 🎔
	Filter	https://12 https://12 https://12 https://12 https://12 https://12	Add Custo Add Gener PUT GET Cloud New Tab	GET × +	✓ ④ ‡
	History Collections	→ GET Cloud-Region (depth = all)			Examples (0) 💌
All	Me Team □ ↓ ↓ ₹ ~				
	Add Instances for Named Query	GET V https://127.0.0.1:8443/aai/v11/cloud-ir	hrastructure/cloud-regions/cloud-region/example-clou	d-owner-val-44086/ex Params	Send Y Save Y
	2 requests	Кеу	Value	Description	••• Bulk Edit
	Add Widget Models	depth	all		
_	1 request				
	Cloud-Region Example	Authorization Headers (4) Body Pre-request	Script Tests		Code
	1 request				
GET	Cloud-Region Example	Type No Auth	~		
	Execute Named Query 1 request	Body Cookies Headers (23) Tests			Status: 200 OK Time: 257 ms
POST	Execute Named Query	Pretty Baw Preview XMI > -			C Save Response
	NamedQuery 1 request	1 xnl version="1.0" encoding="UTF-8"? 2 < cloud-region xnlns="http://org.openecomp.mai.tu 3 <cloud-owner-example-cloud-owner-val-44886<< td=""><td>nventory/v11"> /cloud-owner></td><td></td><td></td></cloud-owner-example-cloud-owner-val-44886<<>	nventory/v11"> /cloud-owner>		
PUT	https://127.0.0.1:8443/aai/v11/serv	4 <cloud-region-id>example-cloud-region-id-va 5 <cloud-type>example-cloud-type-val-137586 somer-defined-type>example-cloud-type-type-type-type=type=type=type=type=type=type=type=</cloud-type></cloud-region-id>	L-67393 Loud-type> me-val-18571		
	Postman Echo 37 requests	7 «cloud-region-version)example-cloud-region- identity-urlexample-identity-url-val-7382 9 «cloud-zone-example-cloud-zone-val-97510e/cloud- 10 «complex-name-wample-complex-name-val-2845 11 «complex-name-wample-complex-name-val-2845	version-val-130 5 fordentity-url> foroplex-name> foroplex-name>		
1	Put/Get Cloud-Region 3 requests	12 <number-attribute-for-denocatist4 number-at<br="">13 <resource-version>150178717681</resource-version>150178717681150178717681157</number-attribute-for-denocatist4>	ersion>		
PUT	PUT Cloud-Region	16 «volume-group-id>example-volume-group 17 «volume-group-name-example-volume-group 18 «heat-stack-id>example-heat-stack-id 19 «vnf-type-example-vnf-type-val-9779	sp-id-val-41816 roup-name-val-11354/volume-group-name> d-val-51114 5		
GET GET	GET Cloud-Region (no depth param) GET Cloud-Region (depth = all)	20 <pre><orc =="" =<="" b="constantial" constantial="constantial" td=""><td><pre>stration-status-val-75292 el-customization-id-val-30399/model-customization-i kample-vf-module-model-customization-id-val-11650</pre></td><td>id> vf-module-model-customization-id></td><td></td></orc></pre>	<pre>stration-status-val-75292 el-customization-id-val-30399/model-customization-i kample-vf-module-model-customization-id-val-11650</pre>	id> vf-module-model-customization-id>	

- a. This indicates that the schema has been updated with the new attributes and they are making it to the database
- 17. Clear the cloud region and then delete it by using "Clear Cloud-Region" and "Delete Cloud-Region"
 - a. note: you will need to perform a GET each time and update the resource version of the cloud-region in the XML payload for the clear, and do the GET again and update the resource-version QueryParam to perform the delete
- 18. Run PUT Cloud-Region missing attr. This will try to PUT the object without the required attribute we defined in the schema, and the response will look like this:

<?xml version="1.0" encoding="UTF-8" standalone="yes"?> <Fault> <requestError> <serviceException> <messageId>SVC3000</messageId> <text>Invalid input performing %1 on %2 (msg=%3) (ec=%4)</text> <variables> <variable>PUT</variable> <variable>v11/cloud-infrastructure/cloud-regions/cloud-region/example-cloud-owner-val-44086/example-cloud-regionid-val-67393</variable> <variable>Invalid input performing %1 on %2:Missing required property: new-attribute-for-demo</variable> <variable>ERR.5.2.3000</variable> </variables> </serviceException> </requestError> </Fault>

