

IBM WebSphere Application Server

Configuring application routing



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This presentation describes the options available for configuring a JSR 289 application router with IBM WebSphere Application Server and shows examples of how to perform router configuration.

Agenda

- Application router configuration overview
- How to configure an application router

The first section of this presentation gives an overview of the different ways you can configure an application router, and the second section shows several examples of how to configure application routing using the administrative console.

Application router configuration overview

This section provides an overview of application router and the three types of routing policies that are available – application startup order, a properties-based default application router, and a custom application router implementation.

Application routing overview

- Application servers that support the SIP servlet specification often rely on many applications to provide a complete SIP-based service
- Application routing enables deployers to build complex services out of modular components
- The application router:
 - Determines which application to invoke based on an incoming request
 - Can access external information (database, subscriber service) to help choose the appropriate application
 - Is only responsible for routing and does not implement any application logic

SIP servlet application servers are typically provisioned with many different applications. Each application provides specific functionality, but, by invoking multiple applications to service a call, the deployer can build a complex and complete service. This modular and compositional approach makes it easier for application developers to develop new applications and for the deployer to combine applications from different sources and manage feature interaction. A typical example from traditional telephony is a call-screening application and a call-forwarding application. If the application server receives an incoming INVITE destined to a callee who subscribes to both services, both applications should be invoked.

The application router is a separate component, outside of the SIP container. The container receives initial requests, calls the application router to determine which application to invoke, and then the container calls that application. Once the container has called into an application, that application calls into the appropriate servlet to handle the request, based on the application's configuration – for example, using mappings defined in the application's deployment descriptor. By default, WebSphere Application Server uses application startup weights to define the routing order. The JSR 289 specification also defines a Default Application Router (DAR) properties file format and a custom application router application format to describe application routing.

Application routing policies (1 of 3)

- **Use application startup order**
 - Order can be configured from the administrative console
 - This is the default behavior if no other router options are specified, and is the same as the behavior in previous releases of the application server
- Use a default application router (DAR) properties file
- Use a custom application router JAR file

The default application routing policy is a basic application routing order based on application startup order. Startup order is typically determined by the order in which applications are installed, but the ordering can be changed later in the administrative console. Applications with the lowest number in the startup order get called first in the application chain. If a request gets proxied, it keeps going through the application chain defined by the ordering. This basic routing configuration offers the same behavior that was available in WebSphere Application Server V6.1.

Application routing policies (2 of 3)

- Use application startup order
- **Use a default application router (DAR) properties file**
 - Use a system property (configured in wsadmin or the administrative console) to identify the location of the DAR file
 - `javax.servlet.sip.ar.dar.configuration`
 - Import a DAR properties file in the administrative console
 - Use the DAR wizard in the administrative console to create routing rules
- Use a custom application router JAR file

A default application router, or DAR, properties file can also be used to configure routing order. The rules for formatting the DAR properties file are defined in the JSR 289 specification. You can define a DAR properties-based router in three ways. First, you can define a system property, using wsadmin or the administrative console, to identify the location of the DAR file. This configuration option is specified in and required by JSR 289. The WebSphere administrative console also includes panels for working with a DAR properties file configuration. You can import a DAR properties file directly into your configuration from the console, or you can use a special wizard to define application routing rules.

Application routing policies (3 of 3)

- Use application startup order
- Use a default application router (DAR) properties file
- **Use a custom application router JAR file**
 - Use a system property (configured in wsadmin or the administrative console) to identify the JAR location
 - `javax.servlet.sip.ar.spi.SipApplicationRouterProvider`
 - Configure the custom router in the administrative console

A custom application router is the most advanced application routing configuration available. A custom application router is a JAR file that contains your application router implementation. This application contains the routing rules for your environment and can reference external sources to pull in relevant user data to help determine the appropriate routing path. A custom application router can be defined using a system property or through the administrative console.

How to configure an application router

This section of the presentation includes several examples of how to configure an application router from the administrative console.

Configuring application startup order

Go to **Environment > SIP application routers**, and click the link for **DefaultSIPApplicationRouter**

Cell=AIMCP019Node01Cell, profile=AppSrv01

SIP application routers

SIP application routers > DefaultSIPApplicationRouter

Use this page to view or modify the targets associated with the default application router (DAR). You can specify the order in which SIP applications are executed at an initial SIP request for each associated target.

