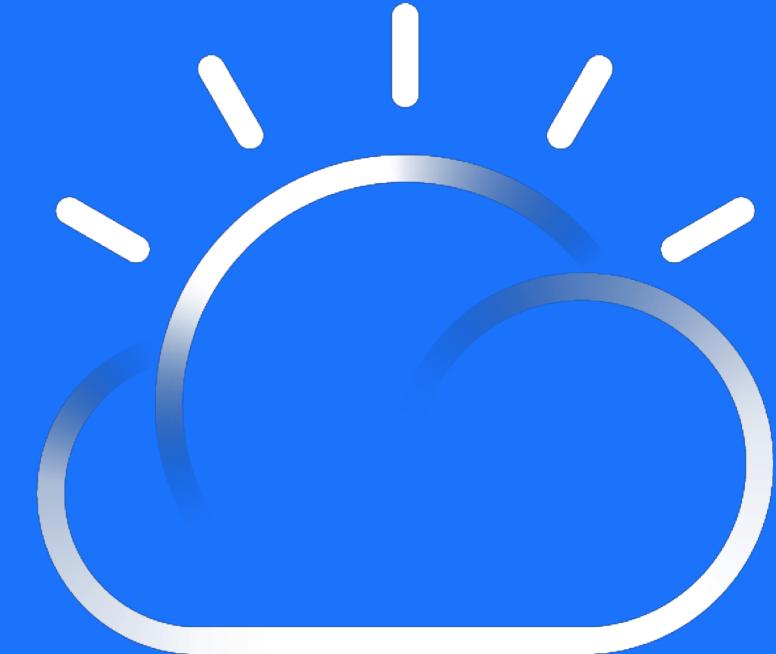


A04 Application Integration

Administering
ACE v11



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IBM Cloud

IBM

Agenda



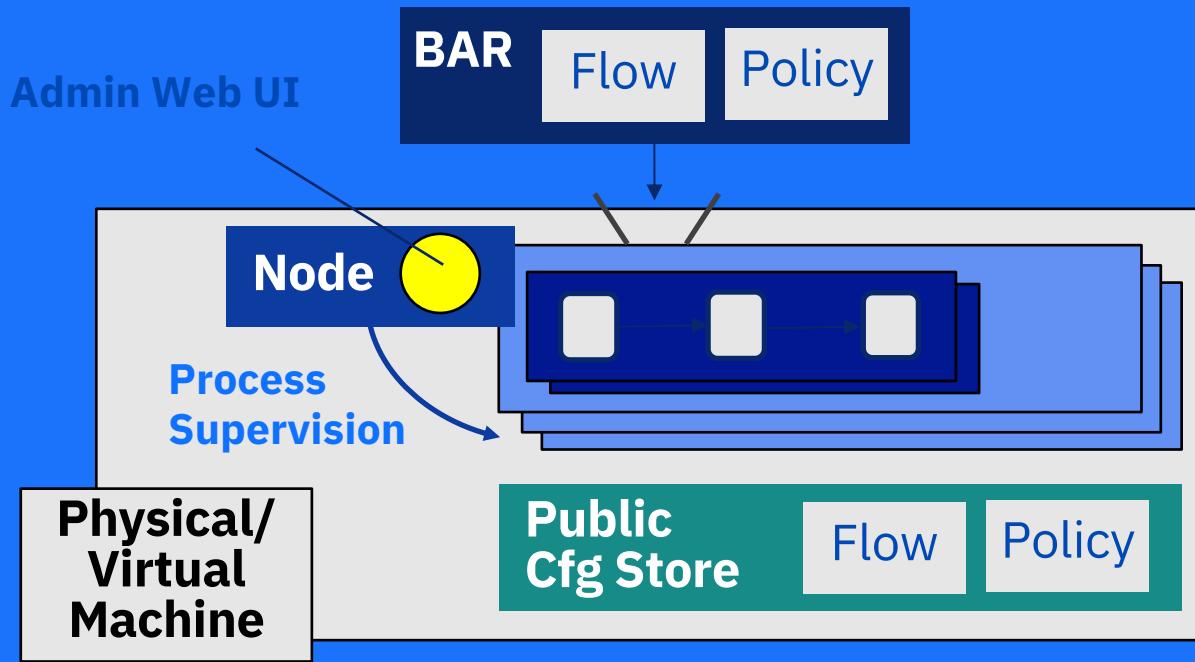
- Management Styles
- Configuration
- Administration Interfaces
- Overrides
- Administration Security
- Resource Managers
- Deployment Considerations
- Migration

Management Styles

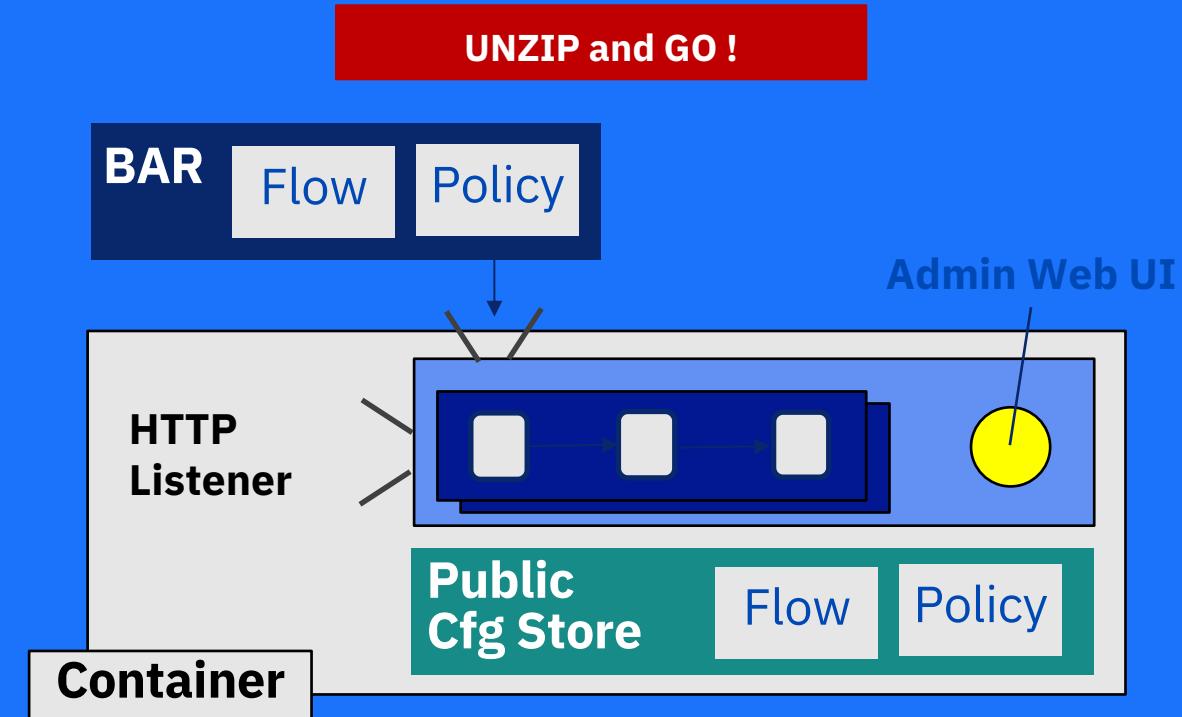
IBM.



Management Styles



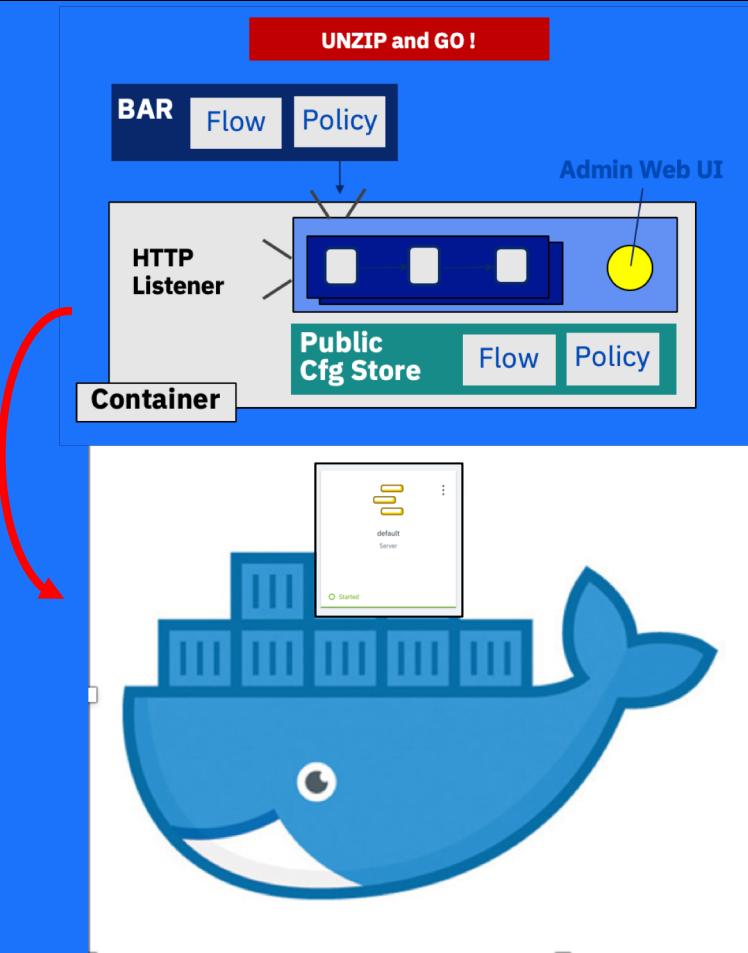
Nodes and their integration servers are long-lived.
Require dynamic operational capability using commands.



Containers can be re-started.
Configuration based on settings in a yaml file.

Management Styles: Integration Servers

- One common codebase for integration servers regardless of whether they are associated with a node or not
- Servers support all the common integration artifacts from IIBy10
- Servers associated with a node are controlled through the node
- Independent Servers:
 - Are the natural choice for running in Docker containers
 - Run directly from a command console environment (no create step!)
 - Are controlled through their administrative REST API ("v2")
 - Receive configuration at start-up time from options on IntegrationServer command / server.conf.yaml



Configuration



Configuration: New concepts in V11



Create 'work' directory using mqsicreateworkdir

'Copy the BAR to the run directory'

'Precompile maps using mqsbard'

'Just unzip and go!'

'/apiv2'

'copy into overrides'

'update the config in server.conf.yaml'

'IntegrationServer'

'Use PATCH to persist across re-deploy and re-start'

'Default Application'

'Policy Project'

Configuration: the way you do stuff in V11!

Create a work directory using mqsicreateworkdir



Configure work/server.conf.yaml



Copy bars into the work/run directory



Run IntegrationServer

At a high level, you simply create a 'work' directory and configure a server.conf.yaml file

Copy your BAR files into a 'run' sub-directory.

When you run IntegrationServer, the contents of the BAR file are extracted.

Schemas and maps are compiled and then message flows are started.

Configuration: The work directory

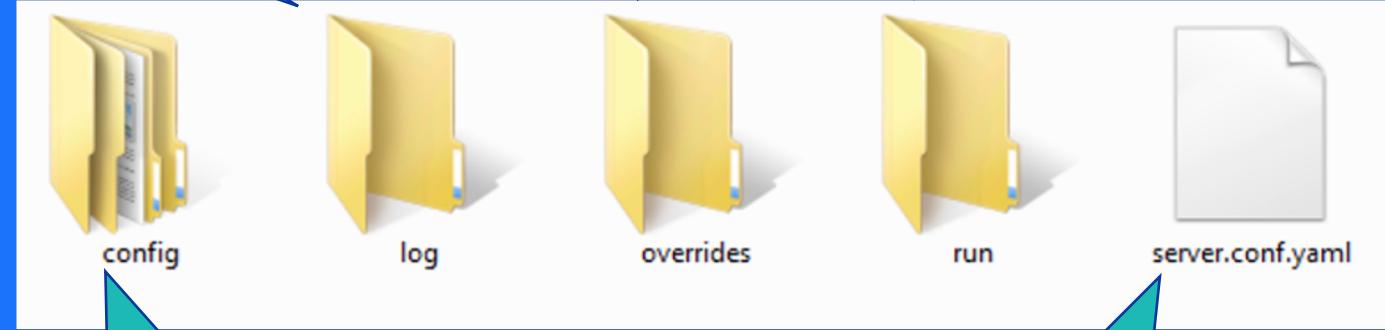
- mqsicreateworkdir

The **log** directory holds event files containing BIP messages.

The **overrides** directory holds files which override server configuration or policies.

The **run** directory contains the unzipped deployed content from BAR files.

```
[sanjayn@sachin ~]$ mqsicreateworkdir work_fp4
1 file(s) copied.
[sanjayn@sachin ~]$
[sanjayn@sachin ~]$ ls -l work_fp4
total 48
drwxrwxr-x 7 sanjayn sanjayn 4096 Apr  5 08:37 config
drwxrwxr-x 2 sanjayn sanjayn 4096 Apr  5 08:37 log
drwxrwxr-x 2 sanjayn sanjayn 4096 Apr  5 08:37 overrides
drwxrwxr-x 2 sanjayn sanjayn 4096 Apr  5 08:37 run
-rwxr-xr-x 1 sanjayn sanjayn 28875 Apr  5 08:37 server.conf.yaml
```



The **config** directory holds configuration files (eg for loopback, switch, security config etc.)

server.conf.yaml contains configuration for how the Integration Server should run.