19. Adding a new node type. First, add the container under the top-level inventory category. Adding "newWidgets" to "Network" so the URI will be "aai/v11/network/new-widgets/new-widget-name}"

<java-type name="Network"> <xml-properties> <rml-property name="description" value="Namespace for network inventory resources." /> </xml-properties> <xml-root-element name="network" /> <java-attributes> <xml-element java-attribute="logicalLinks" name="logical-links" type="inventory.aai.onap.org.v11.LogicalLinks" /> <xml-element java-attribute="sitePairSets" name="site-pair-sets" type="inventory.aai.onap.org.v11.SitePairSets" /> <rml-element java-attribute="vpnBindings" name="vpn-bindings" type="inventory.aai.onap.org.v11.VpnBindings" /> <xml-element java-attribute="vplsPes" name="vpls-pes" type="inventory.aai.onap.org.v11.VplsPes" /> <rml-element java-attribute="multicastConfigurations" name="multicast-configurations" type="inventory.aai.onap.org.v11.</p> MulticastConfigurations" /> <xml-element java-attribute="vces" name="vces" type="inventory.aai.onap.org.v11.Vces" /> <xml-element java-attribute="vpes" name="vpes" type="inventory.aai.onap.org.v11.Vpes" /> <xml-element java-attribute="vnfcs" name="vnfcs" type="inventory.aai.onap.org.v11.Vnfcs" /> <xml-element java-attribute="I3Networks" name="I3-networks" type="inventory.aai.onap.org.v11.L3Networks" /> <rml-element java-attribute="networkPolicies" name="network-policies" type="inventory.aai.onap.org.v11.NetworkPolicies" /> <xml-element java-attribute="genericVnfs" name="generic-vnfs" type="inventory.aai.onap.org.v11.GenericVnfs" /> <xml-element java-attribute="lagLinks" name="lag-links" type="inventory.aai.onap.org.v11.LagLinks" /> <xml-element java-attribute="newvces" name="newvces" type="inventory.aai.onap.org.v11.Newvces" /> <xml-element java-attribute="pnfs" name="pnfs" type="inventory.aai.onap.org.v11.Pnfs" /> <rml-element java-attribute="physicalLinks" name="physical-links" type="inventory.aai.onap.org.v11.PhysicalLinks" /> <xml-element java-attribute="newWidgets" name="new-widgets" type="inventory.aai.onap.org.v11.NewWidgets" /> <rml-element java-attribute="ipsecConfigurations" name="ipsec-configurations" type="inventory.aai.onap.org.v11.</p> IpsecConfigurations" /> <rml-element java-attribute="routeTableReferences" name="route-table-references" type="inventory.aai.onap.org.v11.</p> RouteTableReferences" /> <rml-element java-attribute="instanceGroups" name="instance-groups" type="inventory.aai.onap.org.v11.InstanceGroups" /> <xml-element java-attribute="zones" name="zones" type="inventory.aai.onap.org.v11.Zones" /> </java-attributes> </java-type>

20. Set up the "NewWidgets" java type:

21.

	<pre><java-type name="NewWidgets"> <xml-properties> <xml-property name="description" value="Collection of new Widgets"></xml-property> </xml-properties> <xml-root-element name="new-widgets"></xml-root-element> <java-attributes> <xml-element container-type="java.util.ArrayList" java-attribute="newWidget" name="new-widget" type="inventory.aai.onap.org. v11.NewWidget"></xml-element> </java-attributes> </java-type></pre>
Se	et up the NewWidget java type:
	<pre><java-type name="NewWidget"> <xml-root-element name="new-widget"></xml-root-element> <java-attributes> <xml-element java-attribute="newWidgetName" name="new-widget-name" required="true" type="java.lang.String" xml-key="true"> <xml-properties> <xml-property name="description" value="e.g.,awesome-new-widget, terrific-new-widget"></xml-property> </xml-properties> </xml-element> <xml-element java-attribute="newWidgetType" name="new-widget-type" required="true" type="java.lang.String"> <xml-properties> </xml-properties> </xml-element></java-attributes></java-type></pre>
	<pre> ava-attribute="modelInvariantId" name="model-invariant-id" type="java.lang.String"> </pre>

