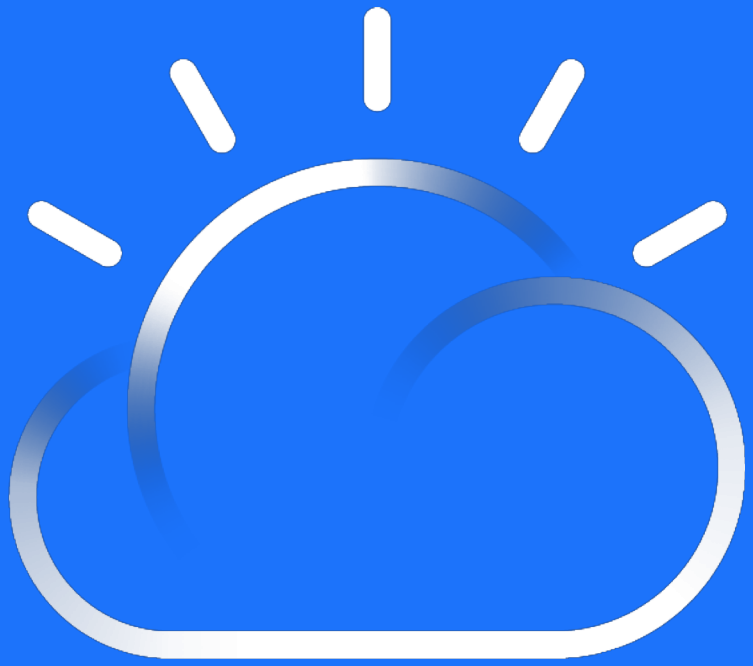
Integration Technical Conference 2019

A04 Application Integration

Administering ACE v11



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IBM **Cloud**

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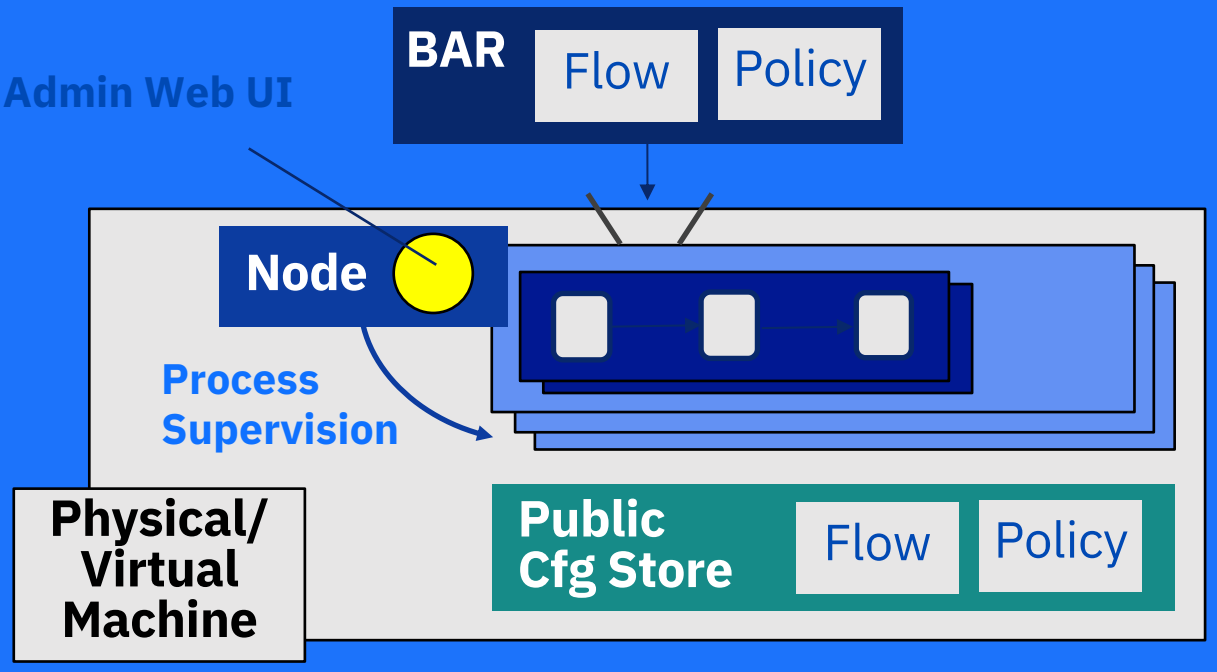
Agenda

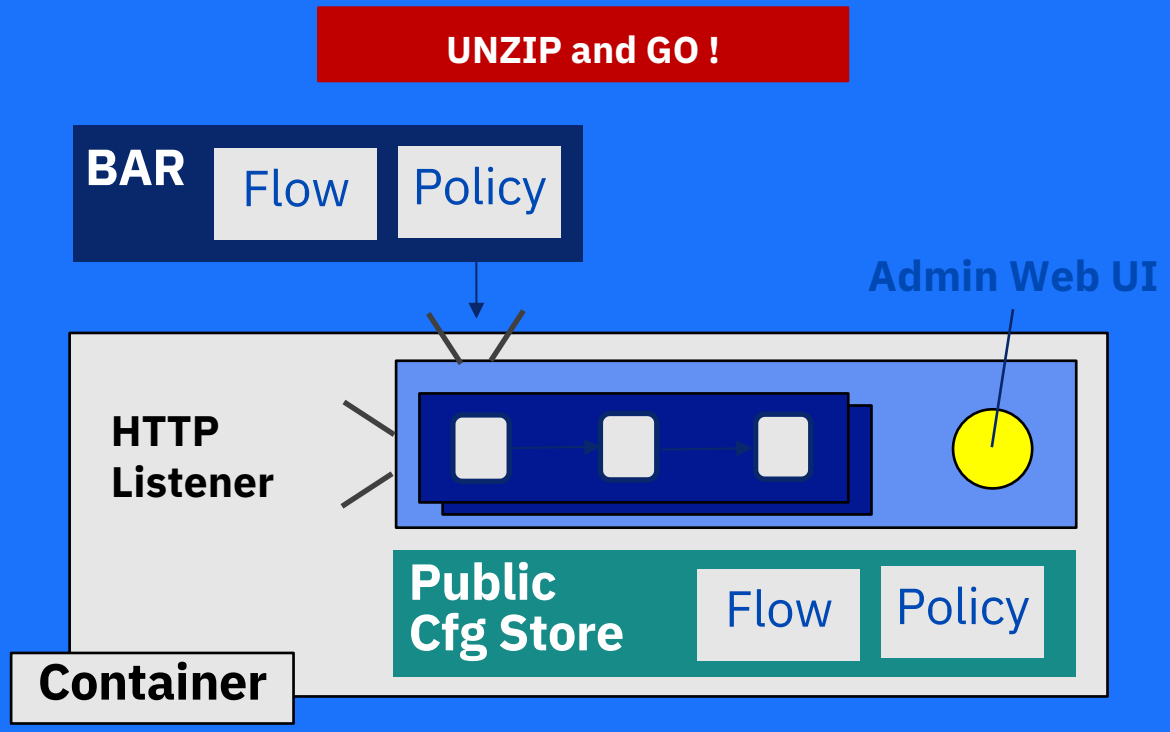
- Management Styles
- Configuration
- Administration Interfaces
- Overrides
- Administration Security
- Resource Managers
- Deployment Considerations
- Migration

Management Styles

Management Styles



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

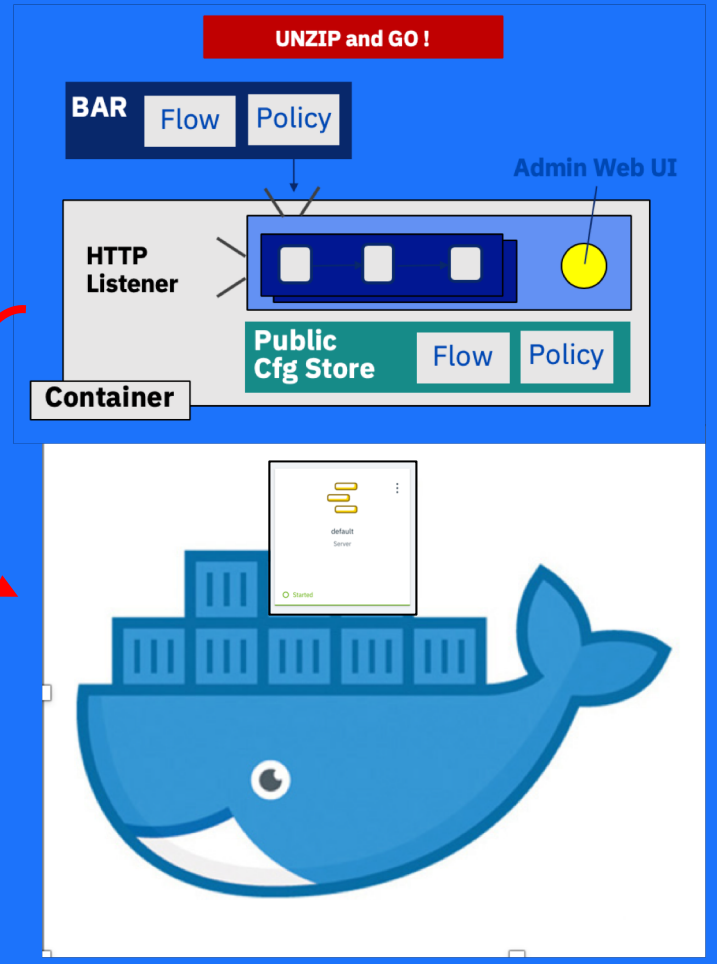


Containers can be re-started.
Configuration based on settings in a yaml file.

Agile Integration Architecture (https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=15017915USEN)

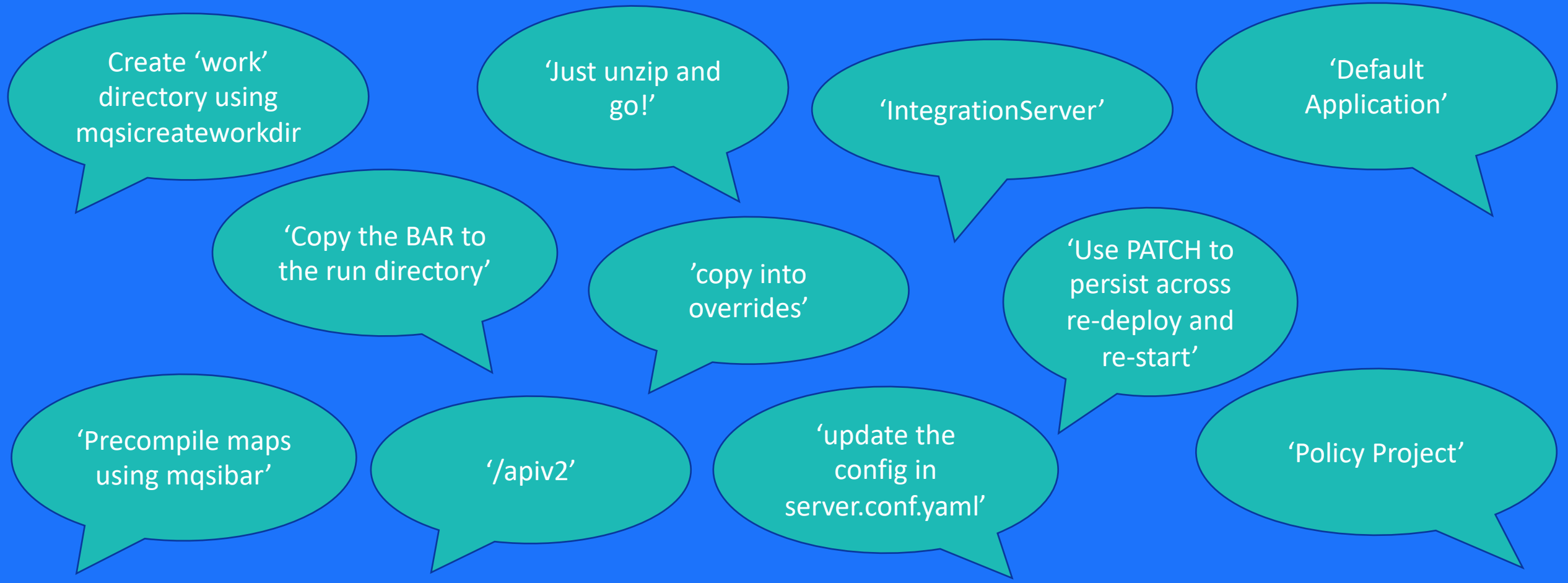
Management Styles: Integration Servers

- 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 IIBv10
- 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