Configuration: Running an Integration Server



```
[sanjayn@sachin ~]$ IntegrationServer
BIP8605W: Start an integration server.
Syntax:
IntegrationServer --work-dir <arg> [options]

Required Command Options:
'--work-dir <arg>' The path to the work directory that will be used by the integration server.

Optional Command Options:
'--admin-rest-api <arg>' The port number through which the REST API is used for integration server administration.
'--default-application-name <arg>' The name of application under which the server will place any independent resources.
'--event-log <file_name>' The name of the file where event logging is sent.
'--http-port-number <arg>' The port number on which this integration server will listen for HTTP requests.
'--log-output-format <arg>' The format for logging data (BIP messages) for the integration server. Supported values: text, ibmjson.
'--mq-queue-manager-name <arg>' The name of the default queue manager to be associated with the integration server.
'--name <arg>' The name of the integration server.
'--overrides-directory <arg>' The directory under which a user can place extra configuration to override the main settings.

'--service-trace' Turn on service trace collection. To be used only under the direction of IBM Support.
'--diagnostic-trace' Turn on service trace collection at the diagnostic level. To be used only under the direction of IBM Support.
'--service-trace-size <arg> Set the service trace size. To be used only under the direction of IBM Support.
[sanjayn@sachin ~]$
```

IntegrationServer is a new command in V11 for starting an Independent Integration Server. It requires a work directory which contains a server.conf.yaml

```
[sanjayn@sachin ~]$ IntegrationServer --name SIS_SACHIN --work-dir /home/sanjayn/work_fp4
.....2019-04-05 07:26:13.339006: .2019-04-05 08:26:13.339438: Integration server 'SIS_SACHIN' starting initialization; version '11.0.0.4' (64-bit)
.....2019-04-05 08:26:15.280953: About to 'Initialize' the deployed resource 'JDBCApp' of type 'Application'.
2019-04-05 08:26:15.285567: About to 'Initialize' the deployed resource 'Transformation_Map' of type 'Application'.
2019-04-05 08:26:15.549868: About to 'Initialize' the deployed resource 'HelloApp' of type 'Application'.
2019-04-05 08:26:18.510958: Created compiled 'XMLNSC' schema file 'Transformation_Map/$mqsiApplication.bir'. ←
2019-04-05 08:26:18.757832: About to 'Start' the deployed resource 'HelloApp' of type 'Application'.
2019-04-05 08:26:18.758014: Deployed resource 'HelloFlow' (uuid='HelloFlow',type='MessageFlow') started successfully. ←
2019-04-05 08:26:18.770670: The HTTP Listener has started listening on port '7800' for 'http' connections. ←
2019-04-05 08:26:18.770932: Listening on HTTP URL '/hello'.
2019-04-05 08:26:18.771130: About to 'Start' the deployed resource 'JDBCApp' of type 'Application'.
2019-04-05 08:26:18.771276: Deployed resource 'Flow1' (uuid='Flow1',type='MessageFlow') started successfully.
2019-04-05 08:26:18.771648: Listening on HTTP URL '/policy'.
2019-04-05 08:26:18.771830: About to 'Start' the deployed resource 'Transformation_Map' of type 'Application'.
2019-04-05 08:26:18.771940: Deployed resource 'Transformation_Map' (uuid='Transformation_Map',type='MessageFlow') started successfully.
2019-04-05 08:26:18.772218: Listening on HTTP URL '/Transformation_Map'.
..2019-04-05 08:26:19.749714: IBM App Connect Enterprise administration security is authentication only. ←
2019-04-05 08:26:19.823556: The HTTP Listener has started listening on port '7600' for 'RestAdmin http' connections.

2019-04-05 08:26:19.825620: Integration server has finished initialization.
```

Integration Server starts up:
Schemas are compiled,
Flows are started.,
HTTP Listener started,
Admin Security is enabled
for authentication.

Configuration: server.conf.yaml

```
---
# ACE Integration Server configuration file
#
# General notes :
# - Integration Server will load server.conf.yaml from directory set via --work-dir
# - To ensure valid YAML avoid any use of TAB characters
# - File paths may be taken as absolute, or relative to the integration server's work directory
#
# WARNING: Any value specified in the 'overrides/server.conf.yaml' will override values here
#
serverConfVersion: 1

#lilPath: ''          # A list of paths from where User-defined node LIL/
# are separated by platform path separator)

#deployMode: 'replace'      # Deploy mode: replace | none | manual

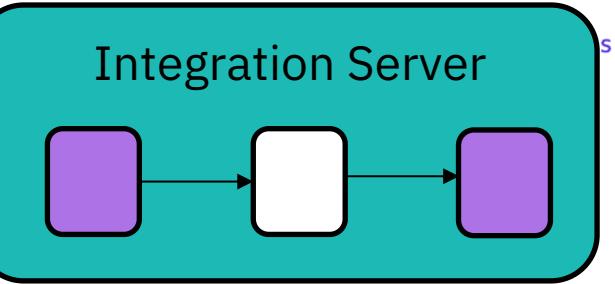
#defaultQueueManager: ''    # Set non-empty string to specify a default queue manager
#mqTrustedQueueManager: 'no' # Set to yes to enable MQ communication across multiple systems

#trace: 'none'
#traceSize: '1G'
#traceNodeLevel: true

#forceServerHTTPS: true     # force HTTPS on all HTTP/SOAP input nodes

Log:
  #consoleLog: true
  #outputFormat: 'text'
  #eventLog: ''
```

Configuration!



A heavily commented YAML file used for configuring an Integration Server.

All configuration required by the Integration Server for running message flows is taken from here.

No need to run commands aside from mqsisetdbparms.

Configuration: server.conf.yaml



```
# ACE Integration Server configuration file
#
# General notes :
#   - Integration Server
#   - To ensure valid YAM
#   - File paths may be t
#
# WARNING: Any value spe
#
serverConfVersion: 1

#lilPath: ''
are separated by platform

#deployMode: 'replace'

#defaultQueueManager: ''
#mqTrustedQueueManager: ''

#trace: 'none'
#traceSize: '1G'
#traceNodeLevel: true

#forceServerHTTPS: true

Log:
  #consoleLog: true
  #outputFormat: 'text'
  #eventLog: ''
```



```
RestAdminListener:
  #port: 7600

  # Note the Admin
  #host: 'localhost'

  # SSL Server auth
  #sslCertificate:
  #sslPassword: 'ad

  # If using a pem
  # sslCertificat
  # sslPassword i
  # The file name
  # If using p12/pf
  # sslCertificat
  # sslPassword i

  # SSL Client auth
  #requireClientCer
  #caPath: '/path/t

  # Admin Security
  # Authentication
  #basicAuth: true
  ated when set true
  #ldapUrl: ldap[s]
  #ldapBindDn: ldap
  #ldapBindPassword
  # Authorization
  #adminSecurity: '
  set active
  #authMode: 'file'
```

```
Events:  
  OperationalEvents: # Message flow and Resource statistics plus Workload management  
  MQ:  
    #policy: ''  
    #enabled: false  
  UserExits:
```

10
da
or

Page 10

S:

lication cy Project

#CONCALL

```
#CORSAllowU ic  
#CORSAllowC pe  
#CORSExpose is  
#CORSMaxAge  
#CORSAllowM
```

```
#CORSAllowH  
r : none|basic  
rated list of  
f : true|false
```

- Queue Manager
- Tracing
- Logging

```
#adminRole  
dataPermissions
```

```
# Set Admin  
'all+'  
# '+' grants perm.  
# in the Permission  
# e.g. define the
```

```
#dataViewer: 'read'          > "public"
#dataReplayer: 'read'        /MQTT
#adminRole: 'all+'          #accounting
                             #nodeData
                             #outputFc
aults:
```

```
defaultApplication  
policyProject: 'De  
is 'DefaultPolicies'  
olicies:  
# Set default pol
```

```
#HTTPConnector: '  
#HTTPSSConnector:  
#monitoringProfile  
  
#majorint  
#nodeData  
#outputFc  
#threadData  
  
Resource:  
#outputFc
```

- REST Admin port
- Authentication
- Authorization

Default Settings

- Default Application
- Default Port

```
countingOr  
deDataLevel  
tputFormat:  
readDataLevel
```

```
ve:  
chivalOn: 'inactive'      # choose  
# Also s  
countingOrigin: 'none'    # choose  
# Sets t  
jorInterval: 60           # choose  
deDataLevel: 'none'       # choose
```

```
debitDataLevel: 'none'          # choose  
putFormat: 'usertrace'         # comma  
readDataLevel: 'none'          # choose  
rc:  
tputFormat: ''                 # comma  
portingOn: false              # choose
```

Events:

- Flow Statistics

R • Record & Rep • Stores

- Sources
- Destinatio

```
ordinatedTransaction: false  
resources. Default is false  
tCount: 10
```

```
taken. Default is 10.  
readPoolSize: 10  
bscriptions. Default is 10.  
#commitIntervalSecs: 5  
is greater than 1 but the number
```

```
rces:  
  Copy and customize the SourceTe  
  Rename the section title 'Sourc  
  If you are publishing Monitorin  
er/integrationNodeName/Monitori
```

r, application, library, and msg and message flow. The library r

Configuration: node.conf.yaml

```
---
# ACE Integration Node configuration file
#
# General notes :
#   - Integration Node will load node.conf.yaml from directory named after the Integration Node
#     in the components directory in the workpath:
#     <workpath> eg: /var/mqsi/
#     /components
#     /<node-name>
#       node.conf.yaml
#   - To ensure valid YAML avoid any use of TAB characters
#   - File paths may be taken as absolute, or relative to the integration node's workpath
#
# WARNING: Any value specified in the 'overrides/node.conf.yaml' will
#           override the value in node.conf.yaml
nodeConfVersion: 1

#lilPath: ''          # A list of paths from where User-defined properties
#                     # are separated by platform path separator)

#deployMode: 'replace'      # Deploy mode: replace | none | initial

#defaultQueueManager: ''    # Set non-empty string to specify a default queue manager
#mqTrustedQueueManager: 'no' # Set to yes to enable secure communication

#agentTrace: 'none'        # choose 1 of : none|service|diagnostic
#agentTraceSize: '1G'       # Set the service trace size

Log:
  #eventLog: '/path/to/event/log.txt'  # Writes bip messages to a file
  #gation_server.<server_name>.events.txt

RestAdminListener:
  port: 4414
  # Set the Admin REST API Port
```

Configuration!

A heavily commented YAML file used for configuring an Integration Node.

Integration Servers inherit properties from a node.conf.yaml , but can be overridden in their individual server.conf.yaml.

Resides in:
\$MQSI_REGISTRY/components/<NODE_NAME>/node.conf.yaml

Configuration: Policy files

- Policies replace Configurable Services and include MQEndpoint and Workload Management.
- Policy Sets and Monitoring Profiles are also contained in Policy Projects.

Application Development

- HTTP_MQ_APP
 - Flows
 - SendMsgToMQ.msgflow
 - ESQLs
- MyPolicies
 - Policy
 - MQPolicy.policyxml
- Independent Resources

MQPolicy.policyxml

Policy
Set the attributes for a Policy

Name	MQPolicy
Type	MQEndpoint
Template	MQEndpoint

Property Value

Connection	CLIENT
Queue manager name	SANJAYNQM
Queue manager host name	sachin.hursley.ibm.com
Listener port number	7351
Channel name	SYSTEM.DEF.SVRCONN
Security identity (DSN)	
Use SSL	false
SSL peer name	
SSL cipher specification	

A Policy Project is a peer of Applications and Libraries. It can contain 1 or more policies.

New policy editor for editing different policy types. Driven entirely by schema.

The screenshot shows the IBM Integration Designer interface. On the left, the 'Application Development' tree view has 'MyPolicies' selected and highlighted with a red box. A callout bubble points to it with the text: 'A Policy Project is a peer of Applications and Libraries. It can contain 1 or more policies.' Below it, another callout bubble points to the 'MQPolicy.policyxml' file in the tree with the text: 'New policy editor for editing different policy types. Driven entirely by schema.' In the center, a diagram shows a flow from 'HTTP Input' to 'Compute' (represented by a gear icon), then to a node labeled 'MQ Output' (which is highlighted with a red box), and finally to 'HTTP Reply'. A callout bubble points to this 'MQ Output' node with the text: 'Multiple policy types available.' To the right, a 'Policy' configuration dialog is open. It shows 'MQPolicy' as the name, 'MQEndpoint' as the type, and 'MQEndpoint' as the template. The 'Policy' dropdown is set to '(MyPolicies):MQPolicy'. A callout bubble points to this 'Policy' dropdown with the text: 'Policy is referenced by Policy Project. If the Policy is in a Default Policy Project then just use 'PolicyName''. The bottom right corner of the dialog shows a list of policy types: FTP Server, HTTP Connector, HTTPS Connector, Java Class Loader, JDBC Providers, JMS Providers, MQEndpoint (which is selected and highlighted with a blue box), MQTPublish, MQTTSubscribe, Resequence, SAP Connection, Security Profiles, SMTP, TCP/IP Client, TCP/IP Server, Timer, User Defined, Workload Management, and WXS Server.

- Policies replace Configurable Services and include MQEndpoint and Workload Management.
- Policy Sets and Monitoring Profiles are also contained in Policy Projects.

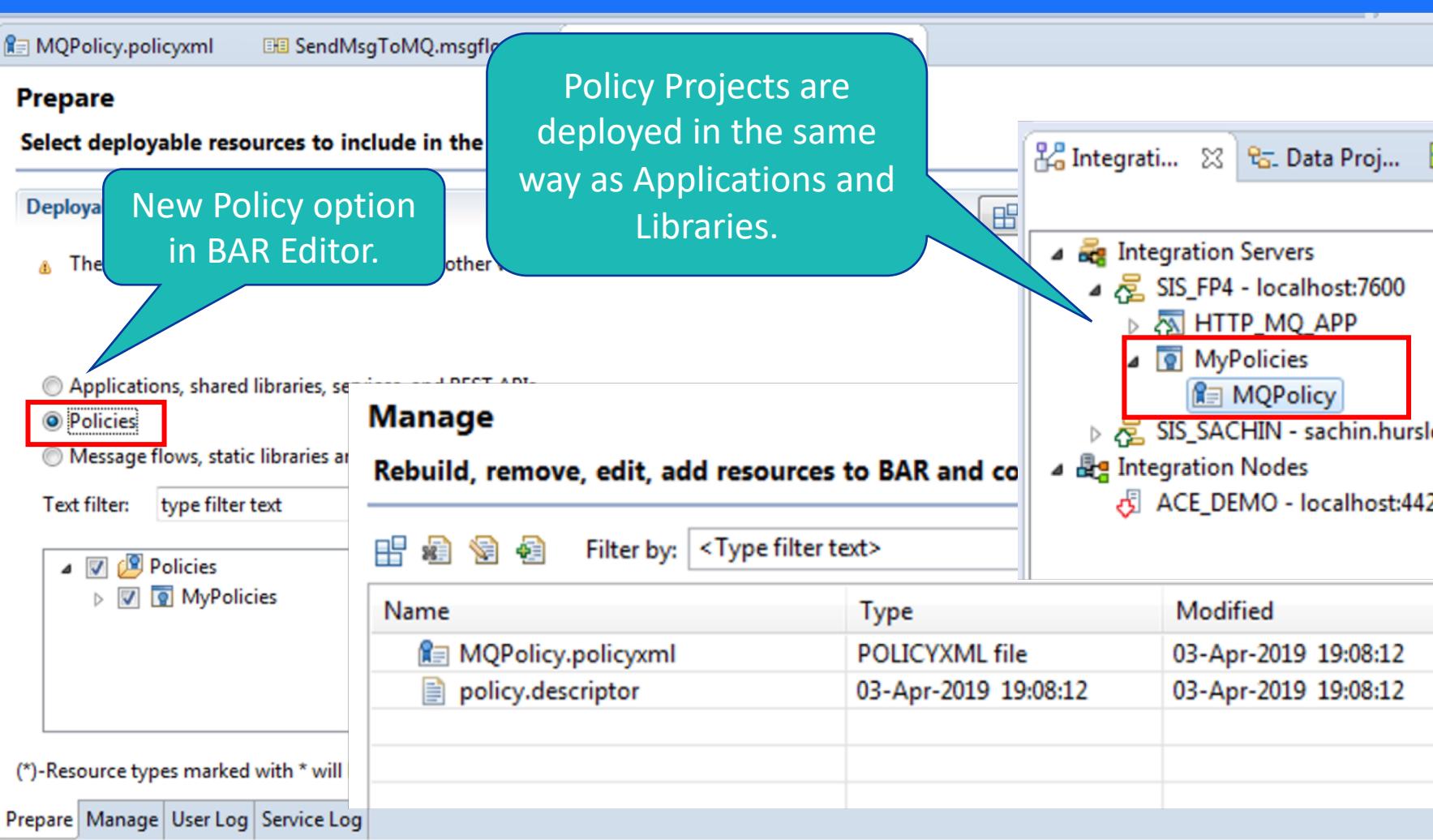
Multiple policy types available.