<xml-property name="dbAlias" value="model-invariant-id-local" /> </xml-properties> </xml-element> <xml-element java-attribute="modelVersionId" name="model-version-id" type="java.lang.String"> <xml-properties> <rml-property name="description" value="the ASDC model version for this resource or service model." /> <xml-property name="visibility" value="deployment" /> <xml-property name="requires" value="model-invariant-id" /> <xml-property name="dbAlias" value="model-version-id-local" /> </xml-properties> </xml-element> <xml-element java-attribute="newWidgetld" name="new-widget-id" type="java.lang.String"> <xml-properties> <xml-property name="description" value="ID of the newWidget" /> </xml-properties> </xml-element> <rml-element java-attribute="relationshipList" name="relationship-list" type="inventory.aai.onap.org.v11.RelationshipList" /> </iava-attributes> <xml-properties> <xml-property name="description" value="New widgets are the best widgets. Our new widgets are really, really great."/> <rml-property name="indexedProps" value="new-widget-id,new-widget-name,model-invariant-id,model-version-id" /> <xml-property name="uniqueProps" value="new-widget-id" /> <xml-property name="container" value="new-widgets" /> <xml-property name="namespace" value="network" /> <xml-property name="searchable" value="new-widget-name,new-widget-id" />

- </xml-properties>
- </java-type>

22. Save the file, and rebuild the libraries and microservices:

here's my example file: aai_oxm_v11.xml

- a. Rebuild aai-common first:
- b. \$ cd ~/LF/AAI/aai-common
- c. \$ mvn versions:set -DnewVersion=0.0.1-TEST-SNAPSHOT
- d. \$ myn clean install
- Should result in BUILD SUCCESS
- e. \$ cd ~/LF/AAI/graphadmin
- f. \$ mvn clean install -Daai.core.version=0.0.1-TEST-SNAPSHOT -Daai.schema.version=0.0.1-TEST-SNAPSHOT Should result in BUILD SUCCESS
- g. \$ cd ~/LF/AAI/resources
- h. \$ mvn clean install -Daai.core.version=0.0.1-TEST-SNAPSHOT -Daai.schema.version=0.0.1-TEST-SNAPSHOT Should result in BUILD SUCCESS
- i. \$ cd ~/LF/AAI/traversal
- mvn clean install -Daai.core.version=0.0.1-TEST-SNAPSHOT -Daai.schema.version=0.0.1-TEST-SNAPSHOT
- j. Should result in BUILD SUCCESS
- 23. Run GenTester, using the target dir under aai-resources:

\$ cd ~/LF/AAI/graphadmin;

java -DAJSC_HOME=. -DBUNDLECONFIG_DIR=src/main/resources/ -Dloader.main=org.onap.aai.schema.GenTester -Dloader.path=. /src/main/resources -Dschema.ingest.file=src/main/resources/application.properties -jar target/aai-graphadmin-*.jar

You should see the following output:

---- NOTE --- about to open graph (takes a little while)------;

- -- loading schema into JanusGraph
- -- loading schema into JanusGraph
- -- Loading new schema elements into JanusGraph --
- -- graph commit
- -- graph shutdown

You can check the logs to see if the graph elements were created successfully and grep for your propertycd logs /createDBSchema/;

grep 'new-widget-name' metrics.log

Creating PropertyKey: [new-widget-name], [String], [SINGLE] [DEV: 2017-Jul-28 08:44:12,287][INFO][main]Creating PropertyKey: [new-widget-name], [String], [SINGLE] Add index for PropertyKey: [new-widget-name] [DEV: 2017-Jul-28 08:44:12,289][INFO][main]Add index for PropertyKey: [new-widget-name] Creating PropertyKey: [new-widget-type], [String], [SINGLE] [DEV: 2017-Jul-28 08:44:12,291][INFO][main]Creating PropertyKey: [new-widget-type], [String], [SINGLE] No index added for PropertyKey: [new-widget-type] [DEV: 2017-Jul-28 08:44:12,501][INFO][main]No index added for PropertyKey: [new-widget-type]