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

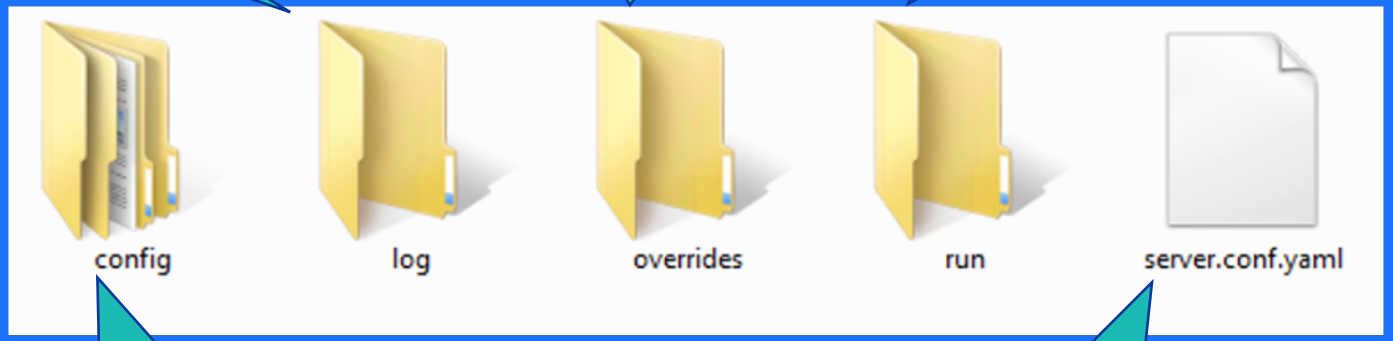
- mqsicreateworkdir

```
[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 ***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.



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 ~]$
```

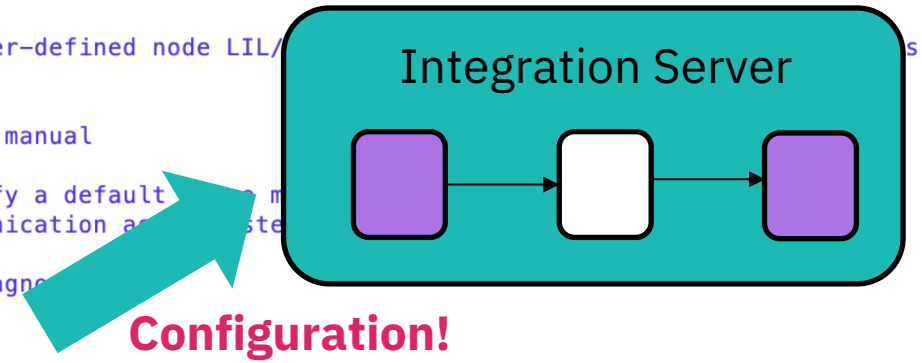
IntegrationServer is a new command in V11 for starting an Independent Integration Server. It requires a work directory which contains a server.conf.yaml

```
[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
#mqTrustedQueueManager: 'no' # Set to yes to enable MQ communication a

#trace: 'none'              # choose 1 of : none|service|diagn
#traceSize: '1G'            # Set the service trace size
#traceNodeLevel: true       # Enable or disable Trace Nodes

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

Log:
  #consoleLog: true         # Control writing BIP messages to standard out. Set to true or false, default is true.
  #outputFormat: 'text'     # Set the format for writing BIP messages ibmjson or text, default is text.
  #eventLog: ''             # Control writing BIP messages to file. Set to '/path/log.txt' to enable, or '' to disable.
                            # Default is <workdir>/log/integration_server.<server_name>.events.txt
```

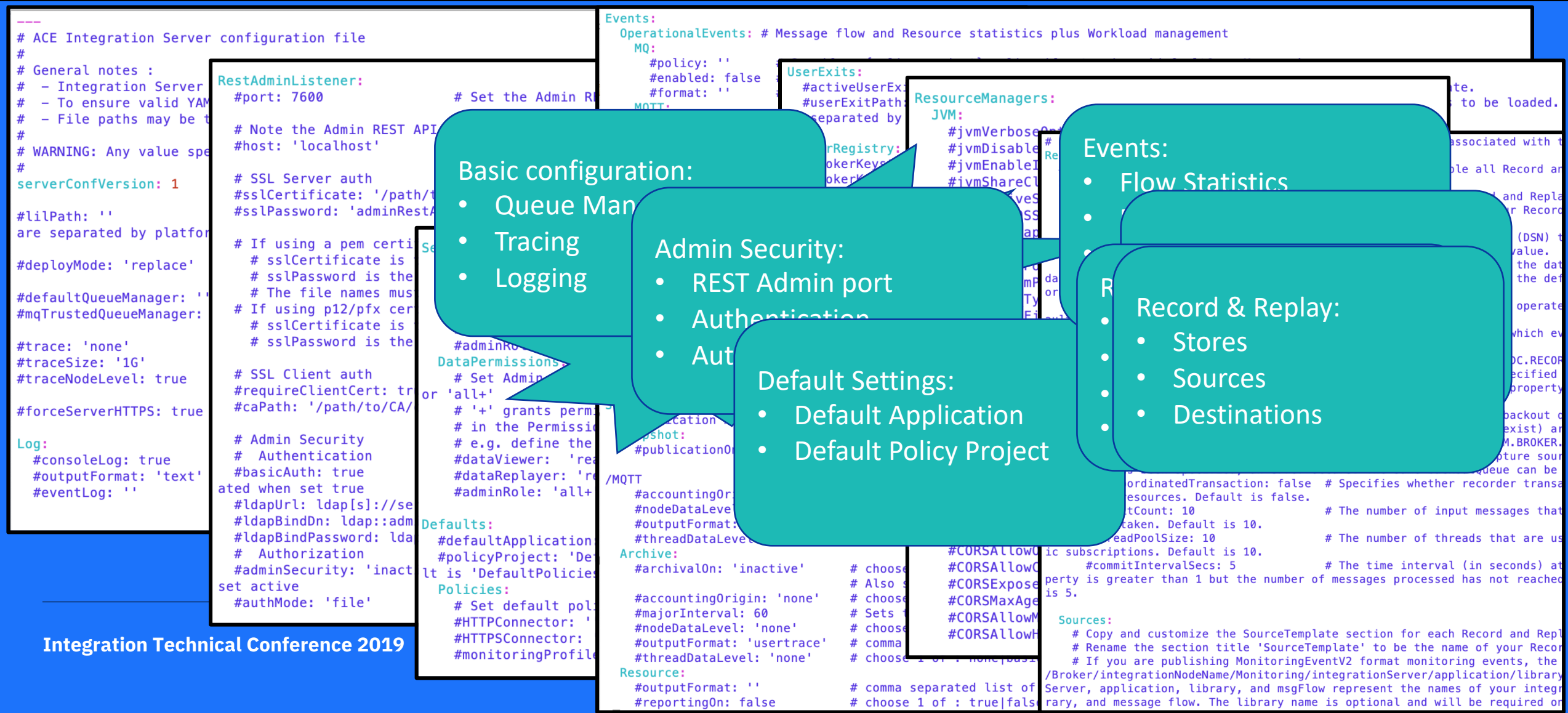


A heavily commented YAML file used for configuring an Integration Server.

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

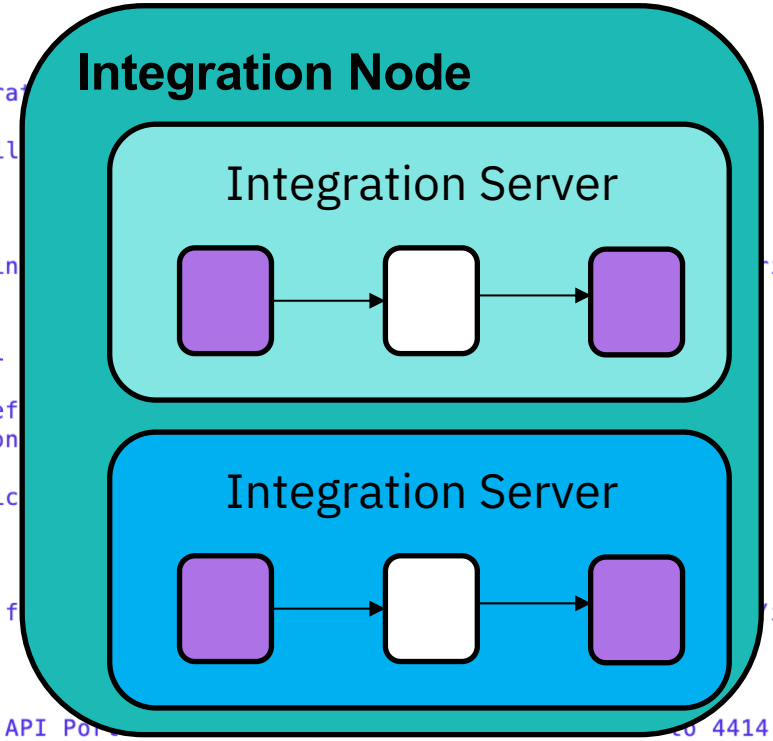
No need to run commands aside from mqsisetdbparms.

Configuration: server.conf.yaml



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 integra
#
# WARNING: Any value specified in the 'overrides/node.conf.yaml' wil
#
nodeConfVersion: 1

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

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

#defaultQueueManager: ''    # Set non-empty string          ry a def
#mqTrustedQueueManager: 'no' # Set to yes to enabl          ommunication

#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 f                    /inte
gration_server.<server_name>.events.txt