Policy is referenced by Policy Project. If the Policy is in a Default Policy Project then just use 'PolicyName'.

Configuration: Policy files

New Policy option in BAR Editor.

Policy Projects are deployed in the same way as Applications and Libraries.



Name	Type	Modified
MQPolicy.policyxml	POLICYXML file	03-Apr-2019 19:08:12
policy.descriptor		03-Apr-2019 19:08:12

These policies are classed as 'dynamic' which allows their Policy Project to be re-deployed or deleted from the Integration Server:

- Aggregation
- CDServer
- CICSConnection
- Collector
- EmailServer
- FtpServer
- Resequence
- SAPConnection
- SMTP
- Timer
- WorkloadManagement

Administration Interfaces

IBM.



Administration Interfaces: REST Admin port

Integration Server

Change this value if port
7600 is already in use.

```
RestAdminListener:  
  port: 7600
```

Set the Admin REST API Port for ACE Web UI and Toolkit or -1 to disable. Defaults to 7600.

Integration Node

```
RestAdminListener:  
  port: 4414
```

Set the Admin REST API Port for ACE Web UI and Toolkit. Defaults to 4414

```
RestAdminListener:  
  authMode: 'mq'  
  port: 4420
```

This value automatically overridden on
mqsistart if port 4414 is already in use.
Check value in overrides/node.conf.yaml or
run mqsilist to find which REST Admin port
is used by the Integration Node.

```
c:\>mqsilist  
BIP1326I: Integration node 'ACE_DEMO' is stopped.  
BIP1285I: Integration node 'ACE_NODE' on queue manager 'btm_qm' is stopped.  
BIP1284I: Integration node 'SANJAY_NODE_RR' with default queue manager 'sanjayn'  
and administration URI 'http://sanjayn:4420' is running.  
BIP1285I: Integration node 'SANJAY_NODE_U11' on queue manager 'sanjayn' is stopped.  
BIP8071I: Successful command completion.  
c:\>
```

Administration Interfaces: /apiV2

REST Admin API provides a way to control Integration Servers.

You can connect to the REST Admin port for an Integration Node or an Integration Server.

REST API classes and methods are described by this specification.

REST API used by webui, toolkit and commands.

REST Admin API provides a way to control Integration Servers.

You can connect to the REST Admin port for an Integration Node or an Integration Server.

REST API classes and methods are described by this specification.

REST API used by webui, toolkit and commands.

Overview

APIs for administering App Connect Enterprise integration servers

Download Open API Document

Type REST

Endpoint http://sanjay.hursley.ibm.com:7600/

Security

Access ACE REST API V2 spec using:
<http://<hostname>:<REST Admin port>/apidocs>
For example:
<http://sanjay.hursley.ibm.com:7600/apidocs>

External links

Additional documentation
https://www.ibm.com/support/knowledgecenter/en/SSTTDS_11.0.0/com.ibm.ace.home.doc/help_home.htm

Screenshot

Method	Path
GET	/apiV2
POST	/apiV2/delete
POST	/apiV2/delete-all
POST	/apiV2/deploy
POST	/apiV2/reset-service-trace
POST	/apiV2/reset-user-trace
POST	/apiV2/setup
POST	/apiV2/shutdown
POST	/apiV2/start
POST	/apiV2/start-service-trace
POST	/apiV2/start-user-trace
POST	/apiV2/stop
POST	/apiV2/stop-service-trace
POST	/apiV2/stop-user-trace
POST	/apiV2/teardown

Administration Interfaces: /apiv2

```
"actions": {  
    "available": {  
        "delete": "/apiv2/delete",  
        "delete-all": "/apiv2/delete-all",  
        "deploy": "/apiv2/deploy",  
        "reset-service-trace": "/apiv2/reset-service-trace",  
        "reset-user-trace": "/apiv2/reset-user-trace",  
        "shutdown": "/apiv2/shutdown",  
        "start-exception-log": "/apiv2/start-exception-log",  
        "start-service-trace": "/apiv2/start-service-trace",  
        "start-user-trace": "/apiv2/start-user-trace"  
    },  
    "unavailable": {  
        "restart-exception-log": "/apiv2/restart-exception-log",  
        "stop-exception-log": "/apiv2/stop-exception-log",  
        "stop-service-trace": "/apiv2/stop-service-trace",  
        "stop-user-trace": "/apiv2/stop-user-trace"  
    }  
}
```

The children element describes what children each resource has. This is a list of children of a Server.

```
"children": {  
    "applications": {  
        "hasChildren": true,  
        "name": "applications",  
        "type": "applications",  
        "uri": "/apiv2/applications"  
    },  
    "restApis": {  
        "hasChildren": false,  
        "name": "rest-apis",  
        "type": "restApis",  
        "uri": "/apiv2/rest-apis"  
    },  
    "services": {  
        "hasChildren": false,  
        "name": "services",  
        "type": "services",  
        "uri": "/apiv2/services"  
    },  
    "sharedLibraries": {  
        "hasChildren": false,  
        "name": "shared-libraries",  
        "type": "sharedLibraries",  
        "uri": "/apiv2/shared-libraries"  
    },  
    "policies": {  
        "hasChildren": true,  
        "name": "policies",  
        "type": "policies",  
        "uri": "/apiv2/policies"  
    },  
    "record-replay": {  
        "hasChildren": true,  
        "name": "record-replay",  
        "type": "record-replay",  
        "uri": "/apiv2/record-replay"  
    },  
    "resourceManagers": {  
        "hasChildren": true,  
        "name": "resource-managers",  
        "type": "resourceManagers",  
        "uri": "/apiv2/resource-managers"  
    },  
    "monitoring": {  
        "hasChildren": true,  
        "name": "monitoring",  
        "type": "monitoring",  
        "uri": "/apiv2/monitoring"  
    },  
    "statistics": {  
        "hasChildren": true,  
        "name": "statistics",  
        "type": "statistics",  
        "uri": "/apiv2/statistics"  
    }  
},  
"Screenshot": {}
```

The API has actions that can be performed on the Server and its children (resources). The actions are split into 2 groups 'available' and 'unavailable'

Administration Interfaces: access using curl

curl -X GET http://sachin.hursley.ibm.com:7600/api/v2/applications

```
{
  "hasChildren": true,
  "name": "applications",
  "type": "applications",
  "uri": "/api/v2/applications",
  "properties": {},
  "descriptiveProperties": {},
  "active": {},
  "actions": {},
  "children": [
    {
      "hasChildren": true,
      "name": "JDBCApp",
      "type": "application",
      "uri": "/api/v2/applications/JDBCApp"
    },
    {
      "hasChildren": true,
      "name": "Transformation_Map",
      "type": "application",
      "uri": "/api/v2/applications/Transformation_Map"
    },
    {
      "hasChildren": true,
      "name": "HelloApp",
      "type": "application",
      "uri": "/api/v2/applications/HelloApp"
    }
  ],
  "links": []
}
```

This curl request returns a list of Applications that are deployed to the Integration Server.

curl -X GET http://sachin.hursley.ibm.com:7600/api/v2/applications>HelloApp

```
"actions": {
  "unavailable": {
    "detach-monitoring-profile": "/api/v2/applications/HelloApp/detach-monitoring-profile",
    "setup": "/api/v2/applications/HelloApp/setup",
    "start": "/api/v2/applications/HelloApp/start",
    "stop-monitoring": "/api/v2/applications/HelloApp/stop-monitoring",
    "validate": "/api/v2/applications/HelloApp/validate"
  },
  "available": {
    "attach-monitoring-profile": "/api/v2/applications/HelloApp/attach-monitoring-profile",
    "start-monitoring": "/api/v2/applications/HelloApp/start-monitoring",
    "stop": "/api/v2/applications/HelloApp/stop",
    "teardown": "/api/v2/applications/HelloApp/teardown"
  }
},
"children": {
  "subFlows": {
    "hasChildren": false,
    "name": "subflows",
    "type": "subflows",
    "uri": "/api/v2/applications/HelloApp/subflows"
  },
  "resources": {
    "hasChildren": true,
    "name": "resources",
    "type": "resources",
    "uri": "/api/v2/applications/HelloApp/resources"
  },
  "libraries": {
    "hasChildren": false,
    "name": "libraries",
    "type": "libraries",
    "uri": "/api/v2/applications/HelloApp/libraries"
  },
  "messageFlows": {
    "hasChildren": true,
    "name": "messageflows",
    "type": "messageFlows",
    "uri": "/api/v2/applications/HelloApp/messageflows"
  },
  "statistics": {
    "hasChildren": true,
    "name": "statistics",
    "type": "statistics",
    "uri": "/api/v2/applications/HelloApp/statistics"
  }
},
```

Actions that can be performed on an Application

Children of an Application.
You can see if any children exist and the URI to inspect further.

Administration Interfaces: Web Admin UI

IBM

IBM App Connect



Server: SIS_FP4

Started



SIS_FP4

Contents

Properties

Policies

Search

Open

Stop

Delete

Open, Stop or Delete an Application

HTTP_MQ_APP

Application

Started

Deploy a BAR file

Select a BAR file to deploy:

Add a BAR file

Cancel

Deploy

A

ServerApp

Application

Started



Deploy +

Administration Interfaces: Web Admin UI

IBM

The screenshot displays the IBM App Connect Web Admin UI interface across two browser windows.

Left Window (Main View): The title bar shows "IBM App Connect" and the URL "https://localhost:7643". The main content area is titled "Servers" and includes tabs for "Contents" and "Statistics". It lists two servers: "MyServer" (Server, http://localhost:7600, Started) and "default" (Server, on node: Windows Node Record and Replay, Started). A red arrow points from the "default" server entry to the corresponding node details in the right window.

Right Window (Node Details): The title bar shows "IBM App Connect" and the URL "https://localhost:7643/nodes/Windows Nod...". The breadcrumb navigation shows "Dashboard / Node: Windows Node Record and Replay / Server: default". The main content area is titled "default" and includes tabs for "Contents", "Properties", "Policies", "Statistics", and "Resource statistics". It lists three applications: "RETAIL_APP" (Application, Started), "RETAIL_ORDER_ITEM_APP" (Application, Started), and "RETAIL_SHARED_LIBRARY" (Shared Library).

Bottom Callout: A teal callout box contains the text: "Administer multiple Integration Nodes and Integration Servers in a single WebUI".

Administration Interfaces: Toolkit



The screenshot displays the IBM Integration Toolkit interface. On the left, there are two overlapping windows: 'Create connection to an Integration Server' and 'Create connection to an integration node'. Both windows show 'Connection details' fields for Host name, Port, User name, and Password, along with checkboxes for 'Save password' and 'Use HTTPS'. A callout bubble points to these windows with the text: 'Add connections to Integration Servers or Integration Nodes, specifying the hostname and REST Admin port.' In the center, the 'Integration Explorer' view shows a tree structure of 'Integration Servers' and 'Integration Nodes'. Under 'Integration Servers', 'SIS_SACHIN' is listed with its host as 'sachin.hursley.ibm.com:7600' and deployed resources like 'HelloApp' and 'MyPolicies'. Under 'Integration Nodes', 'SIS_FP4' is listed with its host as 'sanjayn.hursley.ibm.com:7600' and nodes like 'server1' and 'server2'. A callout bubble points to this view with the text: 'Integration Servers and Integration Nodes are shown in the new Integration Explorer view with their deployed resources.' On the right, a 'Properties' view window is open, showing detailed configuration settings for a node. It includes sections for General, HTTP, JVM, Monitoring and Statistics, Platform, and more. A callout bubble points to this window with the text: 'All interactions with the back-end Integration Servers are made using REST requests.' At the bottom left, the text 'Integration Technical Conference' is visible.

Add connections to Integration Servers or Integration Nodes, specifying the hostname and REST Admin port.

Properties view shows details for a Node, Server, Applications and Message Flows.

Integration Servers and Integration Nodes are shown in the new Integration Explorer view with their deployed resources.

All interactions with the back-end Integration Servers are made using REST requests.

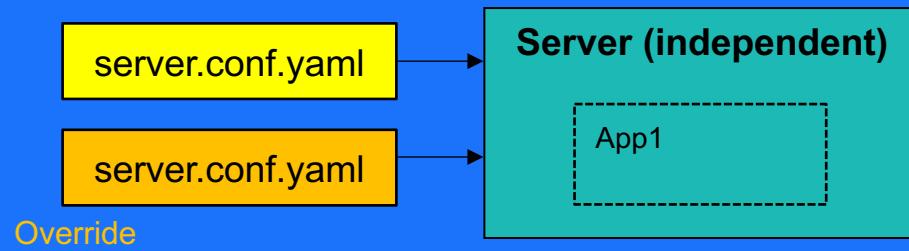
Properties

Property	Value
General	SIS_SACHIN
Default Queue Manager	no
Event Log Location	
Integration Server Name	
Trusted Queue Manager	
HTTP	7800
HTTP Listener port for HTTP-based message flow nodes	7843
HTTPS Listener port for HTTP-based message flow nodes	
JVM	0
JVM Debug Port	268435456
JVM Maximum Heap Size	33554432
JVM Minimum Heap Size	
Monitoring and Statistics	inactive
Flow archive statistics	
Flow snapshot statistics	
Monitoring	inactive
Resource statistics	true
Platform	ib000-L190326.16765 (S000-L190325.15705)
Build Level	x86_64
Operation Mode	Linux
Platform Architecture	3.10.0-957.10.1.el7.x86_64
Platform Name	IBM App Connect Enterprise
Platform Version	11.0.0.4
Product Name	
Product Version	

