Part-5: Dynamic Cluster

WebSphere Application Server v8.5 Primer

By

WebSphereLibrary

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What is dynamic cluster

A dynamic cluster is same like a static cluster except that WebSphere will control the no of active instances for an application, their placement by using service policies and work load demand.

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<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Static clusters</th>
<th>Dynamic clusters</th>
</tr>
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<tbody>
<tr>
<td>Membership</td>
<td>You must manually add application servers to static clusters.</td>
<td>You can define a node group that contains the nodes on which a dynamic cluster can add and or remove cluster members.</td>
</tr>
<tr>
<td>Cluster management</td>
<td>You define the application servers that are in the static cluster and then start or stop all the application servers in the cluster.</td>
<td>A dynamic cluster can start and stop instances of servers as required. If the dynamic cluster is in automatic mode, then the server instances stop and start automatically. If the dynamic cluster is in supervised mode, runtime tasks generate to advise the administrator to start and stop servers at certain times. In manual mode, the administrator decides when instances of servers are stopped and started.</td>
</tr>
<tr>
<td>Cluster templates</td>
<td>When you define a static cluster, you can select an application server template on which to base all the application server instances that you create. However, any changes that you make to the template after creating the instances do not change the instances.</td>
<td>When you define a dynamic cluster, you can define an application server template for the application server instances. After you define the dynamic cluster, you can use the dynamic cluster server template to edit the cluster member properties. The changes are propagated to all of the application server instances.</td>
</tr>
<tr>
<td>Application server weights</td>
<td>You explicitly assign a weight value to each application server instance. You can also enable the dynamic workload manager to assign weight values.</td>
<td>The dynamic workload manager is enabled by default and assigns weights to the application server instances.</td>
</tr>
</tbody>
</table>
To create a dynamic cluster, navigate to servers → clusters → Dynamic clusters.

* Click new
You can create a dynamic cluster with following server types:

- Apache server
  - Dynamic cluster containing Apache servers.

- WebSphere Application Server
  - Dynamic cluster containing application servers that are running Intelligent Management.

- On demand router
  - Dynamic cluster of on demand routers is being created.

- PHP server
  - Dynamic cluster containing servers that are running PHP.

- WebSphere Application Server Community Edition server
  - Dynamic cluster containing WebSphere Application Server Community Edition servers.
Membership type

- Prefer local
  - This indicates EJB requests are routed to client node.
- Create replication domain.
  - A replication domain with same name as of dynamic cluster will be created.
- Manually define cluster members
  - You can manually define the members that joins the dynamic cluster

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Cluster members

- Here you can define cluster members using the membership policy.
- Subexpression builder will help us choose and get the members

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SubExpression builder

- Operand: here you can select nodegroup, node, node hostname and node property
- Operator: you can choose equals, not equals, like, not like etc..

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We want to have cluster members on Node1 and Node3 then...
- Select operand as ‘Node name’ and operator as ‘equals’ and value as ‘node1’... then click generate and then append
- Select logical operator ‘and’ Select operand as ‘Node name’ and operator as ‘equals’ and value as ‘node3’... then click generate and append
- You should have membership policy as ‘node_name = ’node1’ and node_name = ’node3’
- This means dynamic cluster members will be created on node1 and node3 only.
To define membership as all nodes in a specific node group:
* `node_nodegroup = 'my_node_group'`

To define membership as all nodes that run Apache:
* `node_property$APACHE_2_0 IS NOT NULL`

To define membership as all nodes that run Apache and PHP:
* `node_property$APACHE IS NOT NULL and node_property$PHP IS NOT NULL`

To define membership as all nodes that run WebSphere Application Server Community Edition Version 2.0 or later:
* `node_property$WASCE_2.0* IS NOT NULL`

To define membership as all nodes that have a name that is like `my_node`, including `my_node_1`, `my_node_2`, and so on:
* `node_name like 'my_node%'`

To define membership as a list of specific host names:
* `node_hostname in ('node1.mydomain.com','node2.mydomain.com')`

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Dynamic cluster template

- Template: default or development mode
- Core Group: you can select the core group to which these cluster members belong.
Dynamic cluster specific options

- Specify the minimum no of cluster instances
- Specify maximum no of cluster instances
- Select vertical stacking/vertical clustering options.
- Select Isolation policy
**Dynamic cluster specific options (contd...)**

* Minimum no of instances: Specifies the minimum number of running instances for the dynamic cluster
  * If you want one cluster instance started at all times, click Keep one instance started at all times. This option is the default.
  * If you want more than one cluster instance started at all times, click Keep multiple instances started at all times. With this option you can select the no of instances to be started
  * If you want to stop all instances when there is no activity then select ‘stop all instances during periods of inactivity’ option

* Maximum no of instances
  * If you want to limit the maximum no of dynamic cluster instances, select ‘limit no of instances that can start’ option and specify the maximum number
  * If you do not want to restrict the max no of cluster instances, select do not limit the no of instances that can start’ option.
Dynamic cluster specific options (contd...)

* Vertical Staking – this allows more than one instance to start on the same node. This option is same as ‘vertical clustering’
* Isolation – specifies if you want this dynamic cluster to operate on the same nodes as of the other dynamic cluster instances.
  * No Isolation – this dynamic cluster instances can run on the same node of other dynamic clusters
  * Strict Isolation - luster instances in this dynamic cluster can run only with other instances of the same dynamic cluster on the same node.
  * Associate with an isolation group - cluster instance can run with any other instance of a dynamic cluster that is in the same shared group on the same node

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Summary of all options selected

### Summary

<table>
<thead>
<tr>
<th>Summary of actions:</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Options</td>
<td>Values</td>
</tr>
<tr>
<td>Name</td>
<td>DynaCluster</td>
</tr>
<tr>
<td>Server type</td>
<td>WebSphere application server</td>
</tr>
<tr>
<td>Server template</td>
<td>default</td>
</tr>
<tr>
<td>Core Group</td>
<td>DefaultCoreGroup</td>
</tr>
<tr>
<td>Minimum number of cluster instances</td>
<td>Keep one instance started at all times</td>
</tr>
<tr>
<td>Maximum number of cluster instances</td>
<td>Do not limit the number of instances that can start</td>
</tr>
<tr>
<td>Isolation group name</td>
<td>None</td>
</tr>
<tr>
<td>Strict isolation</td>
<td>false</td>
</tr>
<tr>
<td>Nodes</td>
<td>Node01</td>
</tr>
</tbody>
</table>
References

* Static vs Dynamic cluster:
• I’m a WebSphere Consultant with 8 years of experience, working in the areas of Application Infrastructure, Connectivity & Integration, Business Process Management and SOA. IBM Certified for WAS/WMQ/WPS/BPM75/SOA. Received IBM Champion award for the years 2012 and 2013.

Joseph Amrith Raj
Contact details

Joseph’s WebSphere Library

http://facebook.com/WebSphereLibrary

http://about.me/WebSphereLibrary

http://twitter.com/WebSphere_Lib