RestAdminListener:
  port: 4414                          # Set the Admin REST API Por                    to 4414
```



Configuration!

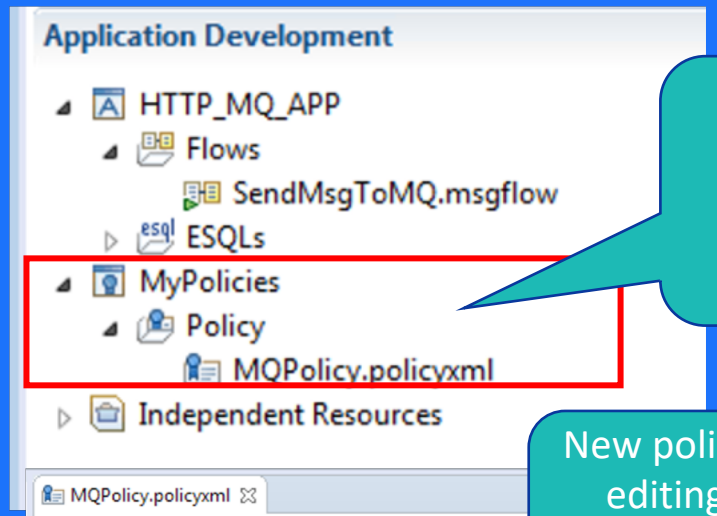
A heavily commented YAML file used for configuring an Integration Node.

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

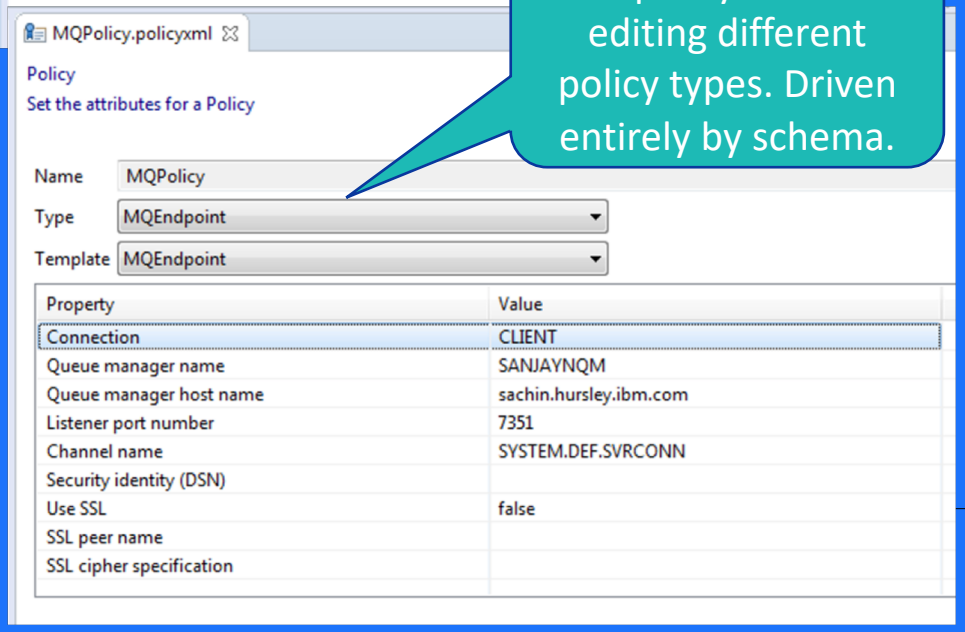
Resides in: $MQSI_REGISTRY/components/<NODE_NAME>/node.conf.yaml

Configuration: Policy files

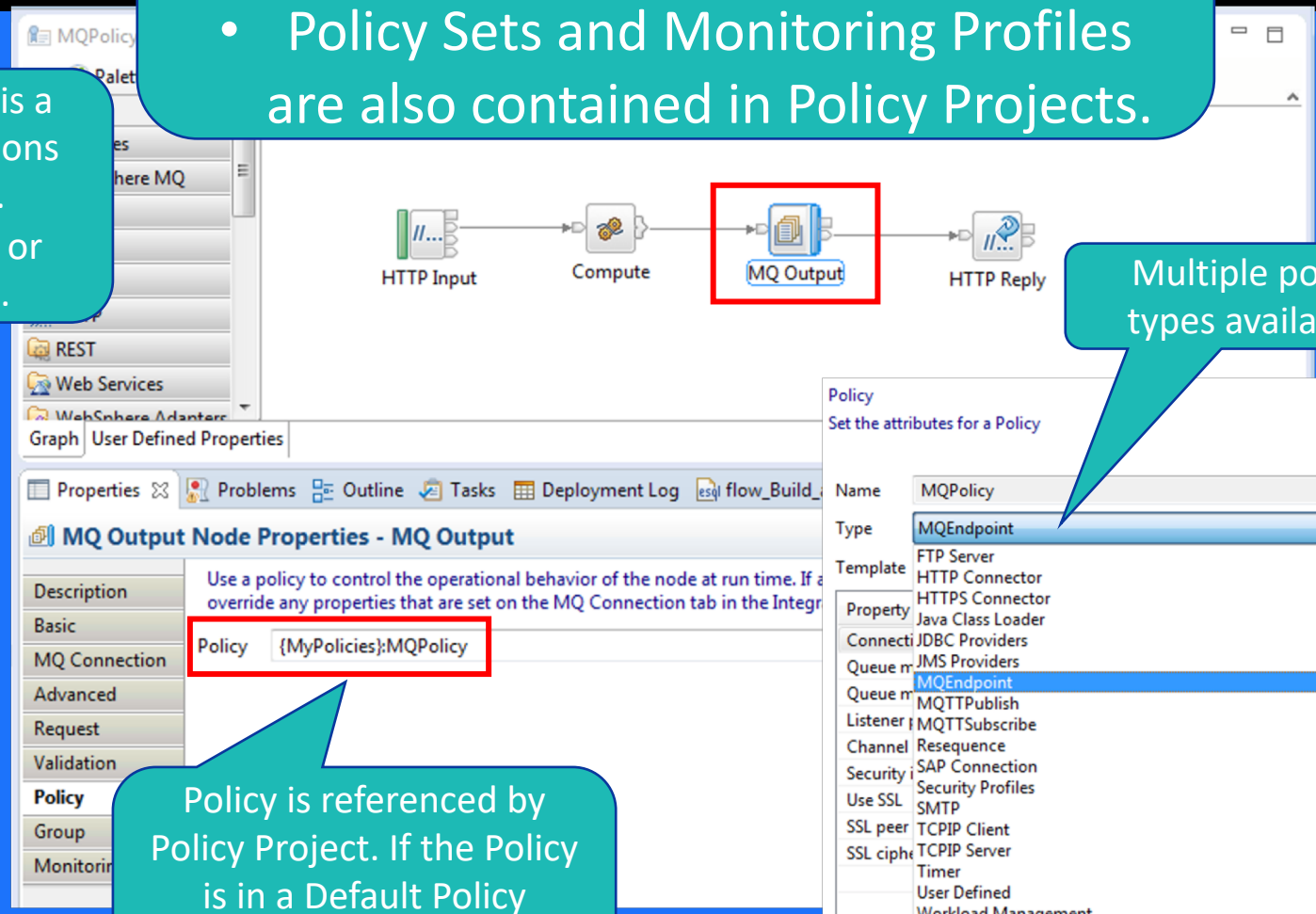
- Policies replace Configurable Services and include MQEndpoint and Workload Management.
- Policy Sets and Monitoring Profiles are also contained in Policy Projects.



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



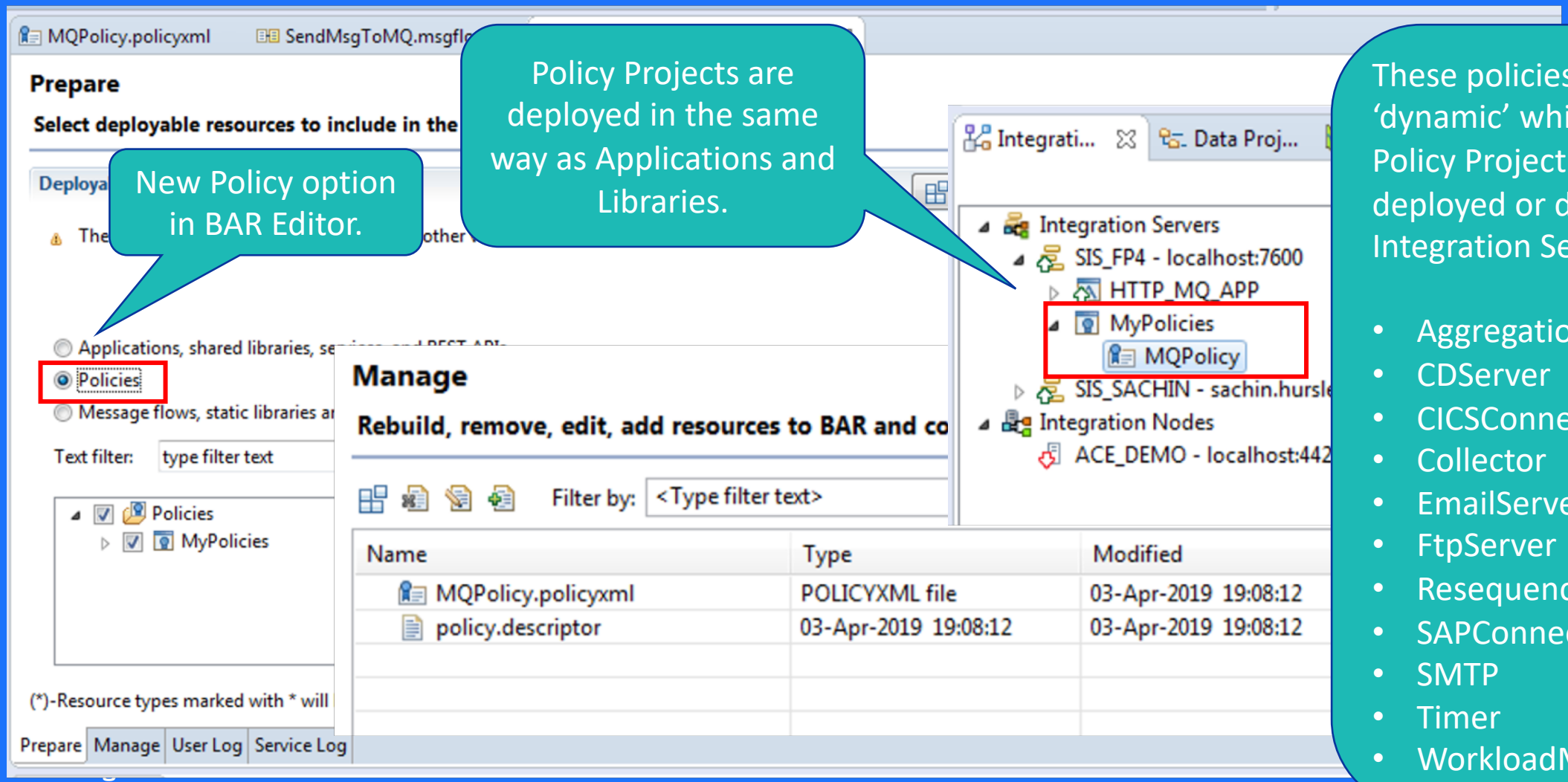
New policy editor for editing different policy types. Driven entirely by schema.



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

Multiple policy types available.

Configuration: Policy files



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

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
```

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.

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

```
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 stopp
ed.
BIP8071I: Successful command completion.

c:\>
```

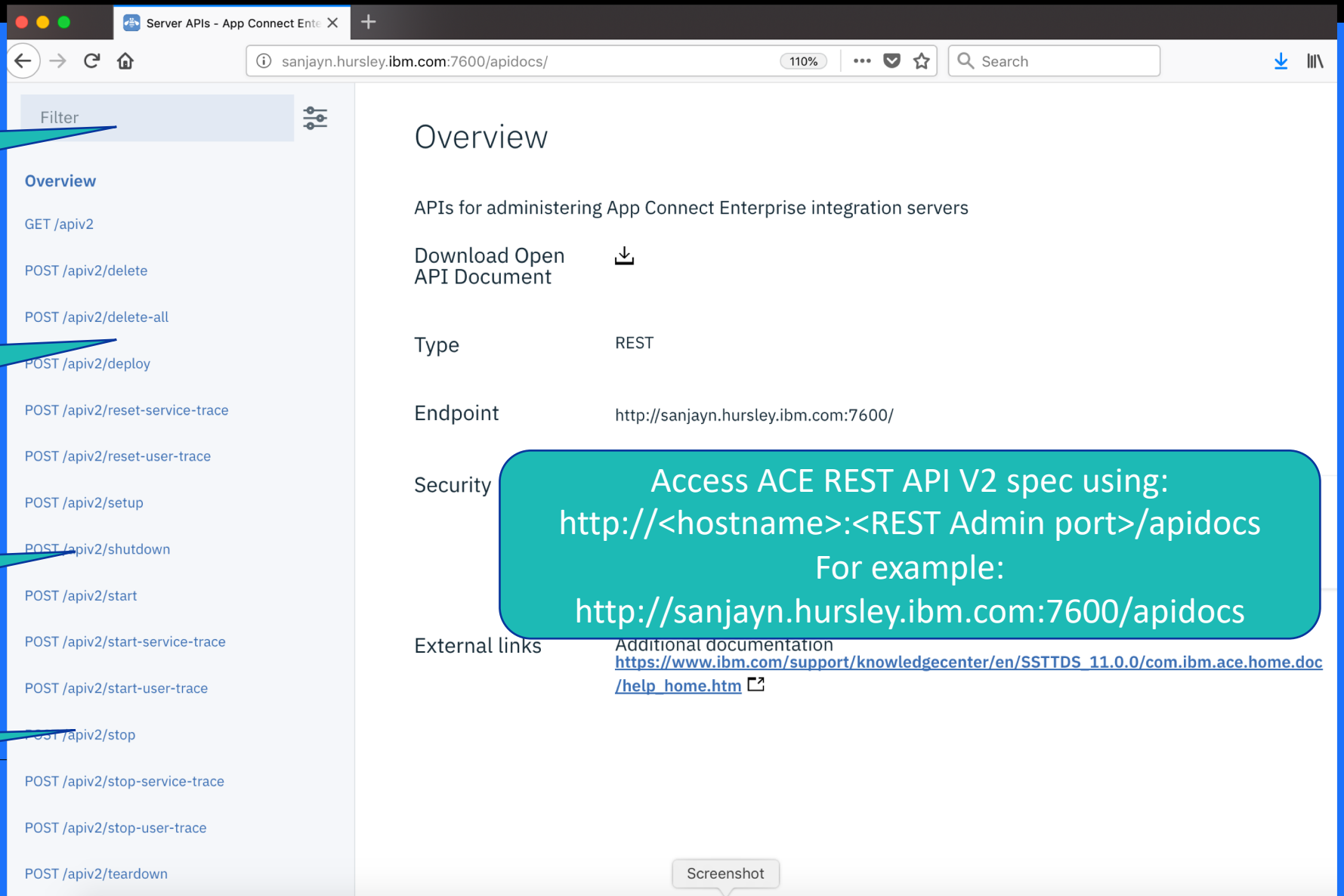
Administration Interfaces: /apiv2

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.



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

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

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"
    }
},
```

Administration Interfaces: access using curl

curl -X GET http://sachin.hursley.ibm.com:7600/apiv2/applications