PropertyKey [resource-version] already existed in the DB. PropertyKey [model-invariant-id] already existed in the DB. PropertyKey [model-version-id] already existed in the DB. Creating PropertyKey: [new-widget-id], [String], [SINGLE] [DEV: 2017-Jul-28 08:44:12,501][INFO][main]Creating PropertyKey: [new-widget-id], [String], [SINGLE]

- 24. Start the "resources" microservice
 - a. Resources runs on port 8447. Go to the resources directory \$ cd ~/LF/AAI/resources
 - **b.** Set the debug port to 9447
 - \$ export MAVEN_OPTS="-Xms1024m -Xmx5120m -XX:PermSize=2024m -Xdebug -Xnoagent -Djava.compiler=NONE -Xrunjdwp: transport=dt_socket,address=9447,server=y,suspend=n"
 - c. Start the microservice
 \$ mvn -pl aai-resources -P runAjsc -Daai.core.version=0.0.1-TEST-SNAPSHOT -Daai.schema.version=0.0.1-TEST-SNAPSHOT Should see something like this: Resources Microservice Started
- 25. Start the "traversal" microservice
 - a. Traversal runs on port 8446. Go to the traversal directory
 - \$ cd ~/LF/AAI/traversal
 - b. Set the debug port to 9446
 - \$ export MAVEN_OPTS="-Xms1024m -Xmx5120m -XX:PermSize=2024m -Xdebug -Xnoagent -Djava.compiler=NONE -Xrunjdwp: transport=dt_socket,address=9447,server=y,suspend=n"
 - c. Start the microservice
 - \$ mvn -pl aai-traversal -P runAjsc -Daai.core.version=0.0.1-TEST-SNAPSHOT -Daai.schema.version=0.0.1-TEST-SNAPSHOT Should see something like this: Traversal Microservice Started
- **26.** Start the "graphadmin" microservice
 - a. Graphadmin runs on port 8449. Go to the graphadmin directory
 - \$ cd ~/LF/AAI/graphadmin
 - **b.** Set the debug port to 9449
 - \$ export MAVEN_OPTS="-Xms1024m -Xmx5120m -XX:PermSize=2024m -Xdebug -Xnoagent -Djava.compiler=NONE -Xrunjdwp: transport=dt_socket,address=9449,server=y,suspend=n"
 - c. Start the microservice
 - \$ mvn -PrunAjsc -Daai.core.version=0.0.1-TEST-SNAPSHOT -Daai.schema.version=0.0.1-TEST-SNAPSHOT Should see something like this: GraphAdmin Microservice Started
- 27. Get an example newWidget using "New Widget Example" (find these examples in this postman collection: New-Widget Example.
 - postman_collection.json)

80	Postman				
) Runner Import 📑	Builder Team Library 😵	SINC OFF	Sign In 🔺 🔑 🖣	2
	Filter	PUT • GET Cloud Dele • Cles • PUT • Nex × PUT • PUT 2nd * Cloud-Reg PUT • New Widg PUT •	local	✓ ◎ 1	j.
	History Collections	▶ New Widget Example		Examples (0) 👻	
All	Me Team 📑 🖓				
		GET V https://127.0.0.1:8443/aai/v11/examples/new-widget	Params	Send Y Save Y	
POST	Execute Named Query	Authorization Headers (4) Body Pre-request Script Tests		Cod	e
	NamedQuery 1 request				
PUT	https://127.0.0.1:8443/aai/v11/serv	Type No Auth			
	New-Widget Example 3 requests	Body Cookies Headers (21) Tests		Status: 200 OK Time: 584 ms	
GET	New Widget Example	Pretty Raw Preview XML V 📅		🗋 Q Save Response	
PUT	PUT New Widget	1 k2xml version="1.0" encoding="UTF-8"?>			
PUT	PUT Cloud-Region related to New	3 cnew-widget-name>example-new-widget-name-val-48832/new-widget-name> 4 cnew-widget-type>example-new-widget-type>val-75449			
	Postman Echo 37 requests	cmddi-turwirian-turesampte-mode-turwirian-tuf-war-roßdk-/mddef-inwartian-tuf- omder-turwirian-tufesampte-mode-version-turwirian-tuf-version-da- da-turwirian-turesampte-mode-version-turwirian-tuf- esampte-turwirian-turwirian-turwirian-tuf-version-tuf- v/new-widget-			
hii	Put/Get/Delete Cloud-Region 6 requests				
PUT	PUT Cloud-Region				
687	GET Cloud-Region (no depth param)				
GET	GET Cloud-Region (depth = all)				
PUT	Clear Cloud-Region				
DEL	Delete Cloud-Region				
PUT	PUT Cloud-Region - missing attr				