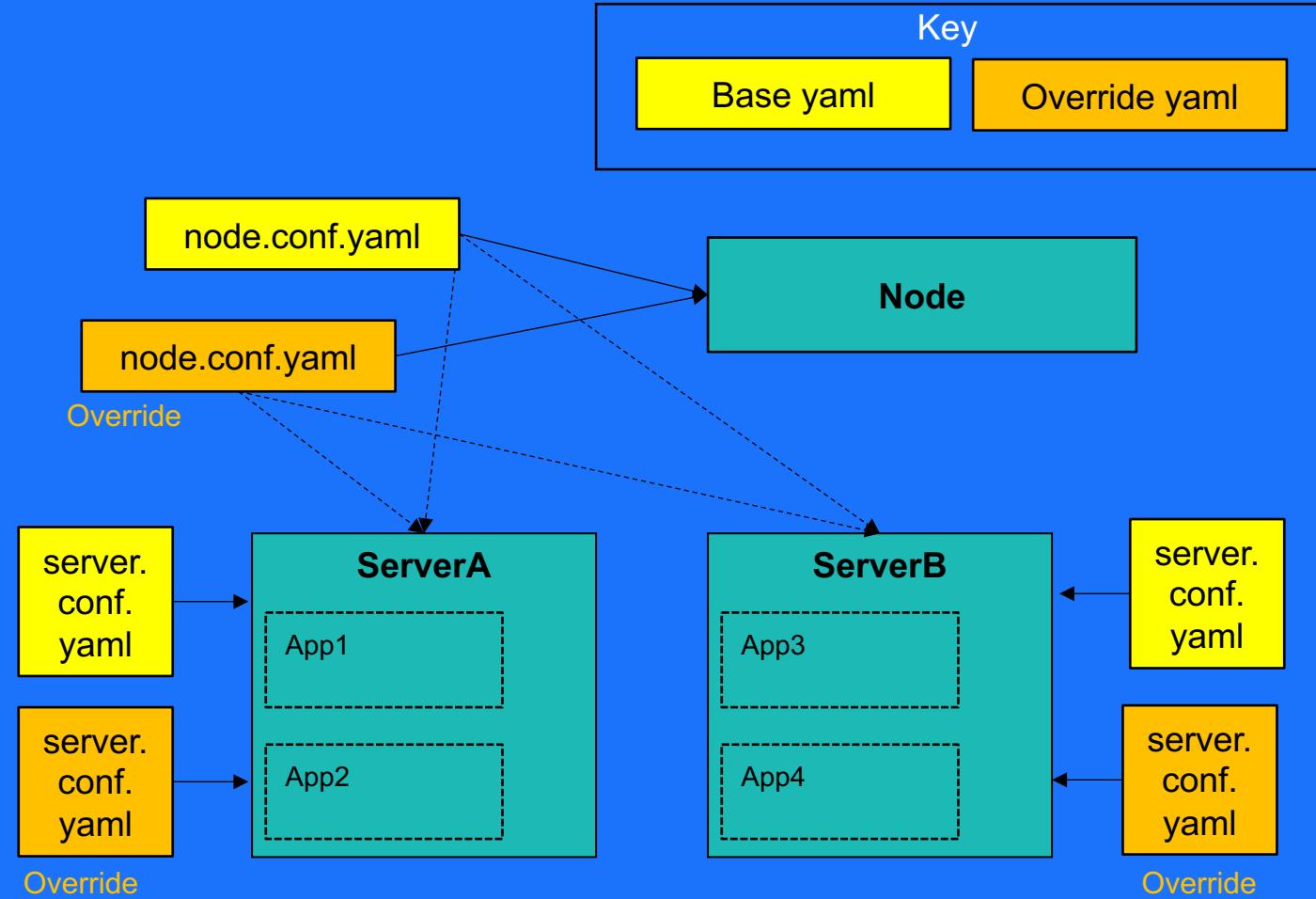
Overrides



Overrides: configuring YAML files

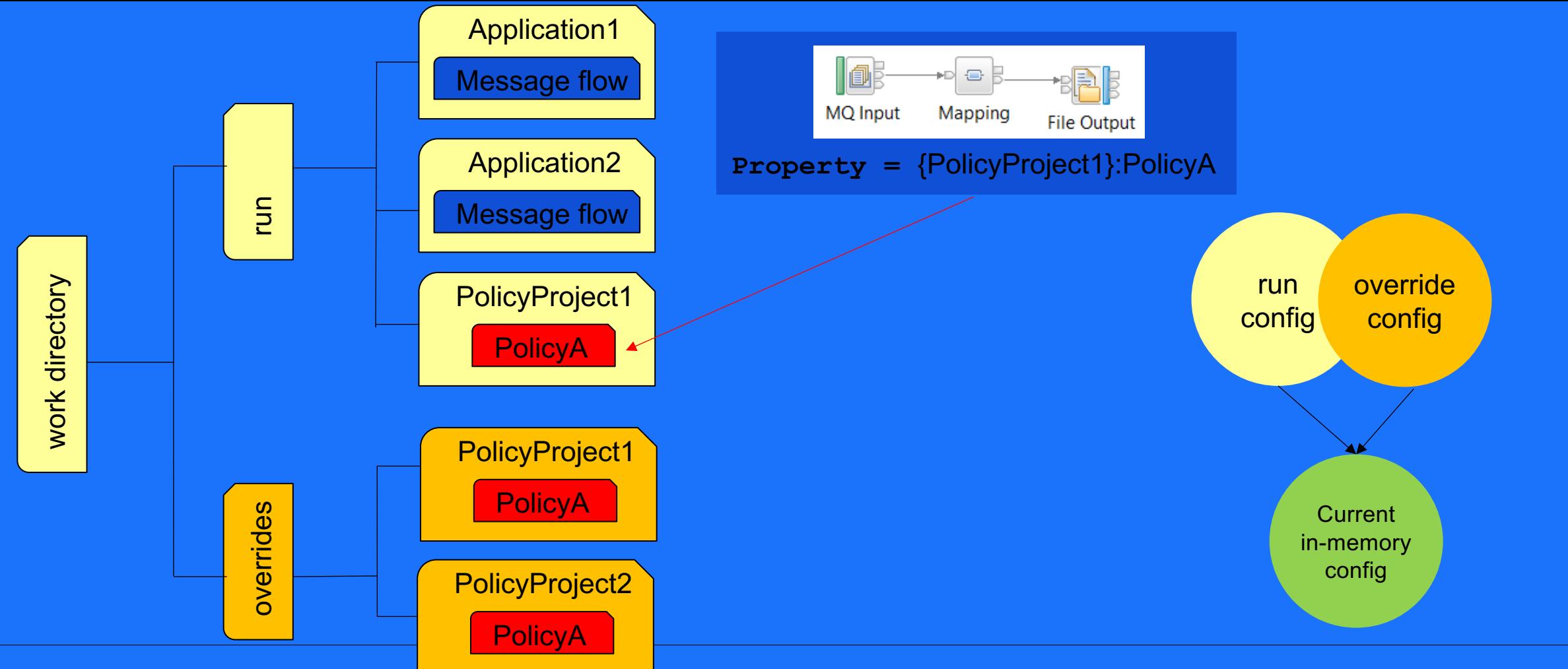


- overrides/server.conf.yaml are provided so that REST APIs can update settings without altering the base server.conf.yaml
- Node.conf.yaml provides a limited set of node wide options
- Node-owned servers inherit settings from the node.conf.yaml.
- Check the values in the overrides/server.conf.yaml or overrides/node.conf.yaml if a property value is used that is unexpected, for example the REST Admin port value used by an Integration Node.



Overrides: configuring Policy files

IBM



Overrides: REST API updates overrides YAML

When properties are changed using the toolkit and commands, the changes appear in the overrides YAML

• 11.0.0.4 introduces 'sticky settings' for flow statistics
• The settings persist across server re-start and flow re-deploy.

Changes are applied administrative RE
• Persisted to disk i

```

Statistics:
# Application message flows will by default inherit Snapshot and Archive values set here
Snapshot:
#publicationOn: 'inactive' # choose 1 of : active|inactive, default inactive
# Also set Events.OperationalEvents.MQ|MQTT for outputFormat json,xml to be published to MQ/MQTT
#accountingOrigin: 'none' # choose 1 of : none|basic
#nodeDataLevel: 'none' # choose 1 of : none|basic|advanced
#outputFormat: 'usertrace' # comma separated list of : csv,bluemix,json,xml,usertrace
#threadDataLevel: 'none' # choose 1 of : none|basic
Archive:
#archivalOn: 'inactive' # choose 1 of : active|inactive, default inactive
# Also set Events.OperationalEvents.MQ|MQTT for outputFormat xml to be published to MQ/MQTT
#accountingOrigin: 'none' # choose 1 of : none|basic
#majorInterval: 60 # Sets the interval in minutes at which archive statistics are published
#nodeDataLevel: 'none' # choose 1 of : none|basic|advanced
#outputFormat: 'usertrace' # comma separated list of : csv,xml,usertrace
#threadDataLevel: 'none' # choose 1 of : none|basic
Resource:
#outputFormat: '' # comma separated list of : file,bluemix
#reportingOn: false # choose 1 of : true|false

```

```

Statistics:
Resource:
reportingOn: 'true'
Snapshot:
outputFormat: 'usertrace,json'
publicationOn: 'active'

```

Administration Security



Administration Security



Admin security is optional, it is not enabled by default

- Control user access to Integration Node/Server resources
- Enable through node.conf.yaml/server.conf.yaml

Authentication

“You are who you say you are!”

Credentials checked by....

Integration Node
Web user account
with a local password.

LDAP Server
Web user account
with a password
held in the LDAP
Server

Authorisation

“But what are you allowed to do ?”

Permissions checked using...

Queue-based authorisation
SYSTEM.BROKER.AUTH
SYSTEM.BROKER.AUTH.EG

MQ INQ
MQ PUT
MQ SET

File-based authorisation
File Read
File Write
File Execute

Administration Security: Authentication (local userid/password)

Integration Node

Edit \$MQSI_REGISTRY/components/
ACE_FP4/node.conf.yaml



Set basicAuth: true



mqsiwebuseradmin ACE_FP4
-u admin -a password -c



Re-start the Integration Node

Integration Server

Edit work/server.conf.yaml



Set basicAuth: true



mqsiwebuseradmin -w work
-u admin -a password -c



Re-start the Integration Server

```
RestAdminListener:  
port: 4414 # Set the Admin REST API port  
  
# Note the Admin REST API will be insecure without the following be-  
# host: 'localhost' # Set the hostname other than localhost  
  
# SSL Server auth  
#sslCertificate: '/path/to/serverPKCS.p12' # See comment below  
#sslPassword: 'adminRestApi::sslpwd' # See comment below  
  
# If using a pem certificate:  
# sslCertificate is the full path to the server certificate key  
# sslPassword is the full path to the server private key, which must  
# The file names must end with '.pem'  
# If using p12/pfx certificate:  
# sslCertificate is the full path to the server certificate store  
# sslPassword is the passphrase or alias to the passphrase of the certificate  
  
# SSL Client auth  
#requireClientCert: true # Request a certificate  
#caPath: '/path/to/CA/certificates' # CA certs, all files are checked  
  
# Admin Security  
# Authentication  
basicAuth: true  
#ldapUrl: ldap[s]://server[:port]/baseDN[?uid_attr][?base|sub]]  
#ldapBindDn: ldap::adminAuthentication  
#ldapBindPassword: ldap::adminAuthentication  
# Authorization  
#adminSecurity: 'inactive' # Used to enable Authorization  
#authMode: 'file' # Set admin authorization mode
```

Administration Security: Authentication (local userid/password)

IBM App Connect

Login to your account

Username
admin

Password

Log in

HTTP using Basic Auth

IBM App Connect

Node: ACE_FP4

ACE_FP4

Servers Properties Data

Search

server1 Server Started

server2 Server Started

Log out

Connect to an Integration Node

Create connection to an integration node

Connection details

*Host name: sachin.hursley.ibm.com

*Port: 4417

User name: admin

Password: *****

Save password

Use HTTPS

Cancel Finish

HTTP using Basic Auth

Integration Servers

SIS_SACHIN - sachin.hursley.ibm.com:7600

SIS_FP4 - sanjay.hursley.ibm.com:7600

Integration Nodes

ACE_FP4 - sachin.hursley.ibm.com:4417

server1

server2

SANJAY_NODE_RR - sanjay.hursley.ibm.com:4420

Graph User Defined Properties

Properties Problems Outline Tasks Deployment Log Tutorial Steps View

Property	Value
Integration Node Information	
Admin REST API Port	4417
Build level	ib000-L190326.16765 (S000-L190325.15705)
Host	sachin.hursley.ibm.com
HTTPConnector Port	7080
HTTPSConnector Port	7083
Name	ACE_FP4
Operating system architecture	x86_64
Operating system name	Linux
Operating system version	3.10.0-957.10.1.el7.x86_64
Queue manager specified on the integration node	<There is no queue manager associated with this integration node>
User ID	admin
Use SSL	False
Version	11.0.0.4

Administration Security: Authentication (LDAP server)

IBM

The screenshot shows the Apache Directory Studio interface. On the left, the LDAP Browser displays a tree view of the directory structure under 'Root DSE (5)' and a detailed view of a user entry 'cn=Sanjay Nagchowdhury,dc=example,dc=com'. The user attributes include objectClass, cn, sn, givenName, mail, uid, and userPassword. A callout bubble points to this area with the text: 'A set of users in an external LDAP Server which require access to administering ACE.'

In the center, the 'Connection' dialog is open, showing network parameters like Hostname ('sanjay.hursley.ibm.com') and Port ('10389'), both of which are highlighted with red boxes. A callout bubble points to this area with the text: 'Connection information needed to access the LDAP Server from ACE.'

On the right, the 'Authentication' dialog is open, showing the 'Simple Authentication' method selected. The 'Bind DN or user:' field contains 'uid=admin,ou=system', which is also highlighted with a red box. A callout bubble points to this area with the text: 'The LDAP Server is secured so a userid/password is required to access it.'

Administration Security: Authentication (LDAP server)



LDAP Server location details are defined in node.conf.yaml/server.conf.yaml

If the LDAP Server is secured, the connection details for accessing it must be stored using mqsisetdbparms

```
# Admin Security
# Authentication
basicAuth: true
authenticated when set true
ldapUrl: 'ldap://sanjayn.hursley.ibm.com:10389/dc=example,dc=com'
ldapBindDn: 'ldap::adminAuthentication'
ldapBindPassword: 'ldap::adminAuthentication'
#ldapUrl: ldap[s]://server[:port]/baseDN[?uid_[tr]][?base|sub]]
#ldapBindDn: ldap::adminAuthentication
#ldapBindPassword: ldap::adminAuthentication
# Authorization
#adminSecurity: 'inactive'
#authorized when set active
#authMode: 'file'

# Used to enable Admin auth
# Set admin authorization
```

Clients web user name and password will be used for authentication

```
# Resource alias
# Resource alias
# ldap search url
# Resource alias
```

Alias used by mqsisetdbparms must be referenced in node.conf.yaml/server.conf.yaml

```
mqsisetdbparms ACE_FP4 -n ldap::adminAuthentication
-u "uid=admin,ou=system" -p xxxx
```

Re-start the Integration Node

```
mqsisetdbparms -w work -n ldap::adminAuthentication
-u "uid=admin,ou=system" -p xxxx
```

Re-start the Integration Server

Administration Security: Authentication (LDAP server)



LDAP - cn=Sanjay Nagchowdhury,dc=example,dc=com - sanjayan.hursley.ibm.com - Apache Directory Studio

File Edit Navigate Search LDAP Window Help

LDAP Browser

DN: cn=Sanjay Nagchowdhury,dc=example,dc=com

Attribute Description	Value
objectClass	inetOrgPerson (structural)
objectClass	organizationalPerson (structural)
objectClass	person (structural)
objectClass	top (abstract)
cn	Sanjay Nagchowdhury
sn	Nagchowdhury
givenName	Sanjay
mail	sanjay_nagchowdhury@uk.ibm.com
uid	sanjay
userPassword	SSHA hashed password

IBM App Connect

Login to your account

Username

sanjay

Password

.....