```
{
    "hasChildren": true,
    "name": "applications",
    "type": "applications",
    "uri": "/apiv2/applications",
    "properties": {},
    "descriptiveProperties": {},
    "active": {},
    "actions": {},
    "children": [
        {
            "hasChildren": true,
            "name": "JDBCApp",
            "type": "application",
            "uri": "/apiv2/applications/JDBCApp"
        },
        {
            "hasChildren": true,
            "name": "Transformation_Map",
            "type": "application",
            "uri": "/apiv2/applications/Transformation_Map"
        },
        {
            "hasChildren": true,
            "name": "HelloApp",
            "type": "application",
            "uri": "/apiv2/applications/HelloApp"
        }
    ],
    "links": []
}
```


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

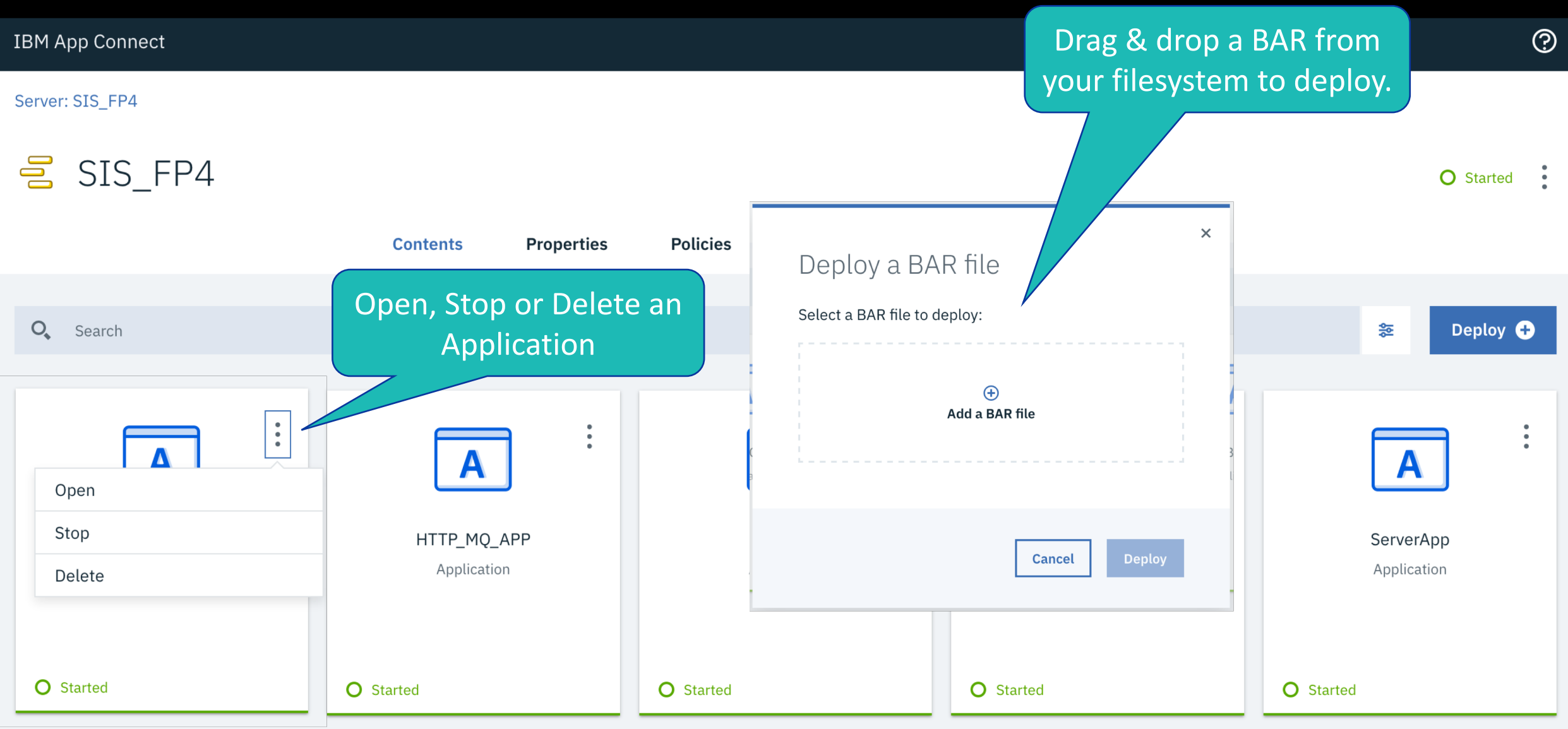
curl -X GET http://sachin.hursley.ibm.com:7600/apiv2/applications/HelloApp