28. Copy the new widget and PUT it: (PUT New Widget)

8	Postman					
] Runner Import 📑	Builder Team Library	🗿 SYNC OFF		•	
Q	Filter	PUT • GET Cloud Dele • Clea • PUT • New Widg PUT • PUT 2nd * Cloud-Reg PUT • New Widg PUT •	local		~	> \$
	History Collections	▶ PUT New Widget			Examples	(0) -
All	Me Team					
		PUT V https://127.0.0.1:8443/aai/v11/network/new-widgets/new-widget/example-new-widget-name-val-43832	Params	Send 🗡	Save	• ~
POST	Execute Named Query	Authorization Headers (5) Body Pre-request Script Tests				Code
	NamedQuery 1 request	● form-data ● x-www-form-urlencoded ● raw ● binary XML (application/xml) ∨				
PUT	https://127.0.0.1:8443/aai/v11/serv	1 k2xml version="1.0" encoding="UTF-8">> 2 * <nev-widset xmlns="http://or.coenecomo.aai.inventory/v11"></nev-widset>				
hii	New-Widget Example 3 requests	3 ensemblight ensemblight interversion wall-eBB2C (non-widget ensemblight) ensemblight typesexamplight ensemblight typesexamplight types anded timest tart. (decamplight ensemblight) ensemblight (1994) (model timest tart-tab- ensemblight) ensemblight ensemblight) ensemblight (1994) (model timest tart-tab- ensemblight) ensemblight) ensemblight) ensemblight ensemblight) ensemblight (1994) ensemblight) ens				
GET	New Widget Example	8				
PUT	PUT New Widget					
PUT	PUT Cloud-Region related to New					
	Postman Echo 37 requests					
hii	Put/Get/Delete Cloud-Region 6 requests					
PUT	PUT Cloud-Region					
GET	GET Cloud-Region (no depth param)	Body Cookies Headers (23) Tests	Sta	atus: 201 Created	Time: 20	j62 ms
GET	GET Cloud-Region (depth = all)	Pretty Raw Preview		ū	Save Res	ponse
PUT	Clear Cloud-Region					
DEL	Delete Cloud-Region					
PUT	PUT Cloud-Region - missing attr					

- 29. Success! We have updated an existing object type and added a new object type. Next, we will set up an edge between the CloudRegion and the NewWidget