Configuration

General Properties

SIP application router name
DefaultSIPApplicationRouter

Targets

Move to Application Router *

| Select | Target | Full Name |
|--------------------------|---------|--|
| <input type="checkbox"/> | server1 | WebSphere:cell=AIMCP019Node01Cell,node=AIMCP019Node01,server=server1 |

Done

Click the link for the target that you want to modify the default routing settings on, in this case, **server1**

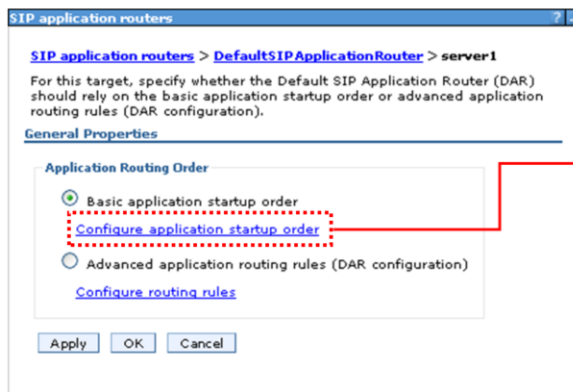
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Configuring application routing

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Application startup order is a basic form of application routing that is used by default. You can change the startup order of the applications in your server under the DefaultSIPApplicationRouter. Expand environment and go into the SIP application routers section. Click the link for the DefaultSIPApplicationRouter, and then you will see a panel similar to the one shown here that lists the targets defined in your environment. A target is something like a server or a cluster that you want to define a set of routing rules for. In this case, there is only one server defined in this profile, so that is the only target available. Click the name of the target you want to configure.

Configuring application startup order (1 of 2)



Application startup order defines the order in which application routing will take place; click **Configure application startup order** to set the startup weights

There are two options for the DefaultSIPApplicationRouter configuration object – either the basic application startup order, or application routing rules defined in a DAR properties configuration. To enable basic application routing using startup order, be sure that the radio button next to that option is selected (this option is selected by default). To modify the startup weights, click the text **Configure application startup order**.

Configuring application startup order (2 of 2)

SIP application routers

SIP application routers > DefaultSIPApplicationRouter > server1 > Startup order

Specify the application startup order weights, which will in turn define the order in which SIP requests are routed to applications. Note: This page and the application level Startup behavior pages modify the same underlying application startup order values.

Preferences

| Startup order weight | Application name |
|----------------------|------------------|
| 1 | ivtApp |
| 4 | query |
| Total 2 | |

Enter the required application weights on this panel and click the **Update** button to update your configuration; lower numbers mean the application starts earlier

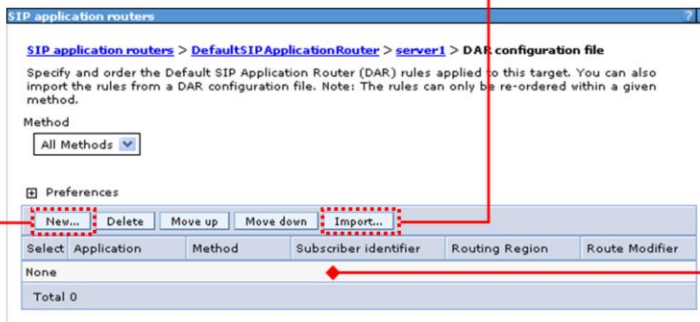
The application startup order panel lists all of the applications installed on this target and their current startup order. To change the startup order, type a number into a field on the left of the table, then click the Update button. Many fields can be changed and updated at the same time. Applications with lower numbers start earlier.

Configuring DAR routing rules

Access the DAR configuration file page under **SIP application routers > DefaultSIPApplicationRouter**, then click the link for the appropriate target and select **Configure routing rules**

Use the **New** button to create a new routing rule

Use the **Import** button to import a DAR properties file that contains rules for this target



There are no DAR rules populated by default

DAR configuration properties are also configured on the DefaultSIPApplicationRouter object. Only one DefaultSIPApplicationRouter object is defined per target, so a target cannot use both startup order and DAR configuration rules at the same time.

To work with DAR routing rules, go to the DefaultSIPApplicationRouter page in the console, select the target you want to configure routing rules for, and then click the Configure routing rules text. In order for the rules you define to take affect, you also need to select the radio button next to DAR configuration. The DAR configuration file page does not contain any routing rules by default – you need to define them. You can define them one at a time by clicking the **New** button to create a routing rule, or, you can import a DAR properties file into your configuration by clicking the **Import** button then providing the location of the properties file.

Adding a routing rule (1 of 2)

SIP application routers

SIP application routers > DefaultSIPApplicationRouter > server1 > DAR configuration file > New

Specify the properties of this Default SIP Application Router rule.