```
"actions": {
    "unavailable": {
        "detach-monitoring-profile": "/apiv2/applications/HelloApp/detach-monitoring-profile",
        "setup": "/apiv2/applications/HelloApp/setup",
        "start": "/apiv2/applications/HelloApp/start",
        "stop-monitoring": "/apiv2/applications/HelloApp/stop-monitoring",
        "validate": "/apiv2/applications/HelloApp/validate"
    },
    "available": {
        "attach-monitoring-profile": "/apiv2/applications/HelloApp/attach-monitoring-profile",
        "start-monitoring": "/apiv2/applications/HelloApp/start-monitoring",
        "stop": "/apiv2/applications/HelloApp/stop",
        "teardown": "/apiv2/applications/HelloApp/teardown"
    }
},
"children": {
    "subFlows": {
        "hasChildren": false,
        "name": "subflows",
        "type": "subFlows",
        "uri": "/apiv2/applications/HelloApp/subflows"
    },
    "resources": {
        "hasChildren": true,
        "name": "resources",
        "type": "resources",
        "uri": "/apiv2/applications/HelloApp/resources"
    },
    "libraries": {
        "hasChildren": false,
        "name": "libraries",
        "type": "libraries",
        "uri": "/apiv2/applications/HelloApp/libraries"
    },
    "messageFlows": {
        "hasChildren": true,
        "name": "messageflows",
        "type": "messageFlows",
        "uri": "/apiv2/applications/HelloApp/messageflows"
    },
    "statistics": {
        "hasChildren": true,
        "name": "statistics",
        "type": "statistics",
        "uri": "/apiv2/applications/HelloApp/statistics"
    }
},
```

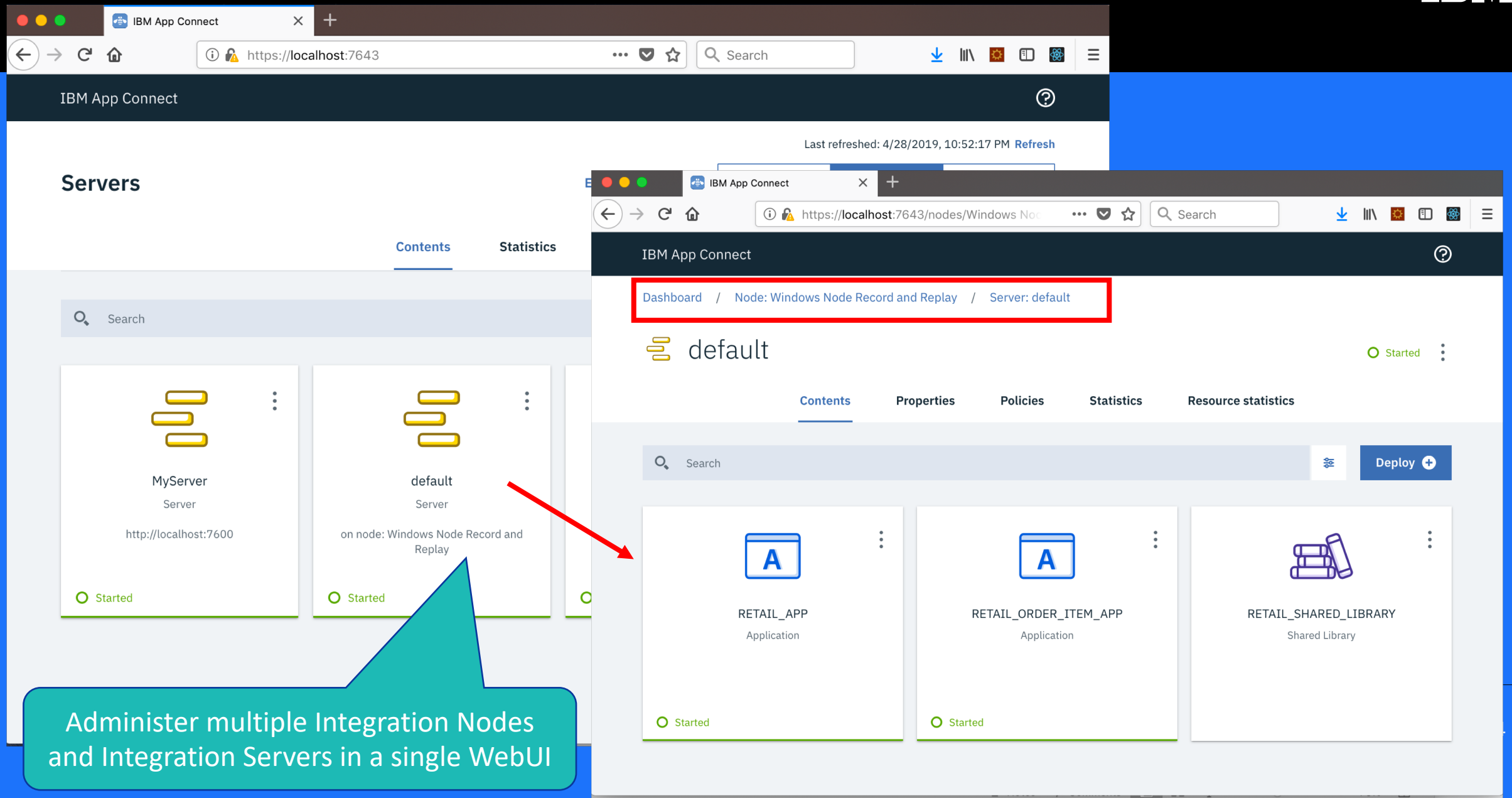

Actions that can be performed on an Application

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

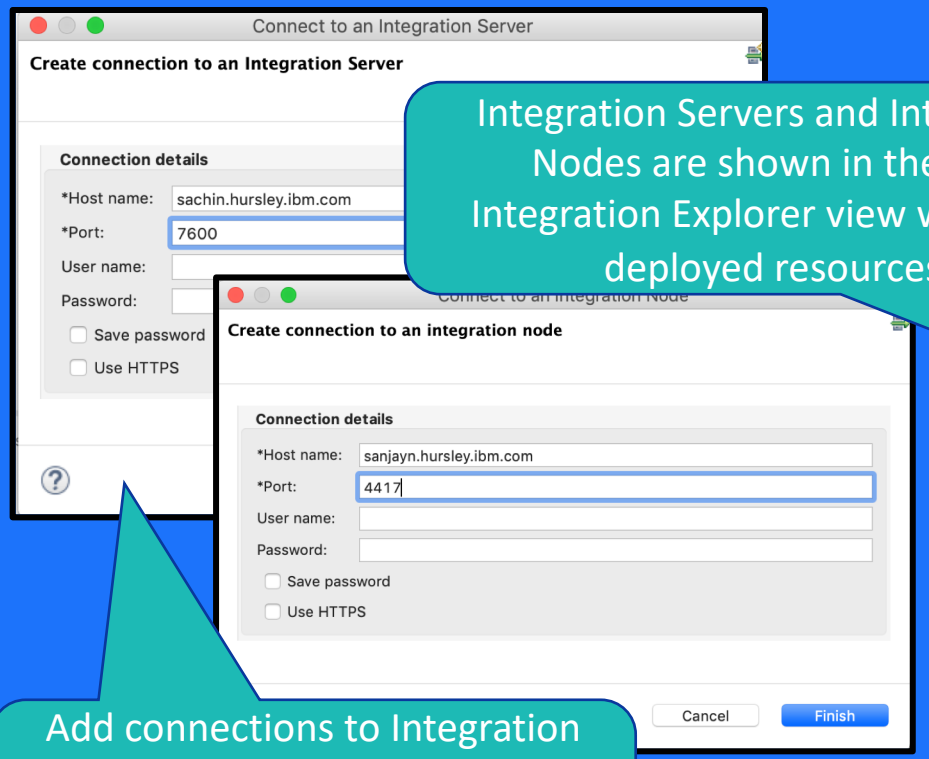
Administration Interfaces: Web Admin UI



Administration Interfaces: Web Admin UI

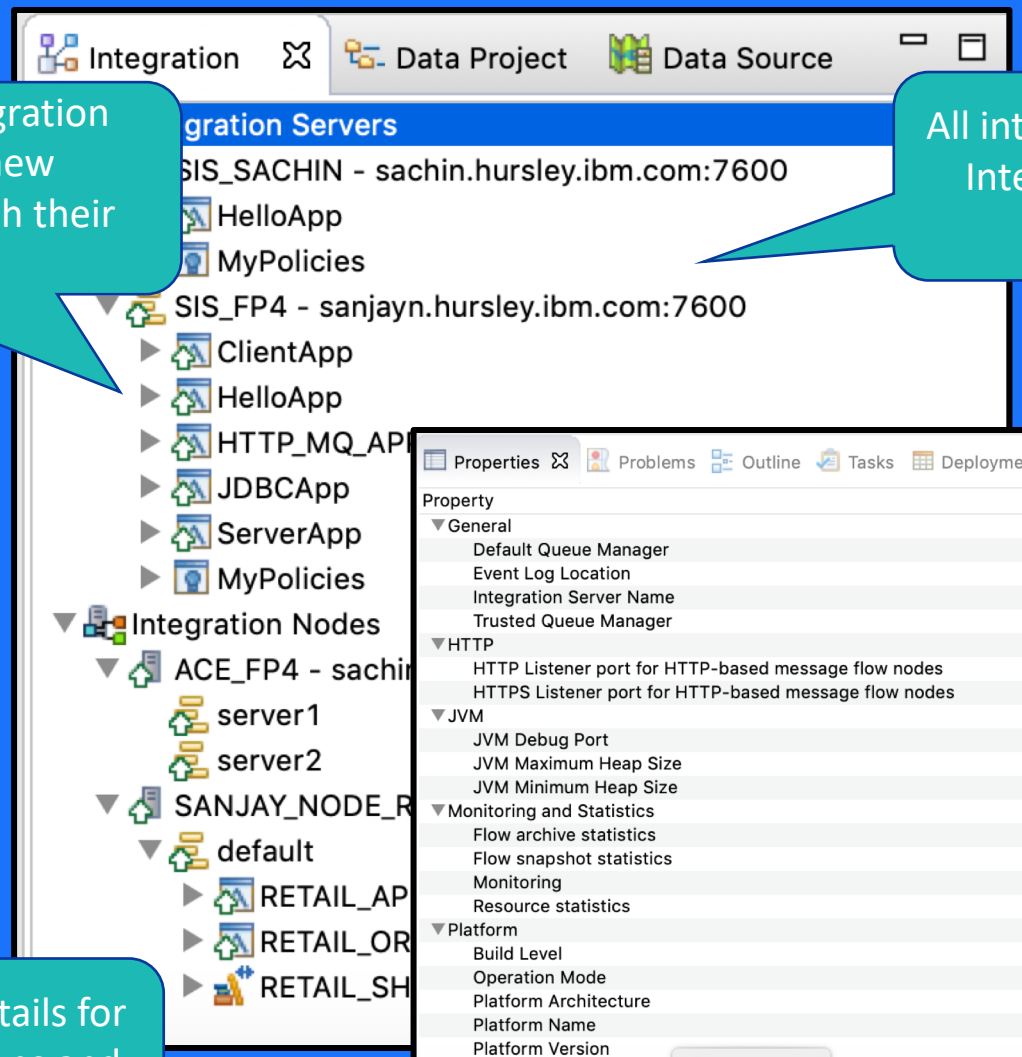


Administration Interfaces: Toolkit



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

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

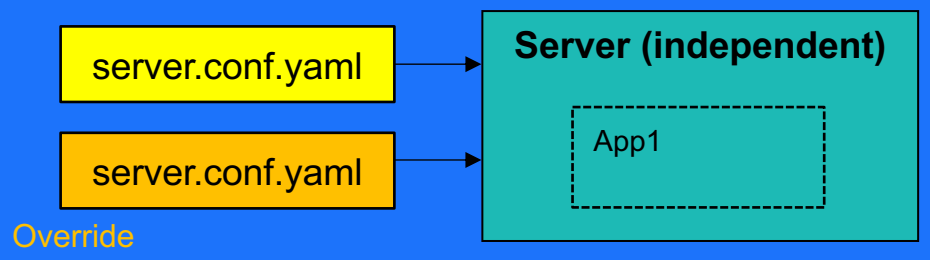


All interactions with the back-end Integration Servers are made using REST requests.

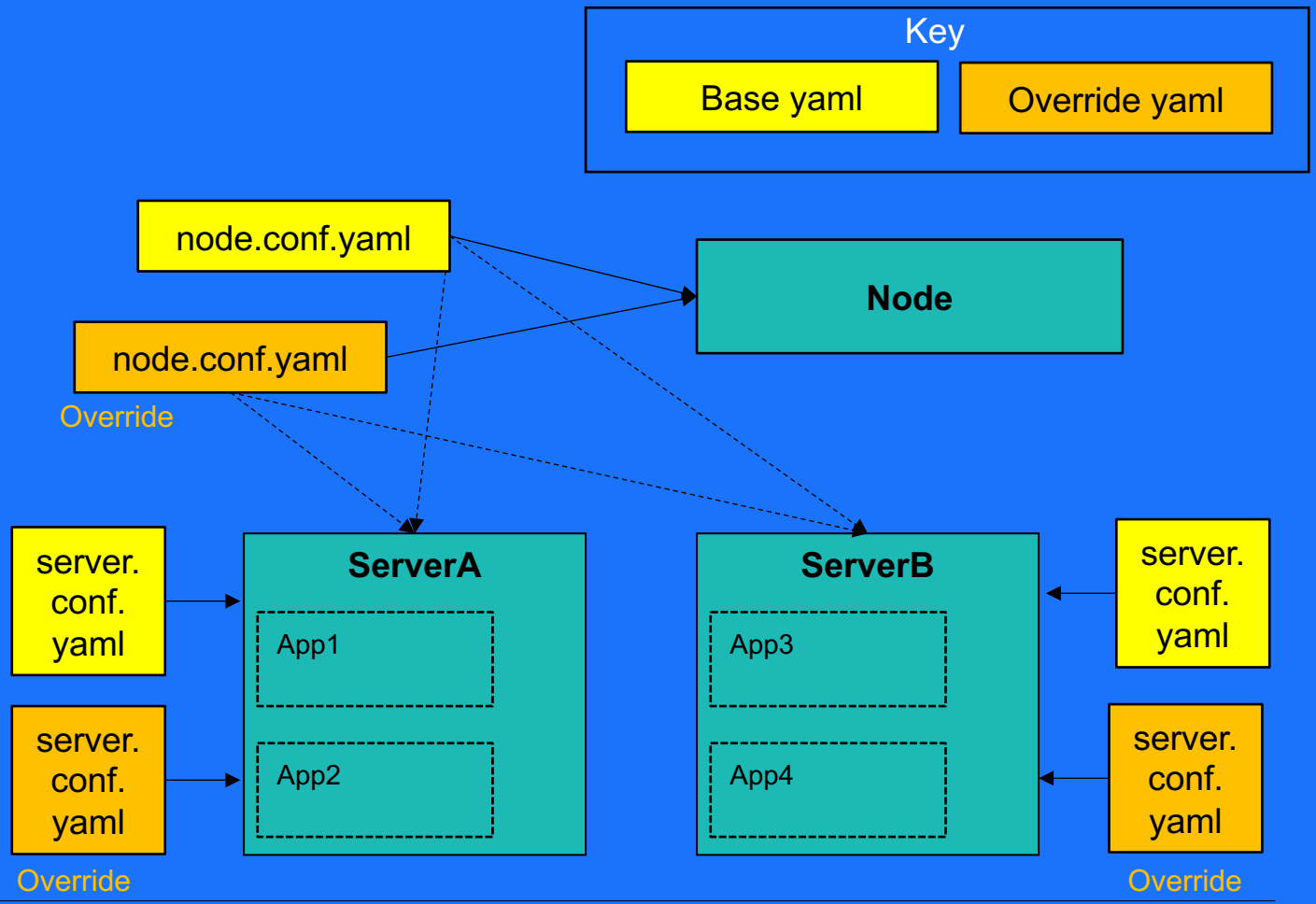
Properties view shows details for a Node, Server, Applications and Message Flows.

Overrides

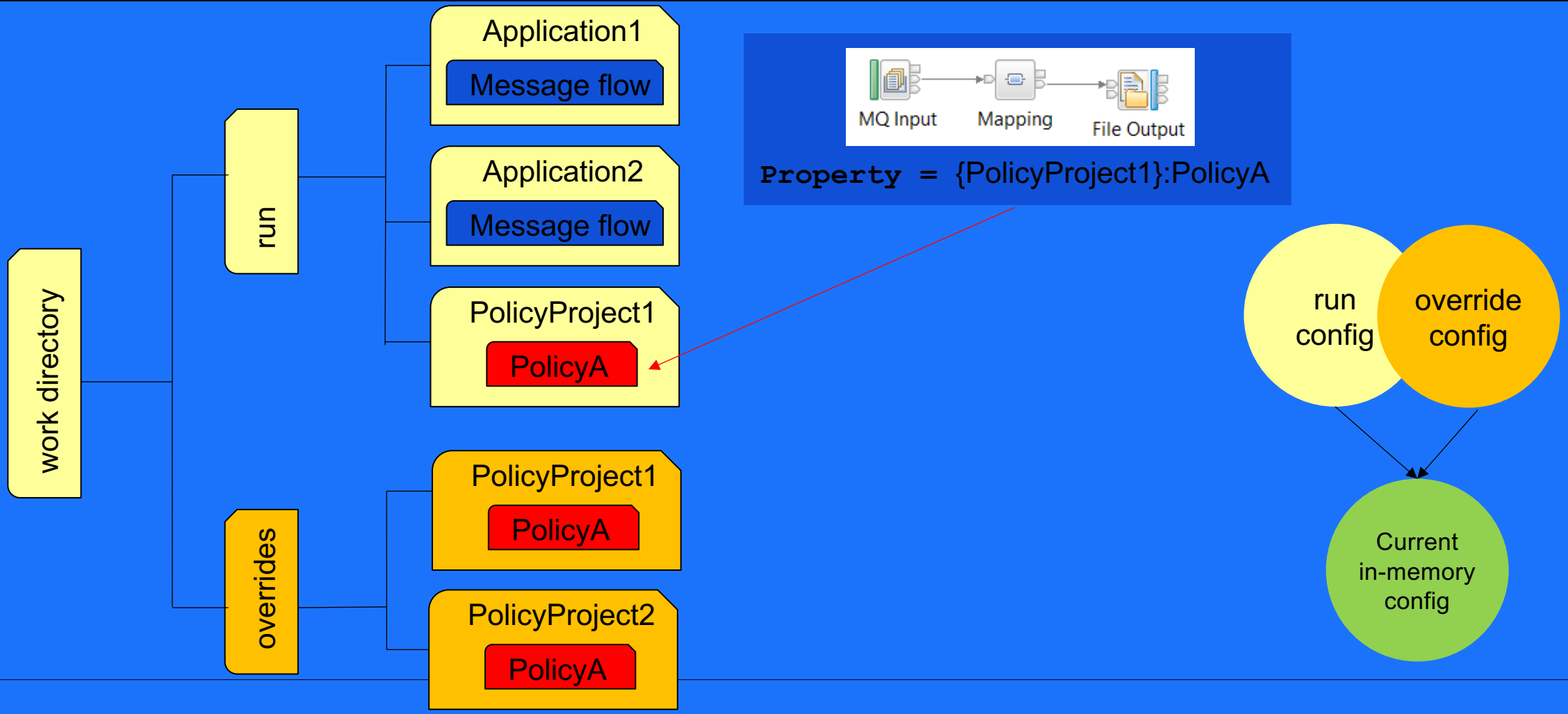
Overrides: configuring YAML files



- 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.

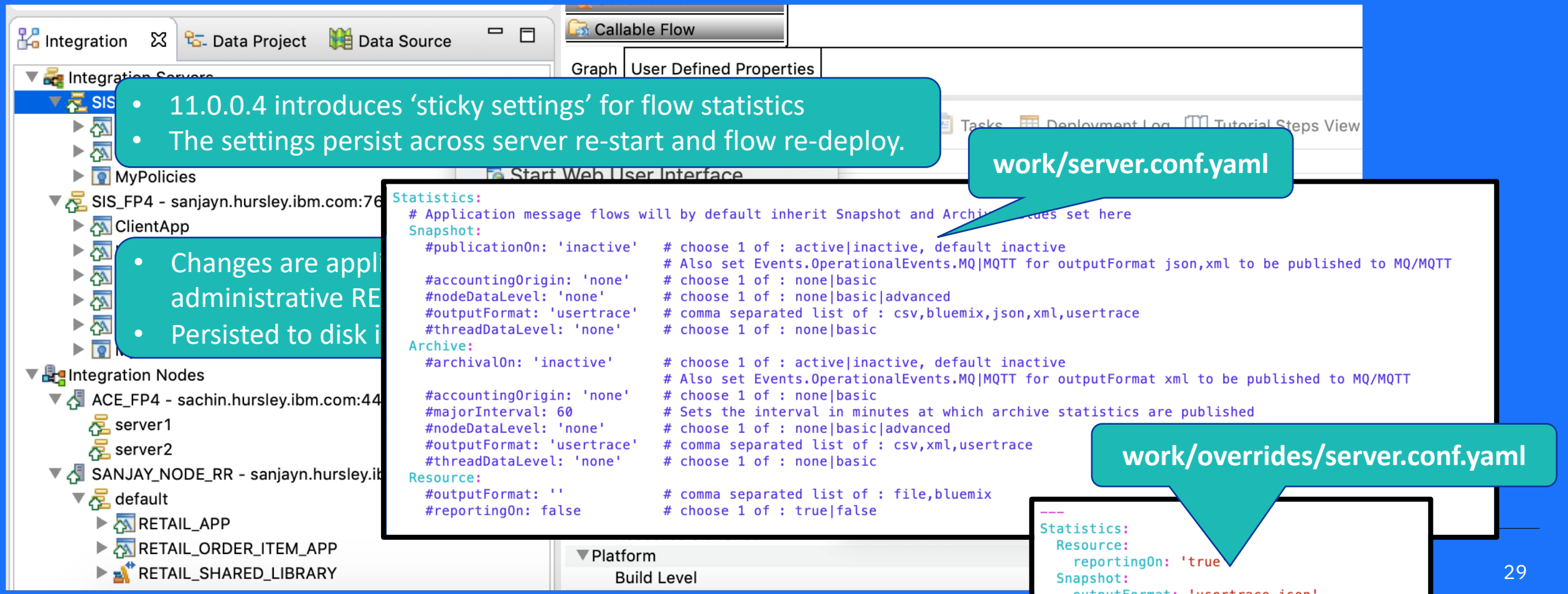


Overrides: configuring Policy files



Overrides: REST API updates overrides YAML

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



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

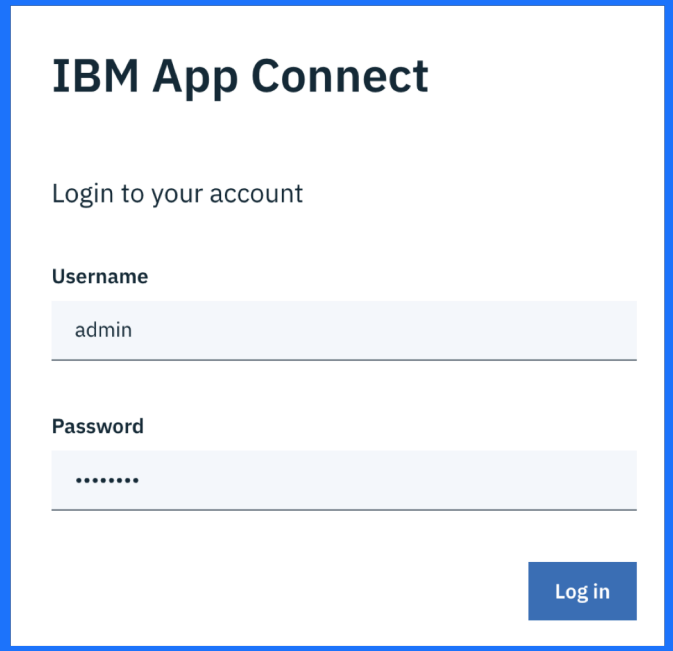
Set basicAuth: true

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

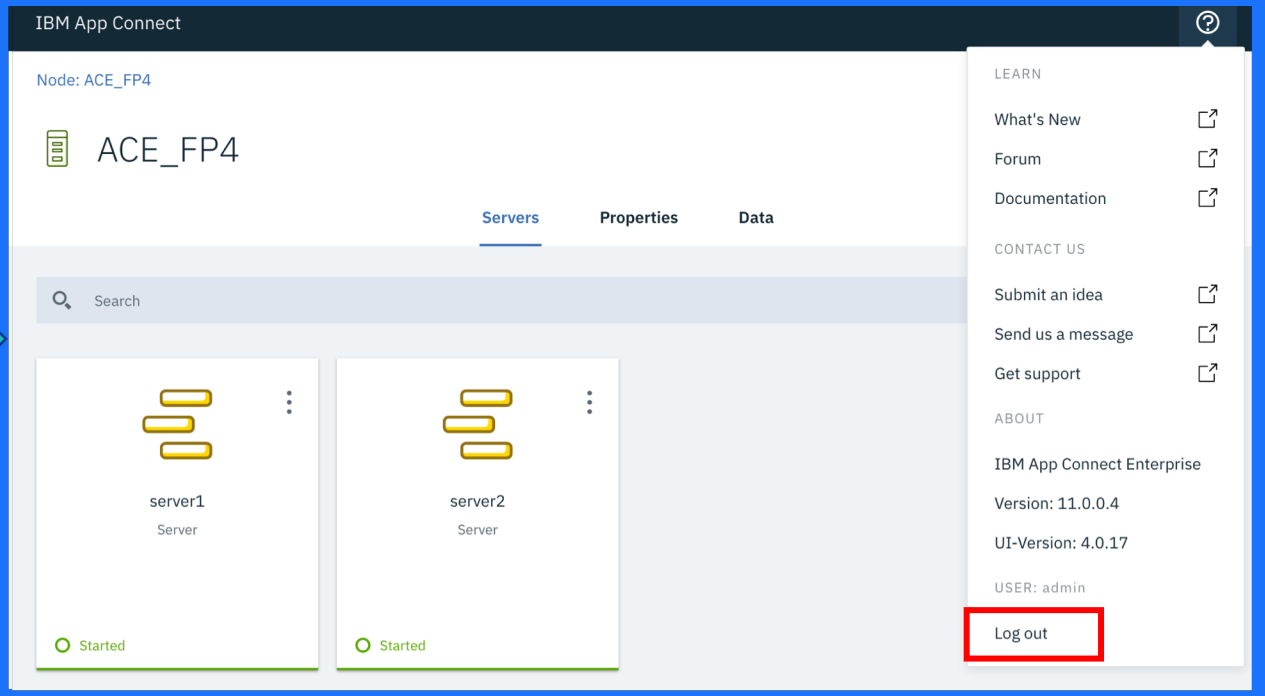
Re-start the Integration Server

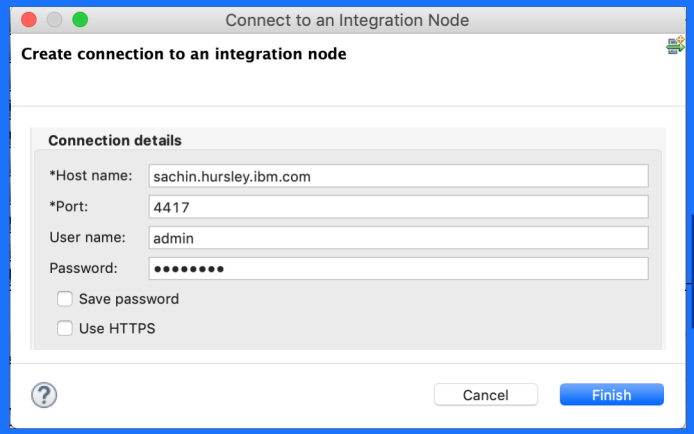
```
RestAdminListener:
  port: 4414                                    # Set the Admin REST AP