File Edit Navigate Search Project Git Run Window Help				
二・ 例 日	0 - 2 6 1/ -	[] [] [] [] [] [] [] [] · 한 · 한 · 한 · 한 · 한 · [] � � � � + 4 (屬 · 종 분 · 영 · 영 		Quick Ace
🕒 Project Explorer 💠 📄 🔁 👘 👘 👘	DbEdgeRules_v11	jaon 33		🗄 Outline 🕮 🧻
b 🖏 aai [aai feature/AAI-9639-increase-common-jar-versions-for]	19	"multiplicity": "Many2Many",	*	An outline is not avai
a 🏹 > aai-common [aai-common bugfix/AAI-9574-xsd-autogeneration-for-v2-is-broken]	20	<pre>contains-other-v": "NONE", "dolate ables v": "NONE",</pre>	E	
aai-annotations [aai-common bugfit/AAI-9574-xsd-autogeneration-for-v2-is-broken]	22	Gelete-other-v: Nume,		
a 🙀 > aai-core [aai-common bugfit/AAI-9574-xsd-autogeneration-for-v2-is-broken]	23	"prevent-delete": " \${direction}"		
> 🤧 src/main/java	24 },			
a 🔄 src/main/resources	25 {			
a 🚯 dbedgerules	26	"from": "availability-zone",		
DbEdgeRules_v10.json	28	label' "suportsGeruiceCapability".		
DbEdgeRules_v11.json	29	"direction": "OUT",		
bEdgeRules_v2.json	30	"multiplicity": "Many2Many",		
DbEdgeRules_v7.json	31	<pre>contains-other-v": "NONE", Teller abbe v. "NONE",</pre>		
DbEdgeRules_v8.json	32	Selectrocher's : Howe,		
DbEdgeRules_v9.json	34	"prevent-delete": "[\${direction}"		
dbedgerules.conversion	35 },			
AAB032.csv	36 (
🔓 EdgeRules.ftl	37	"from": "cloud-region",		
swagger.html.ftl	38	"tor: "complex",		
> 🎒 src/test/java	40	"direction": "OUT".		
B > src/test/resources	41	"multiplicity": "Many2One",		
IRE System Library [JavaSE-1.8]	42	"contains-other-v": "NONE",		
Maven Dependencies	43	"delete-other-v": "NONE",		
👂 🧀 bin	44	"SWC-INFRA: "NONE",		
) 🍰 > src	45 1.	header-nerget i Manierrania		
> 🗁 target	47			
LICENSE.TXT	48	"from": "cloud-region",		
pom.xml	49	"to": "I3-network",		
b ai-schema [aai-common bugfix/AAI-9574-xsd-autogeneration-for-v2-is-broken]	58	"label: "ises",		
🕞 LICENSE.TXT	52	multiplicity" "Nanzhany".		
🔒 pom.xml	53	"contains-other-v": "NONE",		
🔒 readme.md	54	"delete-other-v": "NONE",		
🛐 set-debug-port.bat	55	"SVC-INFRA": "NONE",		
🛐 version.properties	56	-prevent-delete:: "NUNE-		
b pai-incoming-adapter (in incoming-adapter) [incoming-adapter develop]	58 2			
b 10 sai-resources-service (in resources) [resources develop]	59	"from": "cloud-region",		
b b > fitnesse (in automated-testing) [automated-testing develop]	60	"to": "tenant",		
b 🖏 > traversal (in graph-query) [graph-query feature/AAI-9691-custom-queries-for-sdn-gc-to-sup	61	"label": "has",		
	62	"direction": "OUI",		

31. Add a new EdgeRule, allowing an edge between the CloudRegion and NewWidget:

(
	"from": "cloud-region",
	"to": "tenant",
	"label": "has",
	"direction": "OUT",
	"multiplicity": "One2Many",
	"contains-other-v": "\${direction}",
	"delete-other-v": "NONE",
	"SVC-INFRA": "!\${direction}",
	"prevent-delete": "\${direction}"
}	h,
(
	"from": "cloud-region",
	"to": "new-widget",

	"label": "has",
	"direction": "OUT",
	"multiplicity": "One2Many",
	"contains-other-v": "NONE",
	"delete-other-v": "NONE",
	"SVC-INFRA": "NONE",
	"prevent-delete": "NONE"
	},
Tł to	his means cloud-region connects to new-widget, edge label is "has", it's an OUT edge, one cloud region can have multiple edges o new-widgets,
ci S	oud-region does not contain new-widget, new-widget will not be deleted when the cloud-region connected to it is deleted, it is not VC_INFRA type, and having an edge to a new-widget will not prevent deletion of the cloud-region.