General Properties

Method

Existing method New method

INVITE

Application

Subscriber identifier

Existing subscriber identifier New subscriber identifier

DAR:TO

Routing Region

ORIGINATING

SIP URI

Route Modifier

ROUTE

State Info

Apply OK Reset Cancel

Specifies the method being used in the request; can use standard SIP methods or custom text

Indicates the name of SIP application module, as known to the container, that requests corresponding to this rule are routed to

Provides the identity of the subscriber that the router returns – can come from a SIP message header or custom text

The administrative console provides a panel that includes all of the fields associated with defining an application routing rule. The method field specifies the method being used in the request that this rule is designed to process. The method can be either an existing method (the dropdown menu contains a list of standard SIP method names) or some other custom text that represents a method in your application. The application name field indicates name of SIP application module, as known to the container, that requests corresponding to this rule are routed to. This might be different than the name of the application. If the console detects any installed SIP modules on the server, this field will become a drop down list, populated with the module names. If no SIP modules are found, you are given a text field. The subscriber identifier field provides the identity of the subscriber that the router returns. This can be based on a SIP message header or can be any custom text.

Adding a routing rule (2 of 2)

Indicates the routing region for this rule: ORIGINATING, NEUTRAL, TERMINATING

Specifies the SIP URI that indicates the route as returned by the application router – can be an empty string

Contains the route modifier: ROUTE, ROUTE_BACK, NO_ROUTE

Provides state information, for internal use by the router only

The routing region field indicates the routing region for this rule – either ORIGINATING, NEUTRAL, or TERMINATING. These regions are defined in the JSR 289 specification and are the only options available. The SIP URI field specifies the SIP URI that indicates the route, as returned by the application router. This is an optional field. The route modifier field can be either ROUTE, ROUTE_BACK, or NO_ROUTE – like with the routing region, these values are defined by the specification. The state info field is optional and can contain any other state information that the router might need to use.

Configuring a custom application router (1 of 2)

Cell=AIMCP019Node01Cell, Profile=AppSrv01

SIP application routers

SIP application routers

The Session Initiation Protocol (SIP) Application Router allows a user to select which order the SIP applications are executed at an initial SIP request. Once the application is chosen, the SIP Container utilizes the deployment descriptor or annotations to choose the appropriate servlet to execute within that application. Users are able to either utilize the WebSphere default application router or specify their own Application Router adhering to the SIP Servlet specification. The WebSphere default application router allows the user to specify a basic ordering of SIP applications or a properties file based configuration as outlined in the SIP Servlet specification.

Preferences

New **Delete**

Select SIP Application Router Name

You can administer the following resources:

| | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | DefaultSIPApplicationRouter |
| <input type="checkbox"/> | MyCustomApplicationRouter |

Total 2

Go to **Environment > SIP Application Routers**, and click the **New** button to add a new custom application router implementation

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A custom application router configuration is easy to define in the administrative console. Start by going to the SIP application routers page, then click the **New** button to add a new custom application router implementation to your configuration repository.

Configuring a custom application router (2 of 2)

The screenshot shows a web-based configuration interface for SIP application routers. At the top, there is a blue header bar with the text "SIP application routers" and a question mark icon. Below the header, the page title is "SIP application routers > New". A sub-header reads: "Use this page to configure custom SIP application routers. Target servers or clusters that have been associated with this SIP application router are also listed." The main content area is titled "Configuration" and contains a section for "General Properties". This section has two expandable fields: "* SIP application router name" and "* SIP application router provider name", each with a yellow input field. At the bottom of the configuration area are four buttons: "Apply", "OK", "Reset", and "Cancel".

Provide a name for the application router and the provider, click **OK**, and **Save** the changes

A custom application router is an application, packaged in a JAR file, that defines how application routing needs to work for your application set. The application structure and packaging is defined in the JSR 289 specification. On this panel, provide the name of the application router and the provider name of application router. This JAR file must be included in the classpath of the server.

Configuring an application router target

Go to **Environment > SIP application routers** and choose the application router that is associated with the target you want to change

Select the target you want to change from the list of targets

Use the **Move to Application Router** menu to choose the application router to associate with the target

Cell=HumeCell15, Profile=Dm: r01

SIP Application Routers

SIP Application Routers > DefaultSIPApplicationRouter

Use this page to view or modify the targets associated with the default application router (DAR). You can specify the order in which SIP applications are executed at an initial SIP request for each associated target.

Configuration

General Properties

SIP application router name
DefaultSIPApplicationRouter

Targets and Route Order

| | Move to Application Router * | |
|-------------------------------------|------------------------------|--|
| <input type="checkbox"/> | myAppRouter | |
| <input checked="" type="checkbox"/> | server1 | WebSphere:cell=HumeCell15,node=HumeNode28,server=server1 |
| <input type="checkbox"/> | mycluster | WebSphere:cell=HumeCell15,duster=mycluster |

Done

The target for an application router can be changed after the router is created. To move a target to a new application router, go to the **SIP application routers** page and choose the router that's currently associated with the target that you want to modify. This will take you to a panel similar to the one shown on this page. Select the box next to the target you want to move, then click **Move to Application Router**. This brings up a list of application routers that are defined in your environment. Choose the application router that you want to associate with the selected target, then click the **Done** button.