  # Note the Admin REST API will be insecure without the following be
  #host: 'localhost'                            # Set the hostname othe

  # 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 m
    # 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

  # SSL Client auth
  #requireClientCert: true                      # Request a certificate
  #caPath: '/path/to/CA/certificates'           # CA certs, all files a

  # 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 Author
  #authMode: 'file'                             # Set admin authorizati
```

Administration Security: Authentication (local userid/password)

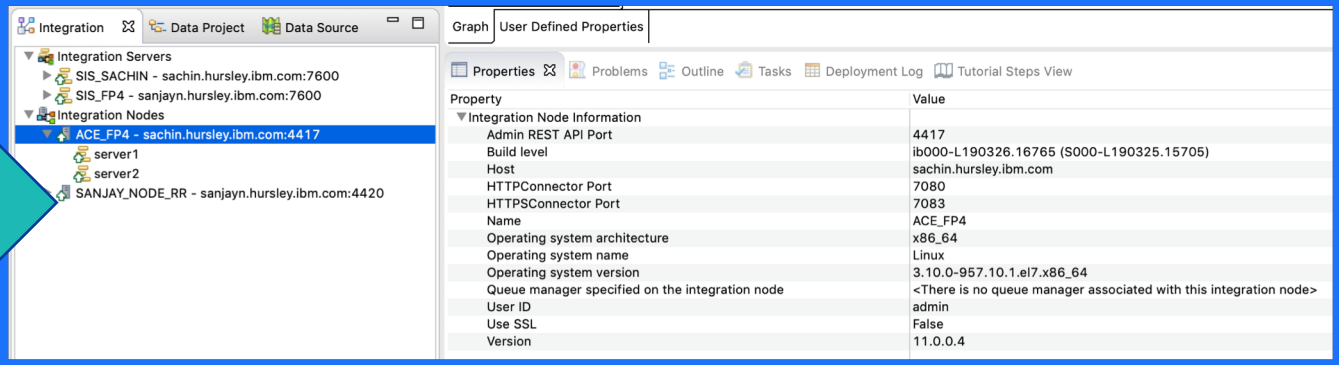


HTTP using Basic Auth

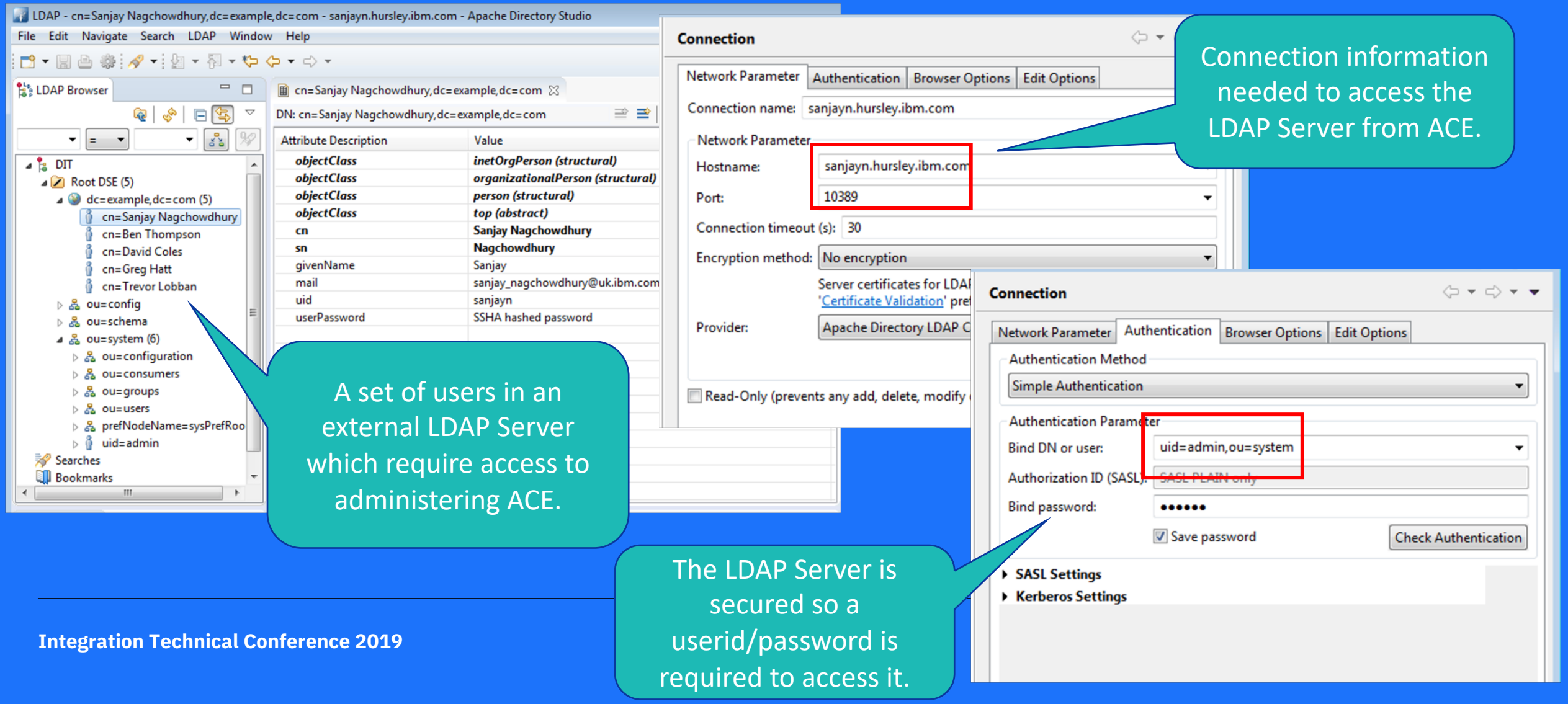




HTTP using Basic Auth



Administration Security: Authentication (LDAP server)



Connection information needed to access the LDAP Server from ACE.

A set of users in an external LDAP Server which require access to administering ACE.

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