- 32. Save the file, and rebuild aai-common, resources, and traversal. Start resources and traversal microservices.
- 33. Create a cloud region with a relationship to the new-widget that was created earlier: (PUT Cloud-Region related to New-Widget)

80	Postman				
	Runner Import 📑	Builder Team Library 😵 🎯 snic 047		•	C 💌
Q	Filter	Duc GET Cloud Delk Cles PUT New Widg PUT PUT Cloud Reg PUT New Fut New Tab Cloud Cloud Reg PUT New Cloud Reg PUT		~	> ¢
	History Collections				
All	Me Team 📑 ↓₹ -	PUT V https://12.7.00.118443/aai/V11/doud-inirastructure/cloud-regions/cloud-regionvexample-cloud-owner-val-44086/ex Params	Send Y	Save	2 ×
	Add Instances for Named Query 2 requests	 c-load: type=capite cload: type=cal_1728/cload: type: -copiter_cload: type=capiter_cload: type=cal_1728/cload: type: -cload: region=region=capiter_cload: type=cal_1828/cload: region=region=capiter_cload: type=capiter_cload: type=c			
1	Add Widget Models 1 request	<pre>ccopic::an=capic:copic:an=capic:copic:an=ca</pre>			
hii	Cloud-Region Example 1 request	15 cfelieft tophen-indext/relates to: 17 cfeliates tophen-indext/relates to: 18 cfeliates tophen-indext.exe-widget-name/relationship-keys 18 cfeliateship-valuesexample-new-widget-name/val-4382c/relationship-values 19 cfeliateship-tophen-indext.exe-val-4382c/relationship-values 19 cfeliateship-tophen-indext.exe-valueship-tophen-indext.exe-valueship-tophen-indext.exe-valueship-tophen-indext.exe-valueship-tophen-indext.exe-valueship-tophen-indext.exe-valueship-tophen-indext.exe-valueship-tophen-indext.exe-valueship-tophen-indext.exe-valueship-tophen-indext.exe-valueship-tophen-indext.exe-valueship-tophen-indext.exe-valueship-tophen-indext.exe-valueship-tophen-indext.exe-			
	Execute Named Query 1 request	21 -/relationalip-list> 22 -/relationalip-list>			
	NamedQuery 1 request	Body Coolies Headers (23) Tests	Status: 201 Created	Time: 3	489 ms
	New-Widget Example 3 requests	Pretty Raw Preview	ū	Save Res	ponse
027	New Widget Example				
PUT	PUT New Widget				
PUT	PUT Cloud-Region related to New-Wi				
	Postman Echo 37 requests		Statu: 201 Cost Signin Image: Cost of the state of th		
	Put/Get/Delete Cloud-Region 6 requests	Builder Tenn Library Weiter Des Contractions PUT http://12/20.0.13443/au/17/double/findstructure/cloud-regions/doud-region/cloud-region-region-region-region-region-region-region-region-region-region/cloud-region/cloud-region-region/cloud-region/cloud-			

34. GET the new-widget object: (GET New Widget)

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	Runner Import 📑	Builder Team Library 🛞 🌀 sinc Gir Sign in 🖉 🔺 🖉 🖤
	Filter	Clea • PUT • New Wedg PUT New PUT • Cloud Reg PUT • New • PUT • New Tab GET • + •••• Iocal V 👁 🔅
	History Collections	→ GET New Widget Examples (0) ▼
All	Me Team 📑 ↓₹ ×	
	Add Instances for Named Query	GET V https://127.00.1:8443/aal/V11/network/new-widget/example-new-widget-name-val-43832 Params Send V Save V
_	2 requests	Authorization Headers (4) Body Pre-request Script Tests Code
	Add Widget Models 1 request	Type No Auth V
hii	Cloud-Region Example 1 request	Body Cookies Headers (22) Tests Status: 200 OK Time: 123 ms
	Execute Named Query 1 request	Pretty Raw Preview XML V 🃅
	NamedQuery 1 request	1 chal version 1.9 "encoding-UFF4"> and impact of the start of the sta
	New-Widget Example 4 requests	<pre>conset.veriion.ic/secangle.model.veriion.ic/veli238145/poste/veriion.ic/s conset.veriion.ic/veli238145/poste/veriion.ic/s conset.veriion.ic/veli238145/poste/veli28045/po</pre>
GET	New Widget Example	<pre>crelated-link-jai/vil/cloud-infrastructure/cloud-regions/cloud-region/example-cloud-owner-val-44086/example-cloud-region-id-val-67393srelationship-data</pre>
PUT	PUT New Widget	<pre>creationship.value>cample.cloud-owner.val.44086 15 cample.cloud-owner.val.44086 16 </pre>
PUT	PUT Cloud-Region related to New	17 v <relationship-data> 18 <relationship-key>cloud-region.cloud-region.id/relationship-key> 19 <relationship-wu relationship-wu="" th="" vms="" we<="" www.examle-cloud-region-id=""></relationship-wu></relationship-key></relationship-data>
GET	GET New Widget	20 21 - <related-to-property></related-to-property>
	Postman Echo 37 requests	22 groups ty keys close + region, oner-def tuel-type//rigor ty-keys 4 groups ty value anglic somer-def tuel-type//rigor ty-keys 5 groups type type type type type type type type
	Put/Get/Delete Cloud-Region 6 requests	er «Inen-Roget»