Log in

Authenticated on
LDAP Server

IBM App Connect

Node: ACE_FP4

ACE_FP4

Servers Properties Data

Create a server +

Search
server1
Started

Search
server2
Server
Started

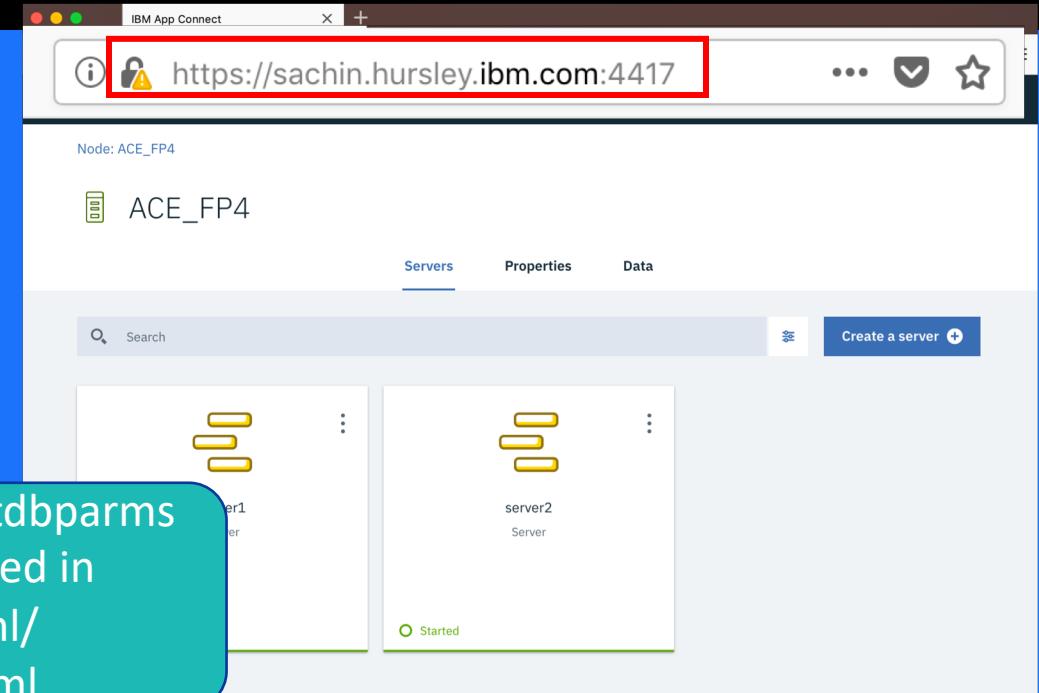
Administration Security: Configuring to use HTTPS



```
# SSL Server auth  
sslCertificate: '/home/sanjayn/SSL/key.p12' # See comment below  
sslPassword: 'adminRestApi::sslpwd' # See comment below  
  
# If using a pem certificate:  
# sslCertificate is the full path to the server certificate  
# sslPassword is the full path to the server private key, where  
# The file names must end with '.pem'  
# If using p12/pfx certificate:  
# sslCertificate is the full path to the server certificate file  
# sslPassword is the passphrase or alias to the certificate  
  
# SSL Client auth  
#requireClientCert: true  
#caPath: '/path/to/CA/certificates'
```

Keystore location

Alias used by mqsisetdbparms
must be referenced in
node.conf.yaml/
server.conf.yaml



```
mqsisetdbparms ACE_FP4 -n adminRestApi::sslpwd  
-u server_certificate -p xxxxxxxx
```

Re-start the Integration Node

```
mqsisetdbparms -w work -n adminRestApi::sslpwd  
-u server_certificate -p xxxxxxxx
```

Re-start the Integration Server

Store credentials for keystore
location using mqsisetdbparms

Administration Security: Authorization



```
RestAdminListener:  
  port: 4414 # Set the Admin REST API port  
  o 4414  
  
  # Note the Admin REST API will be insecure without the following below.  
  # host: 'localhost' # Set the hostname other than localhost  
  
  # SSL Server auth  
  sslCertificate: '/home/sanjayn/SSL/key.p12' # See comment below  
  sslPassword: 'adminRestApi:sslpwd' # See comment below  
  
  # If using a pem certificate:  
  # sslCertificate is the full path to the server certificate key  
  # sslPassword is the full path to the server private key, which must be encrypted one  
  # The file names must end with '.pem'  
  # If using p12/pfx certificate:  
  # sslCertificate is the full path to the server certificate store  
  # sslPassword is the passphrase or alias to the passphrase of the certificate  
  
  # SSL Client auth  
  #requireClientCert: true # Request a certificate from client  
  #caPath: '/path/to/CA/certificates' # CA certs, certificates are checked  
  
  # Admin Security  
  # Authentication  
  basicAuth: true  
  authenticated when set true  
  ldapUrl: 'ldap://sanjayn.hursley.ibm.com:389/dc=example,dc=com'  
  ldapBindDn: 'ldap::adminAuthentication'  
  ldapBindPassword: 'ldap::adminAuthentication'  
  #ldapUrl: ldap[s]://server[:port]/baseDN[?uid_attr][?[base|sub]]  
  #ldapBindDn: ldap::adminAuthentication  
  #ldapBindPassword: ldap::adminAuthentication  
  # Authorization  
  adminSecurity: 'active' # Used to enable Authorization  
  d when set active  
  authMode: 'file' # Set admin authorization mode
```

Enable authorization and define authorization mode (file or mq)

Define a role 'demoRole' which is assigned to users using mqsiwebuseradmin. -x indicates that a password is not stored locally.

```
mqsiwebuseradmin ACE_FP4 -c -u sanjayn -x -r demoRole
```



Re-start the Integration Node

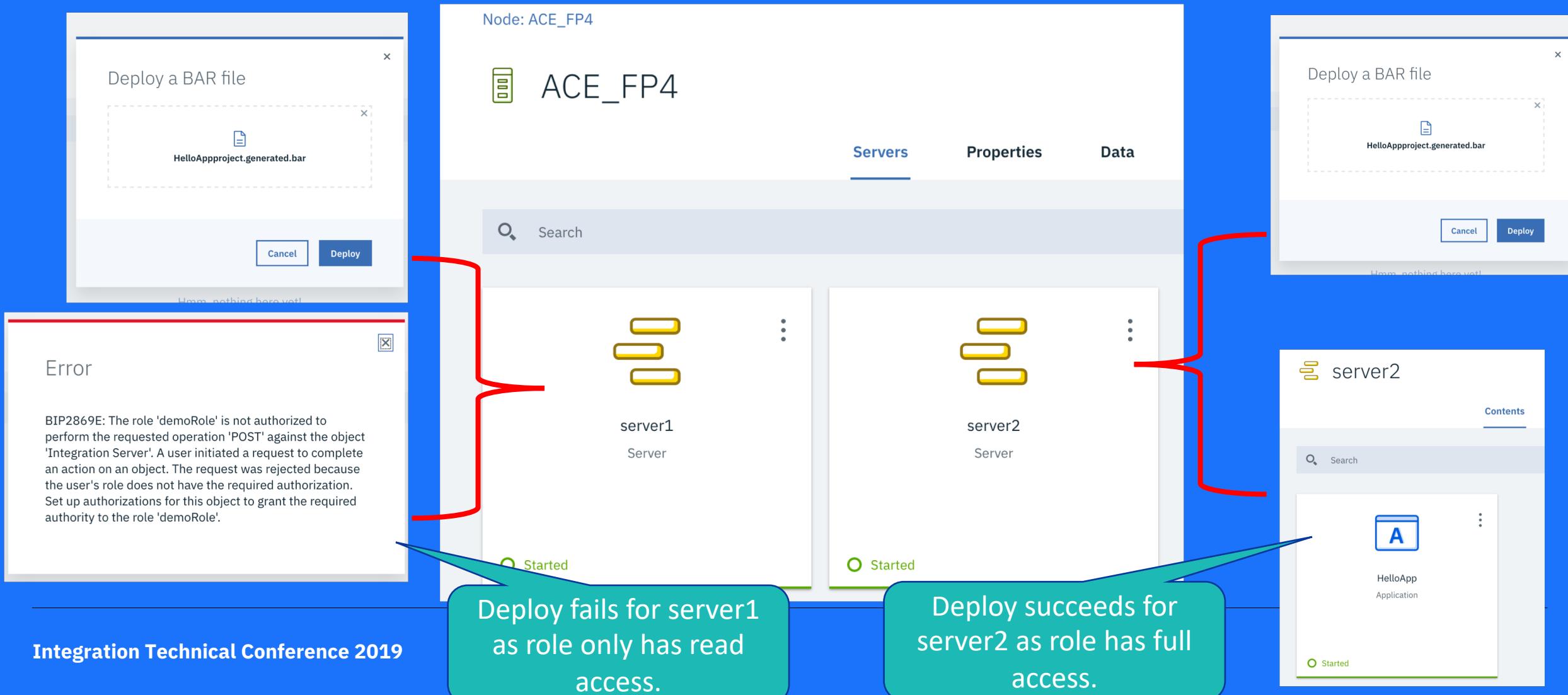
```
Security:  
Node:  
  Permissions:  
    # Set Admin Security Authorization file permissions  
    # '+' grants permission, '-' denies permission  
    # e.g. define the following web user roles  
    #viewRole: 'read+:write-:execute-'  
    #adminRole: 'all+'  
    demoRole: 'all+'  
DataPermissions:  
  # Set Admin Security Authorization file permissions  
  # '+' grants permission, '-' denies permission  
  # Integration Node in the Permissions section  
  # e.g. define the following web user roles  
  #dataViewer: 'read+:write-:execute-'  
  #dataReplayer: 'read+:write-:execute-'  
  #adminRole: 'all+'  
Server:  
  # Set Admin Security Authorization file permissions  
  # e.g. define the following web user roles  
  #server01:  
  #Permissions:  
    #viewRole: 'read+:write-:execute-'  
    #adminRole: 'all+'  
  #DataPermissions:  
    # Set Admin Security Authorization file permissions  
    # '+' grants permission, '-' denies permission  
    # e.g. define the following web user roles  
    #dataViewer: 'read+:write-:execute-'  
    #dataReplayer: 'read+:write-:execute+'  
    #adminRole: 'all+'  
  server1:  
  Permissions:  
    demoRole: 'read+:write-:execute-'  
  server2:  
  Permissions:  
    demoRole: 'all+'
```

'demoRole' : node: full access

'demoRole': server1: read only
server2: full access

Administration Security: Authorization

IBM



Administration Security: Summary



```
RestAdminListener:  
  port: 4417          # Set the Admin REST API Port for ACE Web UI and Toolkit. Defaults to 4414  
  sslCertificate: '/home/sanjayn/SSL/key.p12'  
  sslPassword: 'adminRestApi::sslpwd'  
  
  # Admin Security  
  # Authentication  
  basicAuth: true      # Clients web user name and password will be authenticated when set true  
  ldapUrl: 'ldap://sanjayn.hursley.ibm.com:10389/dc=example,dc=com'  
  ldapBindDn: 'ldap://adminAuthentication'  
  ldapBindPassword: 'ldap://adminAuthentication'  
  # Authorization  
  adminSecurity: 'active'    # Used to enable Authorization.  
  authMode: 'file'          # Set admin authorization mode. Choose 1 of file, mq or db  
  
Security:  
  Node:  
    Permissions:  
      demoRole: 'all+'  
    DataPermissions:  
  Server:  
    server1:  
      Permissions:  
        demoRole: 'read+write+execute+'  
    server2:  
      Permissions:  
        demoRole: 'all+'
```

Enable HTTPS

Enable authentication

Enable authentication using an LDAP server

Enable authorization

Define a role for what resources can be accessed and what actions can be performed on them.

Resource Managers

IBM.



Resource Managers

- ResourceManagers
 - JVM
 - HTTPConnector
 - HTTPSConnector
 - ActivityLogManager
 - DatabaseConnectionManager
 - SocketConnectionManager
 - ContentBasedFiltering
 - FTEAgent
 - **ParserManager**
 - ESQL
 - XMLNSC
 - JSON
 - **MQConnectionManager**
 - XPathCache
 - AsyncHandleManager
 - GlobalCache
 - ExceptionLog
 - ConnectorProviders
 - SAPConnectorProvider
 - SiebelConnectorProvider
 - PeopleSoftConnectorProvider

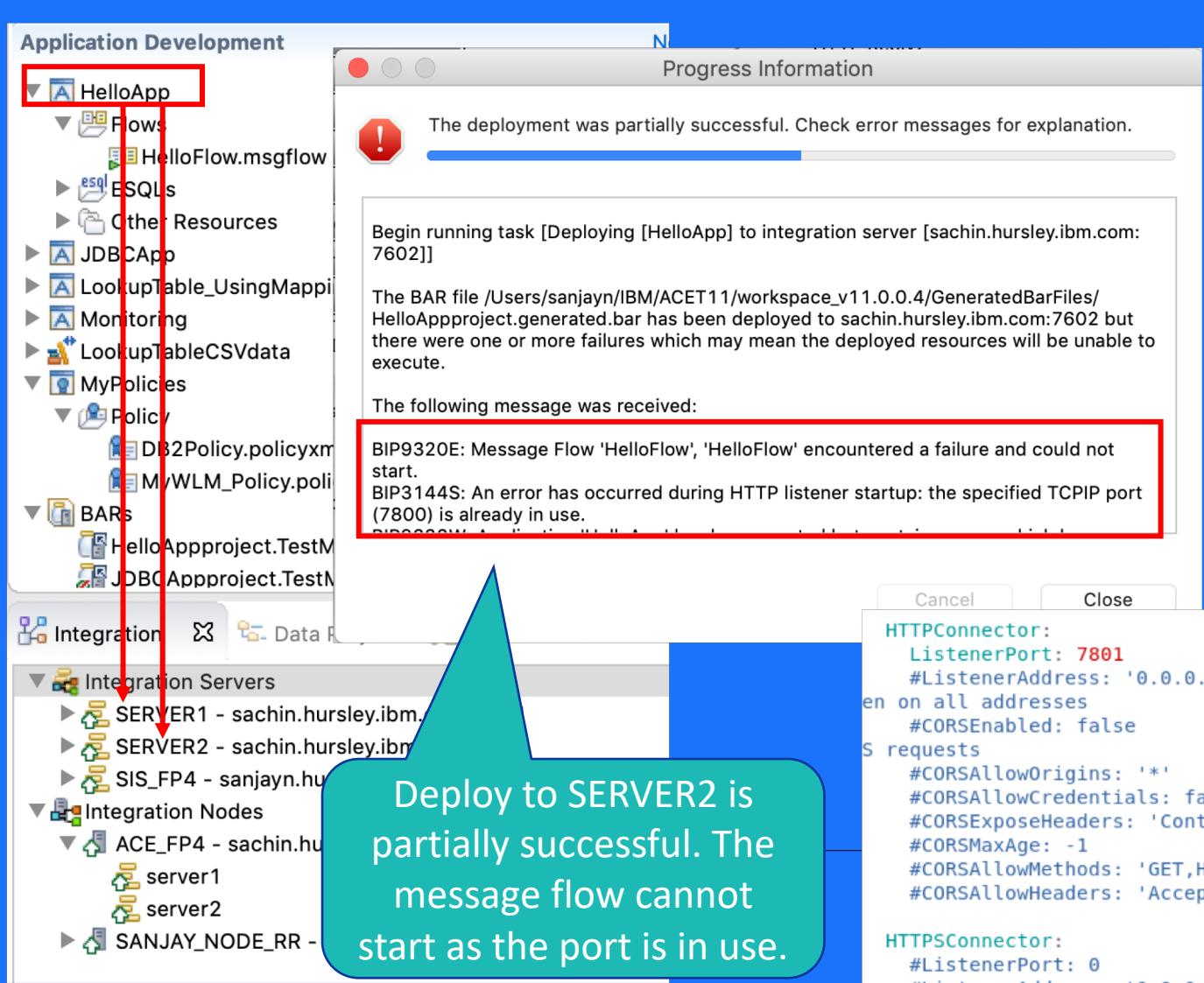
A large selection of resource managers are available to configure in the yaml.