```
  # 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'                             # Resource alias
  ldapBindPassword: 'ldap::adminAuthentication'                       # Resource alias
  #ldapUrl: ldap[s]://server[:port]/baseDN[?[uid_attr][?[base|sub]]]  # ldap search url
  #ldapBindDn: ldap::adminAuthentication
  #ldapBindPassword: ldap::adminAuthentication
  #  Authorization
  #adminSecurity: 'inactive'                    # Used to enable A                    l be autho
rized when set active
  #authMode: 'file'                             # Set admin authoriz
```

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

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

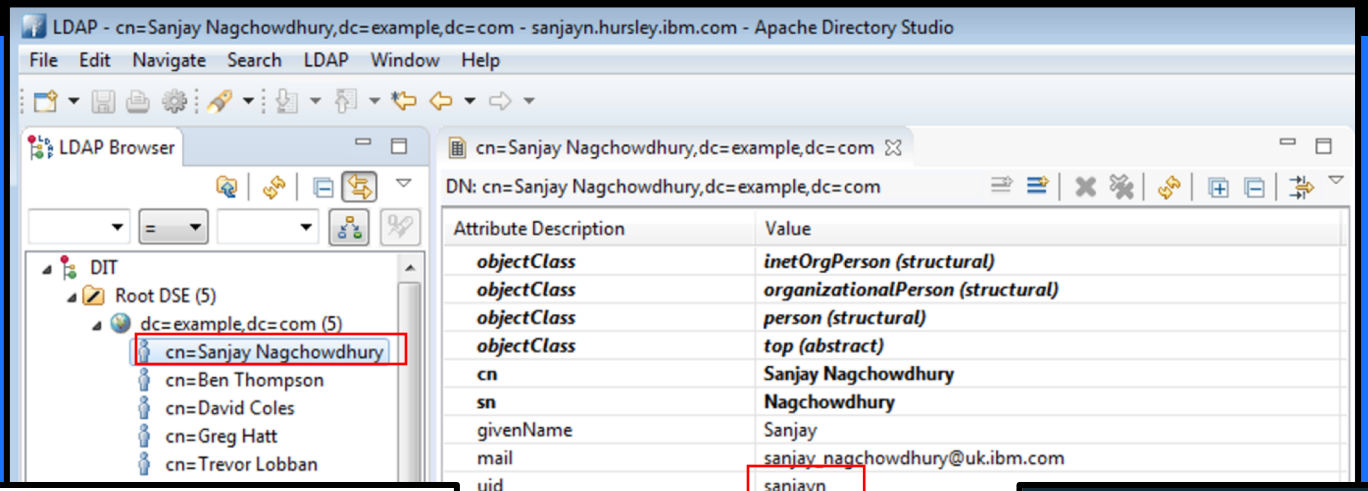
mqsisetdbparms ACE_FP4 -n ldap::adminAuthentication -u "uid=admin,ou=system" -p xxxxx

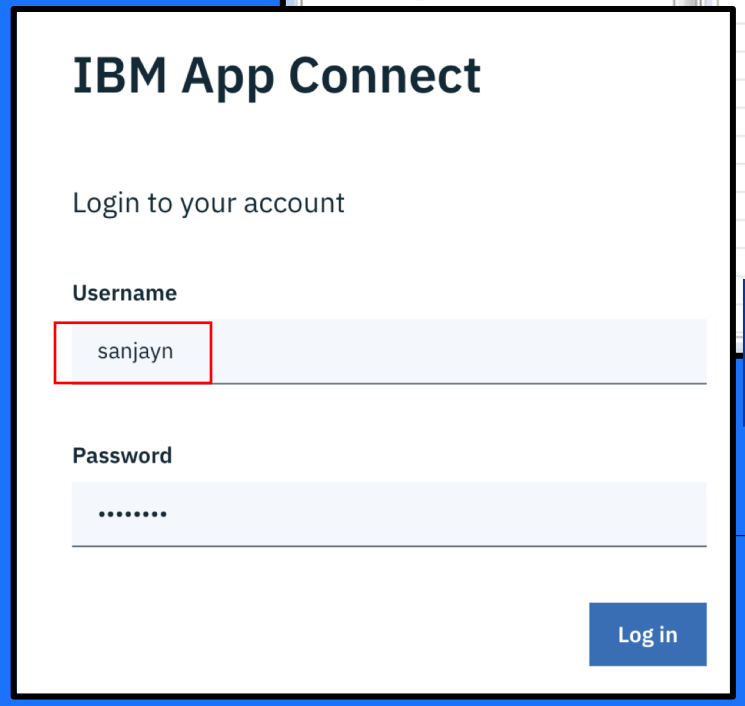
→ Re-start the Integration Node

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

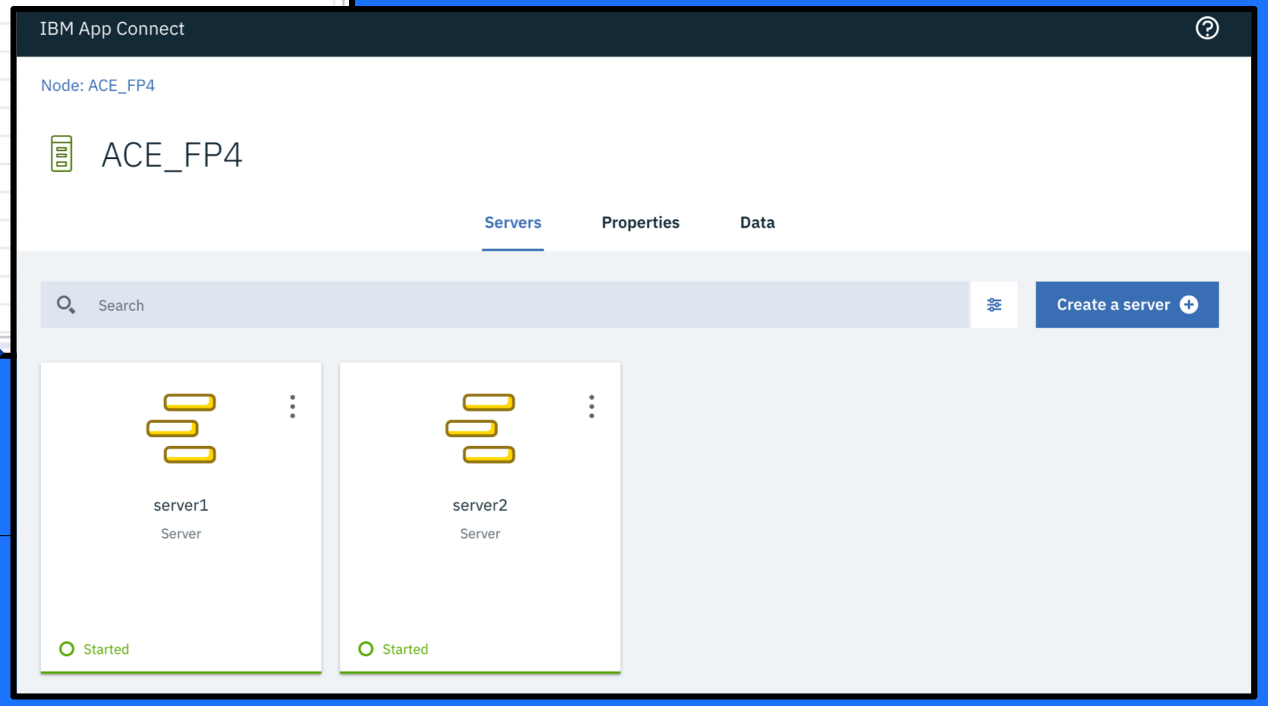
→ Re-start the Integration Server

Administration Security: Authentication (LDAP server)





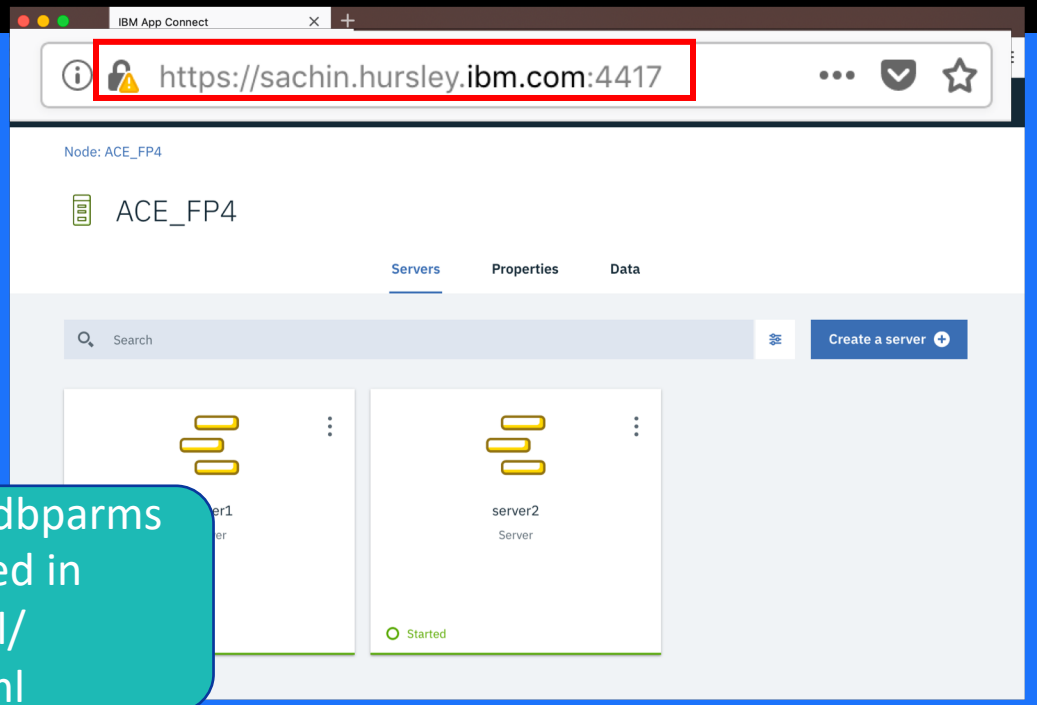
Authenticated on LDAP Server



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
  # sslPassword is the full path to the server private key which
  # The file names must end with '.pem'
# If using p12/pfx certificate:
  # sslCertificate is the full path to the server certificate sto
  # sslPassword is the passphrase or alias to the

# SSL Client auth
#requireClientCert: true                  # Re
#caPath: '/path/to/CA/certificates'       # CA
```

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 xxxxxxx

Re-start the Integration Node

mqsisetdbparms –w work -n adminRestApi::sslpwd -u server_certificate -p xxxxxxx

Re-start the Integration Server

Store credentials for keystore location using mqsisetdbparms

Administration Security: Authorization

```
RestAdminListener:
  port: 4414                                  # Set the Admin REST AP
o 4414

  # Note the Admin REST API will be insecure without the following be
  #host: 'localhost'                          # Set the hostname othe

  # 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 m
ypted 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 th

  # SSL Client auth
  #requireClientCert: true                    # Request a cer
  #caPath: '/path/to/CA/certificates'         # CA certs,

  # Admin Security
  #  Authentication
  basicAuth: true
authenticated when set true
  ldapUrl: 'ldap://sanjayn.hursley.ibm.com:   9/dc=example,dc=com'
  ldapBindDn: 'ldap::adminAuthentication'
  ldapBindPassword: 'ldap::adminAuthen    cation'
  #ldapUrl: ldap[s]://server[:port]/baseDN[?[uid_attr][?[base|sub]]]
  #ldapBindDn: ldap::adminAuthentication
  #ldapBindPassword: ldap::adminAuthentication
  #  Authorization
  adminSecurity: 'active'                     # Used to enable Authoriza
d when set active
  authMode: 'file'                            # Set admin authorizatio
```

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.

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

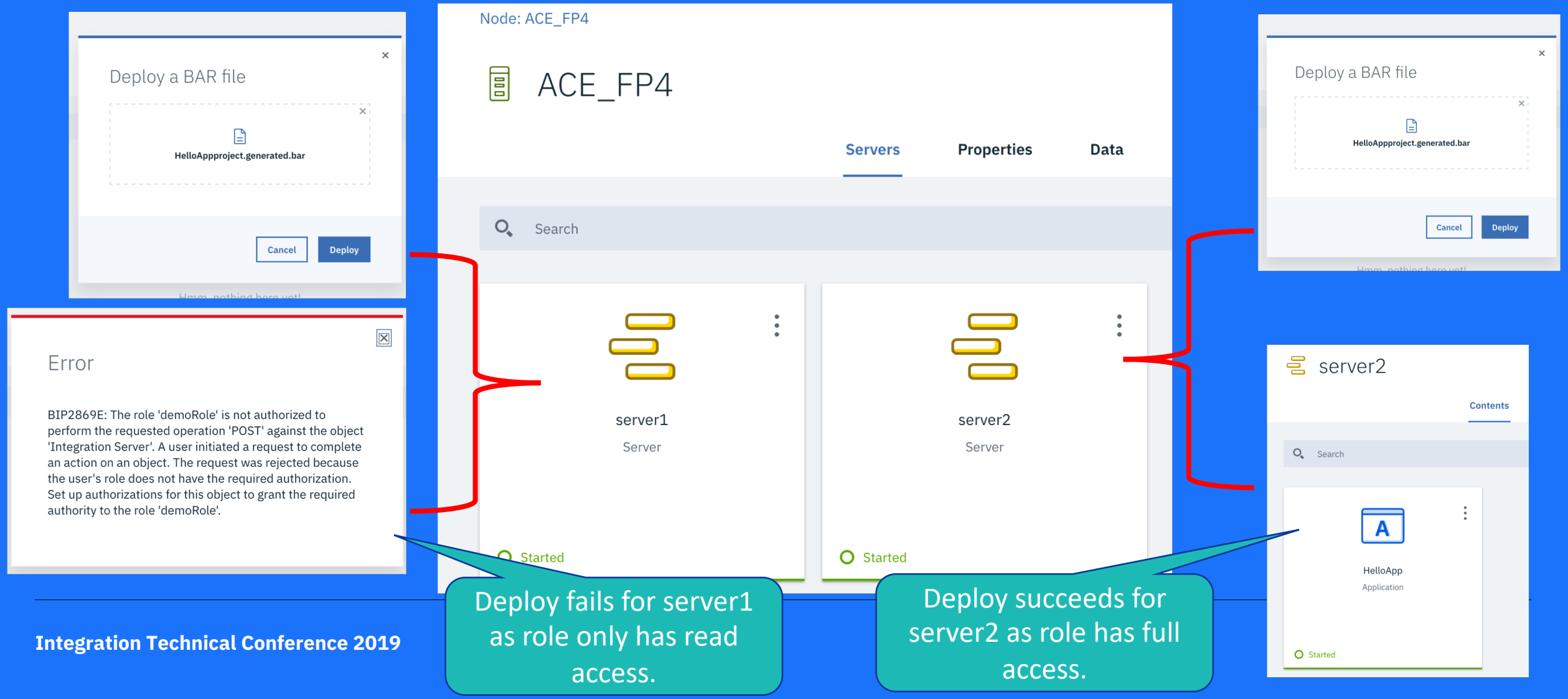
‘**demoRole**’ :
node: full access

‘**demoRole**’:
server1: read only
server2: full access

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

Re-start the Integration Node

Administration Security: Authorization



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 or mq

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

EURO '92 on a night of hell for

SWEDES 2

IT'S MAD AND BAD

RESULTS

TAYLOR SACK RACE

PLATT'S MAGIC . . . the England ace celebrates his super goal before it all went wrong last night