35. Notice that when GETting the new-widget object it shows the relationship to the cloud-region.

We have successfully modified the schema and edge rules to update an existing type, create a new type, and define an edge relationship which allows for a new-widget type to be connected to a cloud-region.

Attachments

File	Modified
PNG File image2017-9-4_11-4-45.png	Dec 06, 2018 by Keong Lim
File New-Widget Example.postman_collection.json	Dec 06, 2018 by Keong Lim
PNG File edgeruleScreenshot.png	Dec 06, 2018 by Keong Lim
PNG File image2017-7-28_9-20-43.png	Dec 06, 2018 by Keong Lim
PNG File image2017-7-28_9-18-56.png	Dec 06, 2018 by Keong Lim
XML File aai_oxm_v11.xml	Dec 06, 2018 by Keong Lim
PNG File image2017-7-28_8-27-41.png	Dec 06, 2018 by Keong Lim
PNG File image2017-7-28_8-26-35.png	Dec 06, 2018 by Keong Lim
PNG File image2017-7-27_15-14-13.png	Dec 06, 2018 by Keong Lim
PNG File image2017-7-27_15-8-17.png	Dec 06, 2018 by Keong Lim
PNG File image2017-7-27_15-5-19.png	Dec 06, 2018 by Keong Lim
PNG File image2017-7-27_15-4-5.png	Dec 06, 2018 by Keong Lim
File Put-Get Cloud-Region.postman_collection.json	Dec 06, 2018 by Keong Lim
PNG File image2017-7-27_14-19-20.png	Dec 06, 2018 by Keong Lim
PNG File image2017-7-27_14-15-23.png	Dec 06, 2018 by Keong Lim
PNG File image2017-7-27_14-11-36.png	Dec 06, 2018 by Keong Lim
PNG File image2017-7-27_14-7-48.png	Dec 06, 2018 by Keong Lim
PNG File image2017-7-27_14-7-35.png	Dec 06, 2018 by Keong Lim

	PNG File image2017-7-27_14-6-53.png	Dec 06, 2018 by Keong Lim
	PNG File image2017-7-27_14-6-25.png	Dec 06, 2018 by Keong Lim
	PNG File image2017-7-27_13-57-5.png	Dec 06, 2018 by Keong Lim
	File Cloud-Region Example.postman_collection.json	Dec 06, 2018 by Keong Lim
	PNG File image2017-7-27_12-31-54.png	Dec 06, 2018 by Keong Lim
	PNG File image2017-7-26_16-58-5.png	Dec 06, 2018 by Keong Lim
	File Execute Named Query.postman_collection.json	Dec 06, 2018 by Keong Lim
	File Add Instances for Named Query.postman_collection.json	Dec 06, 2018 by Keong Lim
	File NamedQuery.postman_collection.json	Dec 06, 2018 by Keong Lim
	File Add Widget Models.postman_collection.json	Dec 06, 2018 by Keong Lim
	PNG File image2017-7-26_16-23-12.png	Dec 06, 2018 by Keong Lim
	PNG File image2017-7-26_16-17-19.png	Dec 06, 2018 by Keong Lim
	File models.csv	Dec 06, 2018 by Keong Lim
	PNG File image2017-7-26_11-6-11.png	Dec 06, 2018 by Keong Lim
	File aai.pem	Dec 06, 2018 by Keong Lim
	File haproxy.cfg	Dec 06, 2018 by Keong Lim
-	1 1 4 11	

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