Using properties to configure a router (1 of 3)

In the administrative console, expand **Servers > WebSphere Application Servers** and click the link for your server name

Application servers

Application servers > server1

Use this page to configure an application server. An application server is a server that provides services required to run enterprise applications.

Runtime Configuration

General Properties

Name: server1

Node name: AIMCP019Node01

Run in development mode

Parallel start

Start components as needed

Access to internal server classes: Allow

Container Settings

- ▣ Session management
- ▣ SIP Container Settings
 - ▣ SIP_container transport chains
 - ▣ SIP_container
- ▣ Web Container Settings
- ▣ Portlet Container Settings
- ▣ EJB Container Settings
- ▣ Container Services

Expand the **SIP Container Settings** section and choose **SIP container**

In addition to using the new graphical configuration panels in the administrative console to configure your application router, you can also use the system properties defined in the JSR 289 specification to add either a DAR properties-based router or a custom application router to your configuration. The next few pages show how to define these system properties from the console. Start by opening the page for your server and going to the SIP container page under SIP Container Settings.

Using properties to configure a router (2 of 3)

From the SIP container page, click Custom properties

Click New to add a property for your router

Application servers > server1 > SIP container

A SIP container handles clients requests for SIP application resources such as, but not limited to, servlets and JSP files. The SIP container creates servlet instances, loads and unloads servlets, creates and manages request and response objects, and performs other tasks for managing the components of a SIP application effectively. An application server contains only one SIP container, or none. The Web server plug-ins, provided by the WebSphere Application Server product, gives Web servers the capability to pass resource requests to the WebSphere Application Server Web container.

Configuration

General Properties

- Maximum application sessions: 120000
- Maximum messages per averaging period: 5000
- Maximum dispatch queue size: 3200 events

Additional Properties

- Custom properties
- SIP container transport chains
- SIP stack
- Session management

Application servers > server1 > SIP container > Custom properties

Use this page to specify an arbitrary name and value pair. The value that is specified for the name and value pair is a string that can set internal system configuration properties.

Preferences

New Delete

| Select | Name | Value | Description |
|--------------------------|--|--------------------------|-------------|
| <input type="checkbox"/> | javax.servlet.sip.ar.dar.configuration | C:\config\dar.properties | |

Total 1

From the SIP container page, click Custom properties, then click the New button to add a property to define the location of your router.

Using properties to configure a router (3 of 3)

Provide the property name and value, then click **Apply** and **Save** your changes

Restart the application server for the changes to take effect

The screenshot shows a web browser window titled 'Application servers'. The breadcrumb navigation is 'Application servers > server1 > SIP container > Custom properties > New'. Below the breadcrumb is a short instruction: 'Use this page to specify an arbitrary name and value pair. The value that is specified for the name and value pair is a string that can set internal system configuration properties.' The main content area is titled 'Configuration' and contains a 'General Properties' section. This section has three input fields: 'Name', 'Value', and 'Description'. Below these fields are four buttons: 'Apply', 'OK', 'Reset', and 'Cancel'. A red dashed box highlights the 'Name' and 'Value' fields, and a red line points from the text on the left to these fields.

Custom router property name: `javax.servlet.sip.ar.spi.SipApplicationRouterProvider`
Custom router property value: Fully qualified class name of router implementation

DAR properties router property name: `javax.servlet.sip.ar.dar.configuration`
DAR properties router property value: Location of the DAR properties file containing the routing rules

The JSR 289 specification defines two system properties for application routers – one for a DAR properties file router and one for a custom application router implementation file. Provide the name and value for the property you need to define then apply and save your changes. If you are defining a custom application router, the JAR file that contains the implementation also needs to be in your server's classpath. You need to restart your server for these application router configuration changes to take effect.

Summary and reference

This section contains a summary and reference.

Summary

- Application routing can be configured using:
 - Application startup order
 - Default application router properties
 - Custom application router implementation
- Panels in the administrative console enable application router configuration

Application routing is a capability defined in JSR 289 that allows you to create end-to-end services by chaining together many SIP applications. Application routing can be defined in three ways – using basic application startup order, a default application router properties file, or a custom application router implementation. There are panels in the administrative console to enable application router configuration.

Reference

- JSR 289 specification
 - <http://jcp.org/aboutJava/communityprocess/final/jsr289/index.html>

For more information about SIP application routing, see the JSR 289 specification.

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