The resource managers are available to view using a GET method.

```
GET http://localhost:7621/apiv2/resource-managers/json

connection: keep-alive
content-encoding: gzip
content-type: application/json; charset=utf-8
date: Fri, 29 Mar 2019 23:18:02 GMT
etag: W/"c10-wmR47Sihktp0ixLj9xcAH8X1kM"
transfer-encoding: chunked
vary: Accept-Encoding
{
  "hasChildren": true,
  "name": "resource-managers",
  "type": "resourceManagers",
  "uri": "/apiv2/resource-managers",
  "properties": {},
  "descriptiveProperties": {},
  "active": {},
  "actions": {},
  "children": [
    {
      "hasChildren": false,
      "name": "integration-server",
      "type": "resourceManager",
      "uri": "/apiv2/resource-managers/integration-server"
    },
    {
      "hasChildren": false,
      "name": "callable-flow-manager",
      "type": "resourceManager",
      "uri": "/apiv2/resource-managers/callable-flow-manager"
    }
  ]
}
```

Resource Managers: example



Deploy to SERVER2 is partially successful. The message flow cannot start as the port is in use.

```
HTTPConnector:
  #ListenerPort: 0
  #ListenerAddress: '0.0.0.0'
  en on all addresses
  #CORSEnabled: false
  S requests
  #CORSAllowOrigins: '*'
  #CORSAllowCredentials: fa
  #CORSExposeHeaders: 'Cont
  #CORSMaxAge: -1
  #CORSAllowMethods: 'GET,H
  #CORSAllowHeaders: 'Accept,Content-Type'
```

Both Integration Servers are using the default value for the ListenerPort in HTTPConnector resource manager. Flow on SERVER1 starts on 7800, but Flow on SERVER 2 cannot start as 7800 is in use.

```
#kerberosConfigFile: ''
#kerberosKeytabFile: ''
```

```
HTTPConnector:
  ListenerPort: 7801
  #ListenerAddress: '0.0.0.0'
  en on all addresses
  #CORSEnabled: false
  S requests
  #CORSAllowOrigins: '*'
  #CORSAllowCredentials: false
  #CORSExposeHeaders: 'Content-Type'
  #CORSMaxAge: -1
  #CORSAllowMethods: 'GET,HEAD,POST'
  #CORSAllowHeaders: 'Accept,Content-Type'
```

```
HTTPConnector:
  ListenerPort: 7802
  #ListenerAddress: '0.0.0.0'
  lts to 7800
  #ListenerAddress: '0.0.0.0' # Set non-zero to set a specific port, def
  en on. Default is to listen on 7800
  #CORSEnabled: false
  S respond to valid HTTP CORS requests
  #CORSAllowOrigins: '*'
  #CORSAllowCredentials: false
  #CORSExposeHeaders: 'Content-Type'
  #CORSMaxAge: -1
  #CORSAllowMethods: 'GET,HEAD,POST'
  #CORSAllowHeaders: 'Accept,Content-Type'
```

Set specific port in HTTPConnector in server.conf.yaml in each work directory for SERVER1 and SERVER2.

Resource Managers: Global Cache

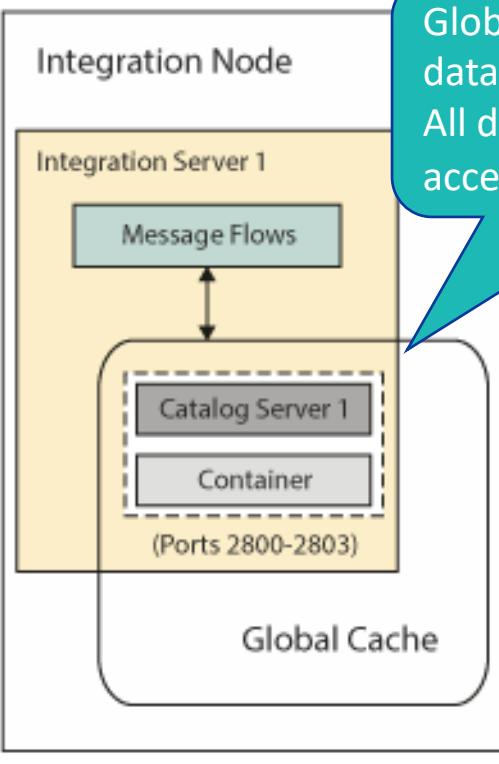


Share data between flows on different Integration Servers
No need for files or database
Can decouple request and response (async) for scalability

Uses `server.conf.yaml` only

No node or node level configuration needed

Examples of fully working samples are provided.



Global Cache is faster than database access.
All data held in instant access memory.

- Global Cache Container servers:**
- Container component is embedded in the Integration Server
 - All container servers host all the cache data.
 - Global cache can cope with the loss of container servers without losing data.

```
# Integration server configuration file for use as global cache container
# Provides an equivalent to the "One Broker HA" and Two Brokers HA" Cache Policy XML configuration
# Uses four integration servers where two are both a catalog server and a container server, and the other two are only catalog servers
#
# General notes :
#   - Integration Server will load server.conf.yaml from directory set via --work-dir
#   - To ensure valid YAML avoid any use of TAB characters
#   - File paths may be taken as absolute, or relative to the integration server's work directory
#
# GlobalCache:
#   cacheOn: true

cacheServerName: 'MyCatalogServer1'
catalogServiceEndPoints: 'localhost:2800,localhost:2804'
catalogDomainName: 'WMB_MyCacheDomain'
catalogClusterEndPoints: 'MyCatalogServer1:localhost:2803:2801:MyCatalogServer2:localhost:2807'

enableCatalogService: true
enableContainerService: true
enableJMX: true
listenerHost: 'localhost'
listenerPort: 2800

# JMX Configuration
jmxCustomFile: ''
jmxFile: ''
jmxPort: 2801
jmxSSL: false

# Global Cache Configuration
globalCachePort: 2808
globalCachePortRange: 2808-2811
globalCachePortCount: 4
globalCachePortStep: 1

# Catalog Configuration
catalogPort: 2809
catalogPortRange: 2809-2812
catalogPortCount: 4
catalogPortStep: 1

# Container Configuration
containerPort: 2810
containerPortRange: 2810-2815
containerPortCount: 5
containerPortStep: 1

# SSL Configuration
sslProtocol: 'TLSv1.2'
sslCipherSuite: 'AES256-SHA256'
sslKeySize: 2048
sslKeyFile: '/etc/ssl/certs/ssl-cert-snakeoil.pem'
sslCertFile: '/etc/ssl/certs/ssl-cert-snakeoil.pem'
sslKeyPassphrase: 'changeit'
sslCertPassphrase: 'changeit'

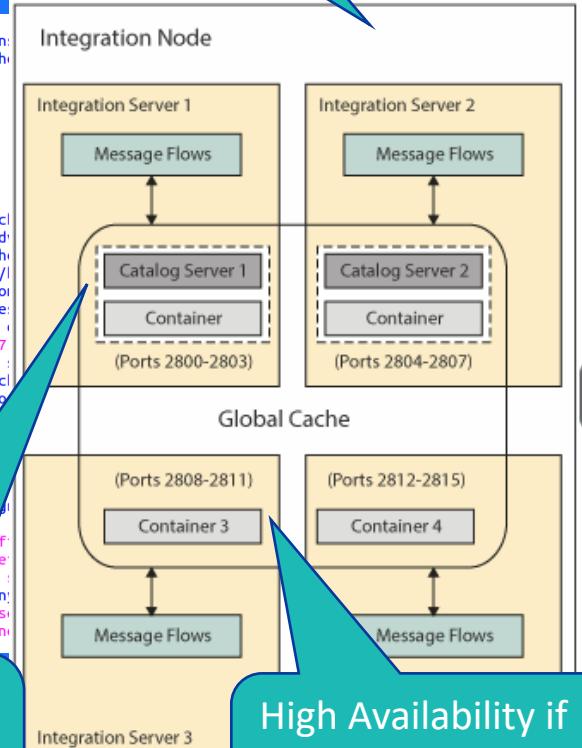
# Logging Configuration
logLevel: 'INFO'
logFile: '/var/log/integration-server.log'
logSize: 10000000
logBackupCount: 10
logAppend: true

# Deployment Configuration
deploymentType: 'File'
deploymentObject: 'DeploymentObject'
deploymentTraceLevel: 1
deploymentTraceFile: '/var/log/deployment.log'
deploymentTraceSize: 10000000
deploymentTraceBackupCount: 10
deploymentTraceAppend: true

# Security Configuration
sslEnabled: true
sslAlias: 'MyCache'
sslProtocol: 'TLSv1.2'
sslCipherSuite: 'AES256-SHA256'
sslKeySize: 2048
sslKeyFile: '/etc/ssl/certs/ssl-cert-snakeoil.pem'
sslCertFile: '/etc/ssl/certs/ssl-cert-snakeoil.pem'
sslKeyPassphrase: 'changeit'
sslCertPassphrase: 'changeit'
```

'Catalog Servers' hold location of where data is stored within the 'Container Servers'

You can use the embedded global cache or an external WebSphere eXtreme Scale grid (or both) in your IBM App Connect Enterprise solution.



High Availability if you use more than 1 'Catalog Server'

Deployment Considerations



Deployment Considerations: deploy a BAR using curl

Deploy integrations

Details

Try it

POST

<http://sachin.hursley.ibm.com:7600/apiV2/deploy>

Deploy integrations onto this server

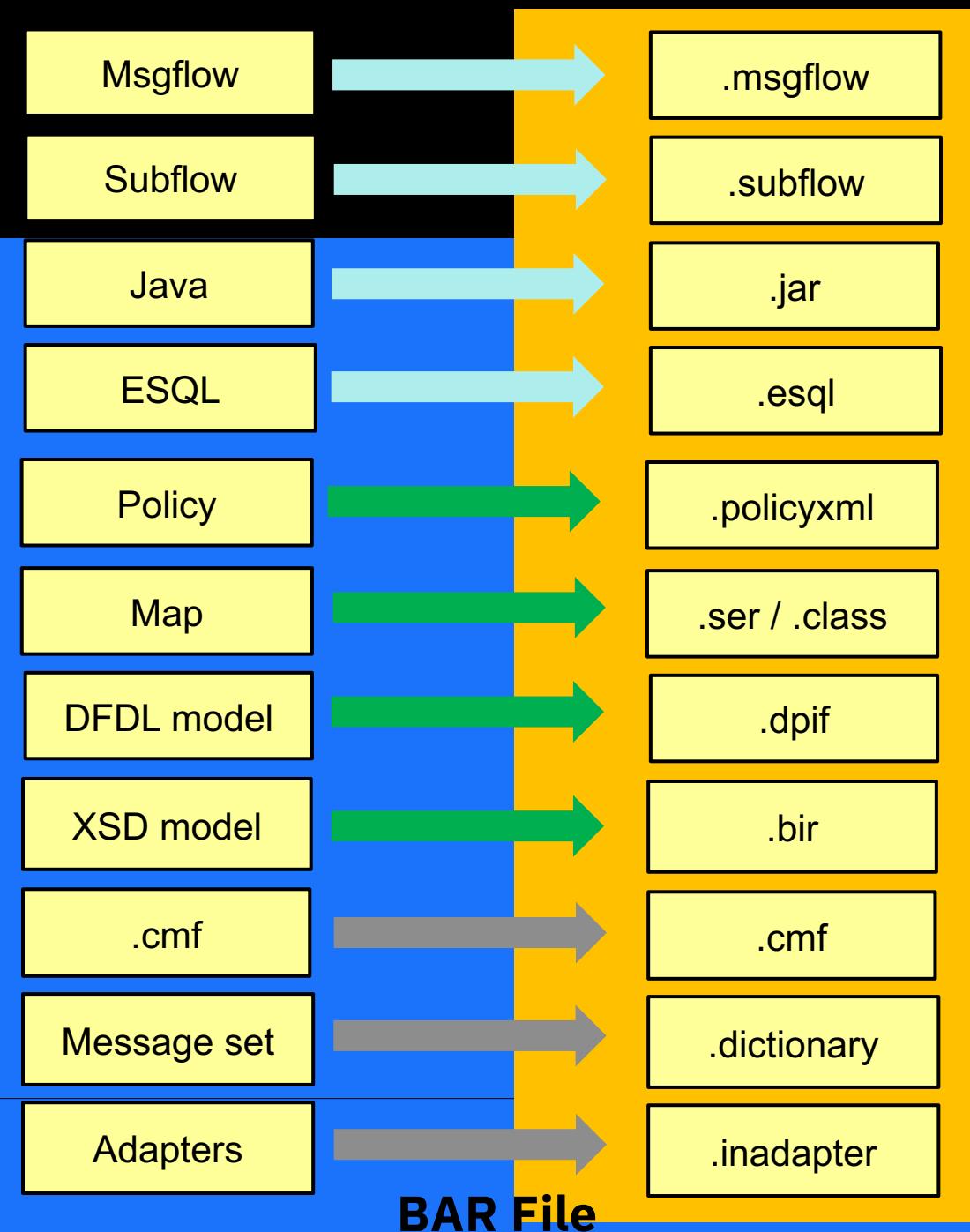
Now possible in V11 to
deploy a BAR file through a
REST request using curl.

```
curl -X POST http://sachin.hursley.ibm.com:7600/apiV2/deploy --data-binary @/Users/sanjayn/JDBCAppproject.bar -H "Content-Type: application/octet-stream"
```

```
{"type":"responseLog","count":2,"uri":"","LogEntry":[{"type":"logEntry","message":{"number":9332,"severity":0,"severityCode":"I","source":"BIPmsgs","inserts":3,"timestamp":1554328844,"threadId":5605,"threadSequenceNumber":1},"text":"BIP9332I: Application 'JDBCApp' has been created successfully. ","detailedText":"\nThe resource 'JDBCApp' of type 'Application' has been successfully created."}, {"type":"logEntry","message":{"number":9326,"severity":0,"severityCode":"I","source":"BIPmsgs","inserts":1,"timestamp":1554328844,"threadId":5605,"threadSequenceNumber":2}, "text":"BIP9326I: The source 'rest-deploy.bar' has been successfully deployed. "}]}
```

Deployment Considerations

- Compiled resources unzipped
- No compilation needed on start-up
- Server just runs!



Deployment Considerations: mqsibar



```
mqsibar -a Transformation_Map.bar -w work_fp4
```

BAR is extracted into work/run directory but not compiled.

```
[sanjay@sachin ~]$ ls -l work_fp4/run/Transformation_Map
total 28
-rw-rw---- 1 sanjayn sanjayn 210 Oct  9 12:30 application.descriptor
-rw-rw---- 1 sanjayn sanjayn 1527 Oct  9 12:30 input.xml
-rw-rw---- 1 sanjayn sanjayn 2250 Oct  9 12:30 InputXMLSchema.xsd
drwxrwx--- 2 sanjayn sanjayn 4096 Apr  5 11:28 META-INF
-rw-rw---- 1 sanjayn sanjayn 2105 Oct  9 12:30 OutputXMLSchema.xsd
-rw-rw---- 1 sanjayn sanjayn 2971 Oct  9 12:30 Transformation_Map.map
-rw---- 1 sanjayn sanjayn 2261 Oct  9 12:30 Transformation_Map.msgflow
```

```
[sanjay@sachin ~]$ IntegrationServer --name
.....2019-04-05 10:32:37.348132: .2019-04-05
.....2019-04-05 11:32:42.511708: Created compiled 'XMLNSC' schema file 'Transformation_Map/$mqsiApplication.bir'.
2019-04-05 11:32:42.654612: About to 'Start' the deployed resource 'Transformation_Map' of type 'Application'.
2019-04-05 11:32:42.654840: Deployed resource 'Transformation_Map' (uuid='Transformation_Map',type='MessageFlow') started successfully.
2019-04-05 11:32:42.673528: The HTTP Listener has started listening on port 17900! for 'http' connections.
2019-04-05 11:32:42.673748: Listening on HTTP URL '/Transformation_Map'.
2019-04-05 11:32:43.610352: IBM App Connect Enterprise administration service started.
2019-04-05 11:32:43.674048: The HTTP Listener has started listening on port 17901! for 'http' connections.
2019-04-05 11:32:43.675348: Application server has finished initialization.
```

Integration Server compiles the maps on startup which generates the .bir and class files.

```
[sanjay@sachin ~]$ on server 'SIS' starting initialization; version '11.0.0.4' (64-bit)
[on server 'SIS' starting initialization; version '11.0.0.4' (64-bit)]
```

```
[sanjay@sachin ~]$ ls -l work_fp4/run/Transformation_Map
total 320
-rw-rw---- 1 sanjayn sanjayn 210 Oct  9 12:30 application.descriptor
-rw-rw---- 1 sanjayn sanjayn 1527 Oct  9 12:30 input.xml
-rw-rw---- 1 sanjayn sanjayn 2250 Oct  9 12:30 InputXMLSchema.xsd
drwxrwx--- 2 sanjayn sanjayn 4096 Apr  5 11:28 META-INF
-rw-rw---- 1 sanjayn sanjayn 18146 Apr  5 11:32 $mqsiApplication.bir
-rw-rw---- 1 sanjayn sanjayn 277 Apr  5 11:32 $mqsiApplication.bir_inf
-rw-rw---- 1 sanjayn sanjayn 2105 Oct  9 12:30 OutputXMLSchema.xsd
-rw-rw---- 1 sanjayn sanjayn 2971 Oct  9 12:30 Transformation_Map.map
-rw-rw---- 1 sanjayn sanjayn 2261 Oct  9 12:30 Transformation_Map.msgflow
-rw-rw---- 1 sanjayn sanjayn 3535 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.class
-rw-rw---- 1 sanjayn sanjayn 604 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Common.class
-rw-rw---- 1 sanjayn sanjayn 554 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Common$ConvertToXCIState.class
-rw-rw---- 1 sanjayn sanjayn 1028 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Common$decimalformat_t.class
-rw-rw---- 1 sanjayn sanjayn 508 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Common$InitParam.class
-rw-rw---- 1 sanjayn sanjayn 563 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Common$KeyTable.class
-rw-rw---- 1 sanjayn sanjayn 382 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Common$NodeKind.class
-rw-rw---- 1 sanjayn sanjayn 143864 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Common_Partition0.class
-rw-rw---- 1 sanjayn sanjayn 21693 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Common_Partition1.class
-rw-rw---- 1 sanjayn sanjayn 552 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Common$subText.class
-rw-rw---- 1 sanjayn sanjayn 452 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.CommonsTunnelParam.class
-rw-rw---- 1 sanjayn sanjayn 560 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Commonstuple_boolean_boolean.class
-rw-rw---- 1 sanjayn sanjayn 560 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Commonstuple_boolean_double.class
-rw-rw---- 1 sanjayn sanjayn 556 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Commonstuple_boolean_float.class
-rw-rw---- 1 sanjayn sanjayn 564 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Commonstuple_boolean_integer.class
-rw-rw---- 1 sanjayn sanjayn 658 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Commonstuple_boolean_BigDecimal.class
-rw-rw---- 1 sanjayn sanjayn 610 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Commonstuple_boolean_XDMItem.class
-rw-rw---- 1 sanjayn sanjayn 626 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Commonstuple_boolean_XDMSequence.class
-rw-rw---- 1 sanjayn sanjayn 542 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Commonstuple_charZZ_int.class
-rw-rw---- 1 sanjayn sanjayn 524 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Commonstuple_int_int.class
-rw-rw---- 1 sanjayn sanjayn 622 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Commonstuple_XDMSequence_double.class
-rw-rw---- 1 sanjayn sanjayn 645 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Commonstuple_XDMSequence_XDMItem.class
-rw-rw---- 1 sanjayn sanjayn 661 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.Commonstuple_XDMSequence_XDMSequence.class
-rw-rw---- 1 sanjayn sanjayn 450 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.CommonsXPath20timeZone.class
-rw-rw---- 1 sanjayn sanjayn 1216 Apr  5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03.CommonsXSLT20ContextInfo.class
-rw-rw---- 1 sanjayn sanjayn 5267 Apr  5 11:32 xmap_default_Transformation_Map.ser
```

Deployment Considerations: mqabar



```
mqabar -a Transformation_Map.bar -w work_fp4 -c  
Generating runtime objects in '/home/sanjayn/work_fp4/run' ...
```

-c option to compile the maps

Generated map: /home/sanjayn/work_fp4/run/Transformation_Map/Transformation_Map.map

Generated runtime objects

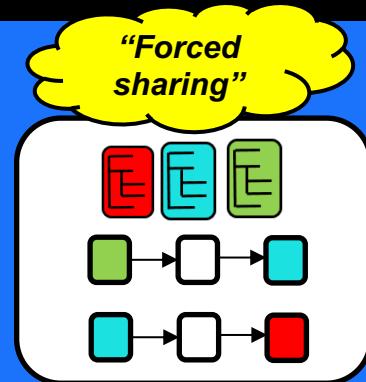
BIP8071I: Successful command completion.

```
[sanjayn@sachin ~]$ ls -l work_fp4/run/Transformation_Map  
total 320  
-rw-rw---- 1 sanjayn sanjayn 210 Oct 9 12:30 application.descriptor  
-rw-rw---- 1 sanjayn sanjayn 1527 Oct 9 12:30 input.xml  
-rw-rw---- 1 sanjayn sanjayn 2250 Oct 9 12:30 InputXMSchema.xsd  
drwxrwx--- 2 sanjayn sanjayn 4096 Apr 5 11:28 META-INF  
-rw-rw---- 1 sanjayn sanjayn 18146 Apr 5 11:32 $mqsiApplication.bir  
-rw-rw---- 1 sanjayn sanjayn 277 Apr 5 11:32 $mqsiApplication.bir_inf  
-rw-rw---- 1 sanjayn sanjayn 2105 Oct 9 12:30 OutputXMSchema.xsd  
-rw-rw---- 1 sanjayn sanjayn 2971 Oct 9 12:30 Transformation_Map.map  
-rw-rw---- 1 sanjayn sanjayn 2261 Oct 9 12:30 Transformation_Map.msgflow  
-rw-rw---- 1 sanjayn sanjayn 3535 Apr 5 11:32 xmap_default_Transformation_Map  
-rw-rw---- 1 sanjayn sanjayn 604 Apr 5 11:32 xmap_default_Transformation_Map  
-rw-rw---- 1 sanjayn sanjayn 554 Apr 5 11:32 xmap_default_Transformation_Map  
-rw-rw---- 1 sanjayn sanjayn 1028 Apr 5 11:32 xmap_default_Transformation_Map  
-rw-rw---- 1 sanjayn sanjayn 508 Apr 5 11:32 xmap_default_Transformation_Map  
-rw-rw---- 1 sanjayn sanjayn 562 Apr 5 11:32 xmap_default_Transformation_Map  
-rw-rw---- 1 sanjayn sanjayn 622 Apr 5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03_Common$tuple_XDMSequence_double.class  
-rw-rw---- 1 sanjayn sanjayn 645 Apr 5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03_Common$tuple_XDMSequence_XDMItem.class  
-rw-rw---- 1 sanjayn sanjayn 661 Apr 5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03_Common$tuple_XDMSequence_XDMSequence.class  
-rw-rw---- 1 sanjayn sanjayn 450 Apr 5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03_Common$XPath20TTimeZone.class  
-rw-rw---- 1 sanjayn sanjayn 1216 Apr 5 11:32 xmap_default_Transformation_Mapebedbc5bf1e20805_03_Common$XSLT20ContextInfo.class  
-rw-rw---- 1 sanjayn sanjayn 5267 Apr 5 11:32 xmap_default_Transformation_Map.ser
```

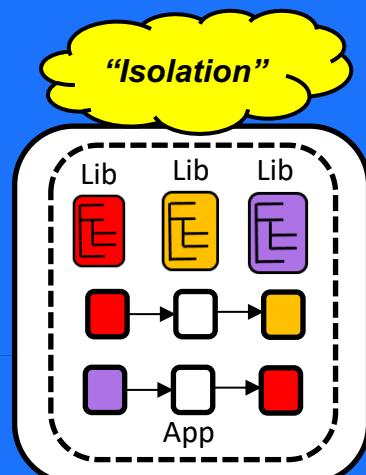
Maps are already compiled in advance, so saves time on starting the Integration Server. It does not need to do a compile step.

```
[sanjayn@sachin ~]$ IntegrationServer --name SIS --work-dir work_fp4  
.....2019-04-05 10:39:59.509572: .2019-04-05 11:39:59.509972: Integration server 'SIS' starting initialization; version '11.0.0.4' (64-bit)  
.....2019-04-05 11:40:01.375127: About to 'Initialize' the deployed resource 'Transformation_Map' of type 'Application'.  
2019-04-05 11:40:03.297245: About to 'Start' the deployed resource 'Transformation_Map' of type 'Application'.  
2019-04-05 11:40:03.297446: Deployed resource 'Transformation_Map' (uuid='Transformation_Map',type='MessageFlow') started successfully.  
2019-04-05 11:40:03.309768: The HTTP Listener has started listening on port '7800' for 'http' connections.  
2019-04-05 11:40:03.309939: Listening on HTTP URL '/Transformation_Map'.  
.2019-04-05 11:40:04.203189: IBM App Connect Enterprise administration security is inactive.  
2019-04-05 11:40:04.258536: The HTTP Listener has started listening on port '7600' for 'RestAdmin http' connections.  
  
2019-04-05 11:40:04.259836: Integration server has finished initialization.
```

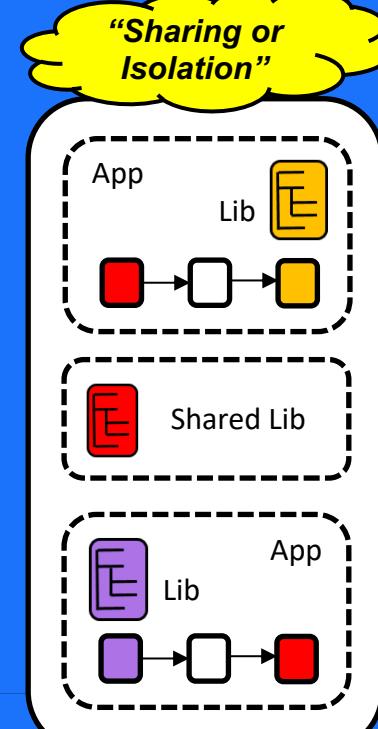
Deployment Considerations: Default Application



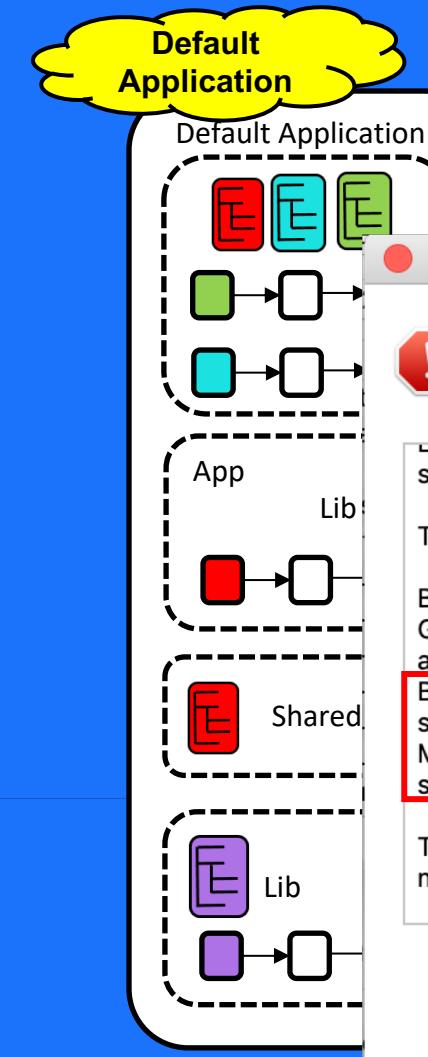
WMBv7
"Broker Projects"



WMBv8, IIBv9
"Applications and Libraries"



IIBv10
"Shared Libraries"



ACEv11

Screenshot of the IBM Integration Bus Deployment Toolkit interface. The left pane shows a tree view of resources: Independent Resources, MyIntProject, Flows, Integration Servers, and Integration Nodes. The right pane displays deployment logs and error messages:

```
Defaults:  
defaultApplication: 'MyDefaultApp'  
#policyProject: 'DefaultPolicies'  
Policies:  
# Set default policy names, options, etc.  
#HTTPConnector: ...  
#HTTPSConnector: ...  
#monitoringProject: ...  
...  
The task did not complete successfully: The deployment was unsuccessful. Check error messages for explanation.
```

A red box highlights the error message:

BIP9325E: The source '/Users/sanjayn/Documents/runtime-LaunchACEtoolkit/GeneratedBarFiles/MyIntProject/MyFlow1.msgflow.generated.bar' could not be deployed as it contains errors. No changes have been made to the integration server.
BIP1383E: The integration server has detected independent resources in BAR file '/Users/sanjayn/Documents/runtime-LaunchACEtoolkit/GeneratedBarFiles/MyIntProject/MyFlow1.msgflow.generated.bar' but no default application name has been specified on server start-up.

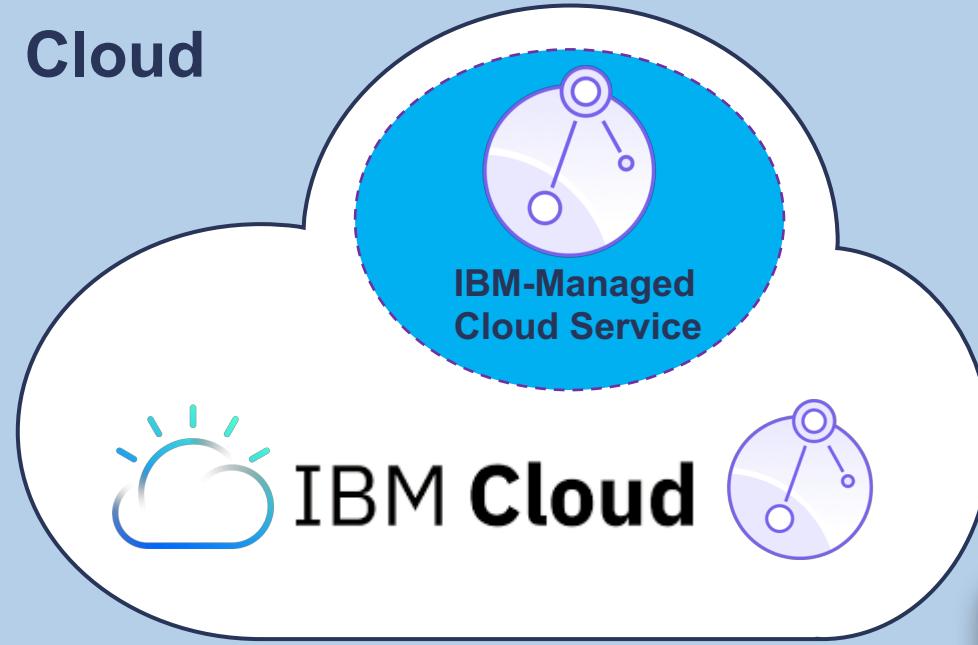
A teal callout bubble points to the error message with the text: "Require a Default Application for Independent Resources."

Cancel Close

Deployment Considerations



Cloud



Azure



Microsoft
Azure

Google

AWS



amazon
web services

On-premises



IIB v10

IBM System Z

ACE Distributed platforms

Microsoft Windows x86-64
Linux on x86-64
Linux on z System



IIB Distributed platforms

IBM AIX
Linux on IBM Power

IIB v10

Private cloud

IBM Cloud
Private

Deployment Considerations: Extra optional steps for unzip & go

Create a work directory using mqsicreateworkdir



Configure work/server.conf.yaml



Copy bars into the work/run directory



Run IntegrationServer

Recall the simplified example to start an Integration Server

Create a work directory using mqsicreateworkdir



Configure work/server.conf.yaml



Run mqisetdbparms

optional

Precompile maps/schema using mqsibar

optional

Copy bars into the work/run directory

optional

Copy policy overrides into the work/overrides directory

optional

Configure server specific overrides in work/overrides/server.conf.yaml

Run IntegrationServer

Extra optional steps when preparing for a containerized approach.

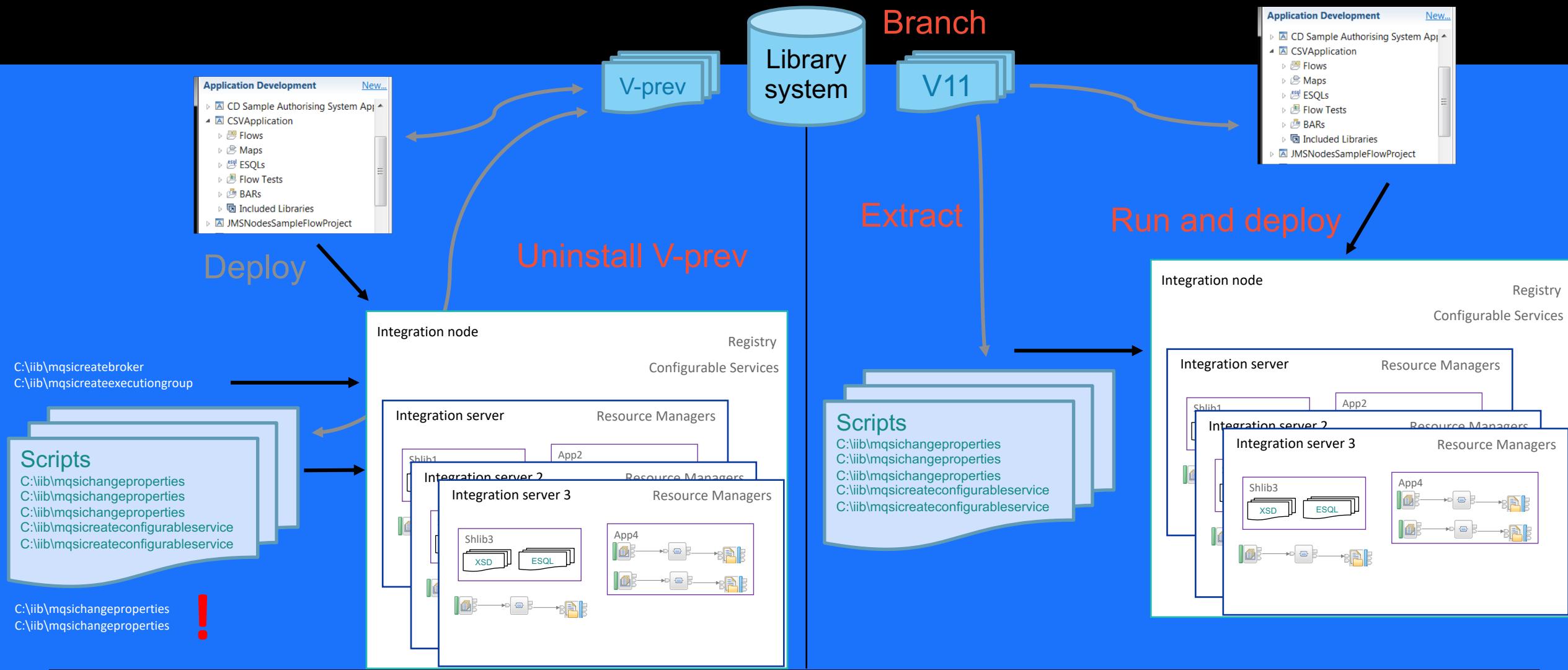
Migration



Migration – Side by side

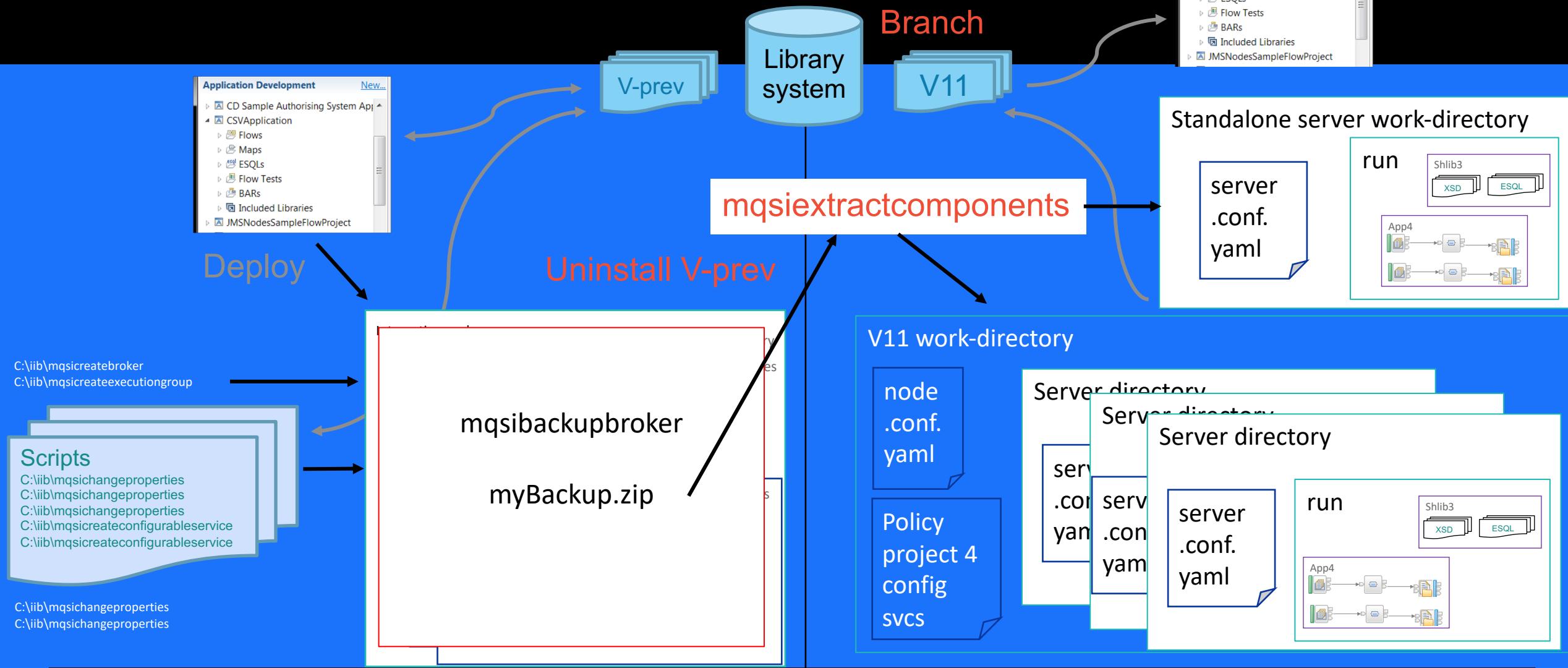
Install ACE V11

The IBM logo consists of the letters "IBM" in a bold, sans-serif font, where each letter is composed of horizontal stripes. A small registered trademark symbol (®) is located at the bottom right of the "M".



Migration – Extract

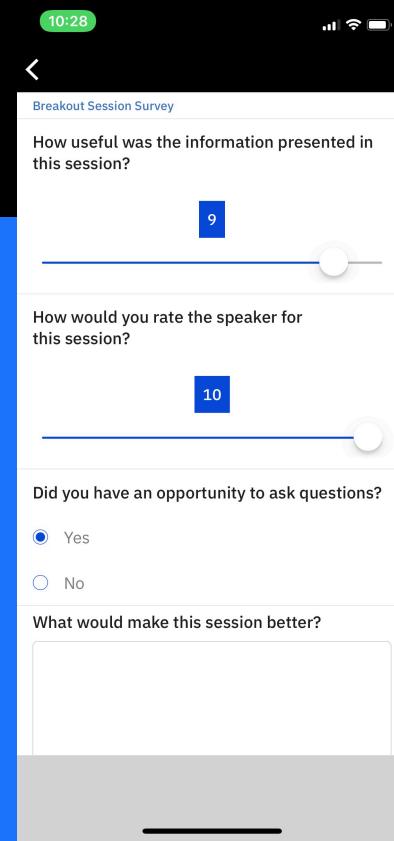
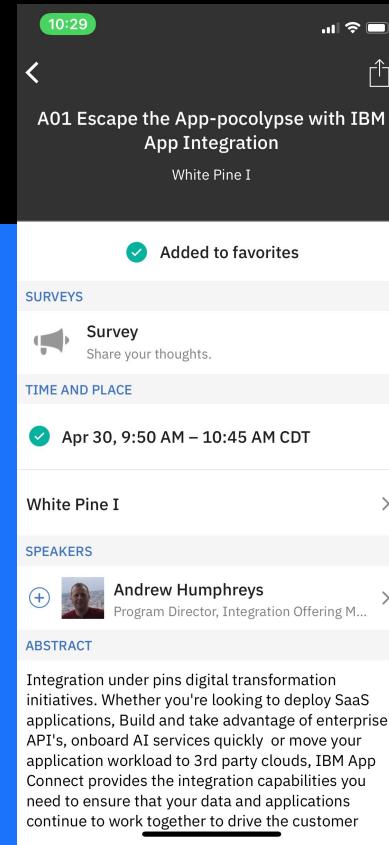
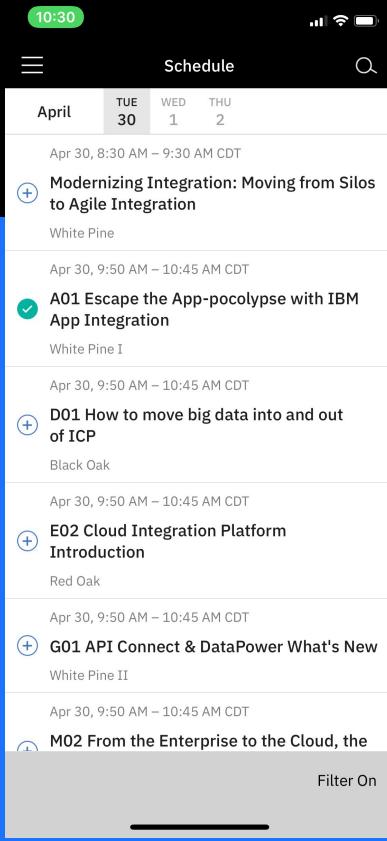
Install ACE V11



Migration: mqsiextractcomponents



- New command and approach to migration
- Extract configuration and resources from existing node (backup)
- Create standalone integration server work directory
- Create integration node from backup
- Cross platform
 - Allows for migration from retired platforms
- Repeatable



IBM

Don't forget to fill out the survey!

Select your session, select survey, rate the session and submit!

Thank You