England's shell-shocked soccer team

TURNIPS 1

Taylor's men get a Viking good hiding

From ALEX MONTGOMERY in Stockholm

ERIK THE 'ORRIBLE . . . Sweden's Jan Eriksson climbs above Carlton Palmer to head the equaliser

HOW THEY RATED

BRIAN WOOLNOUGH'S match ratings out of 10

CHRIS WOODS

DAVID BATTY

STUART PEARCE

MARTIN KEOWN

DES WALKER

TONY DALEY

CARLTON PALMER

NEIL WEBB

ANDY SINTON

GARY LINEKER

DAVID PLATT

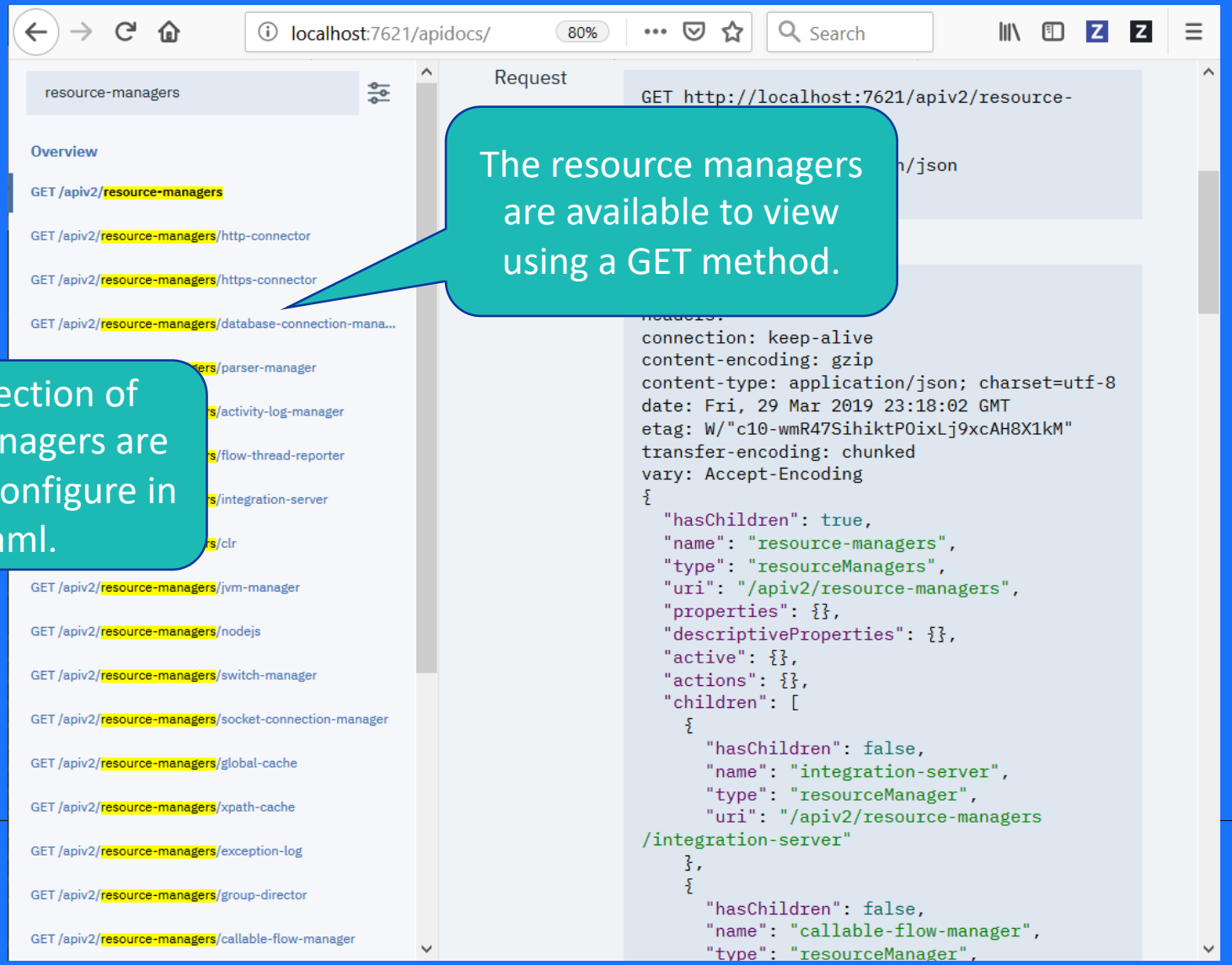
Puzzling

Superb

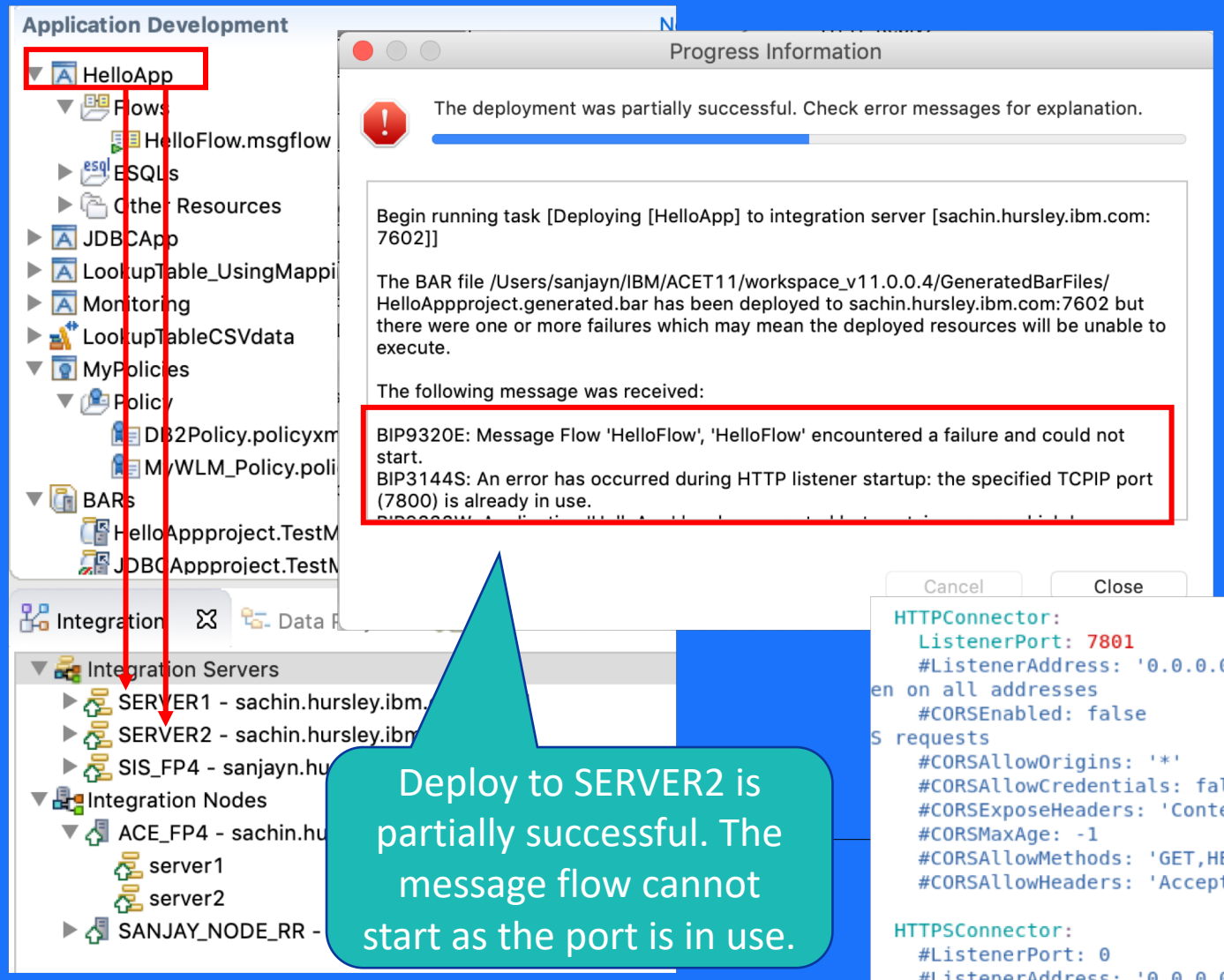
Resource Managers

- 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.



Resource Managers: example



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

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

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.

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

HTTPSConnector:
  #ListenerPort: 0
  #ListenerAddress: '0.0.0.0'
```

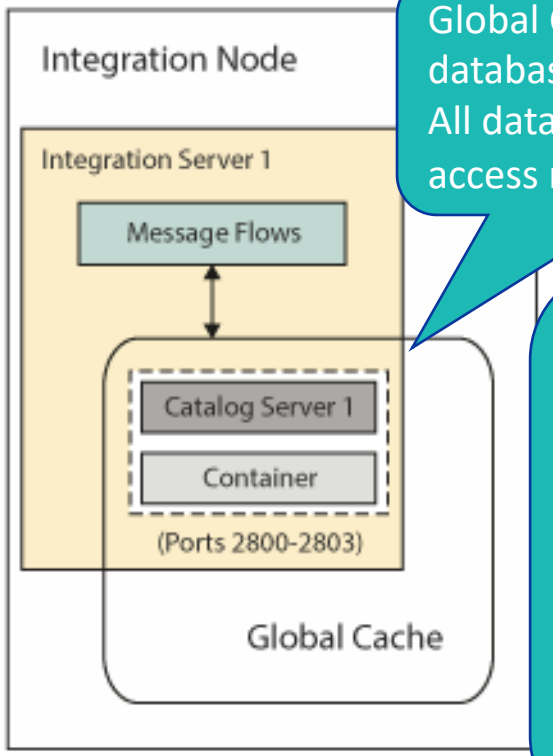
```
  #kerberosConfigFile: ''
  #kerberosKeytabFile: ''

HTTPConnector:
  ListenerPort: 7802              # Set non-zero to set a specific port, def
lts to 7800
  #ListenerAddress: '0.0.         # Sp
n on. Default is to listen on
  #CORSEnabled: false
espond to valid HTTP CORS requests
  #CORSAllowOrigins: '*'
  #CORSAllowCredentials: false
  #CORSExposeHeaders: 'Content-Type
  #CORSMaxAge: -1
  #CORSAllowMethods: 'GET,HEAD,POST
  #CORSAllowHeaders: 'Accept,Accept
```

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.

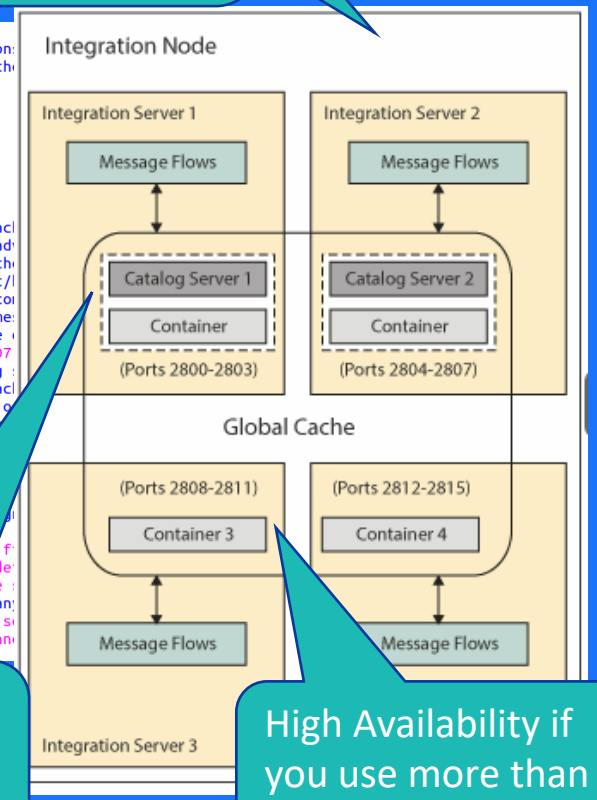


Global Cache is faster than database access.
All data held in instant access memory.

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 th
#
# 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                                          # Set to true to enable Global Cac
                                                         # When using Global Cache it is ad
                                                         # the number of live objects in th
                                                         # see https://www.ibm.com/support/
  cacheServerName: 'MyCatalogServer1'                    # The name of this cache server co
  catalogServiceEndPoints: 'localhost:2800,localhost:2804'  # Comma-separated list of hostname
  catalogDomainName: 'WMB_MyCacheDomain'                 # Name of the shared global cache
  catalogClusterEndPoints: 'MyCatalogServer1:localhost:2803:2801,MyCatalogServer2:localhost:2807
                                                         # Comma-separated list of catalog
                                                         # If this is a catalog server, cac
                                                         # The list should be in the same o
  enableCatalogService: true                             # Set to true to launch a catalo
  enableContainerService: true                           # Set to true to launch a conta
  enableJMX: true                                        # Allow admin access to this c
  listenerHost: 'localhost'                              # Comma-separated list of ho
  listenerPort: 2800                                     # Port number this cache se
                                                         # Four consecutive ports a

                                                         # Override the deployme
                                                         # Override the Object
                                                         # Set a trace level
                                                         # Set to true to en
                                                         # SSL Alias to us
                                                         # SSL Protocol t
```



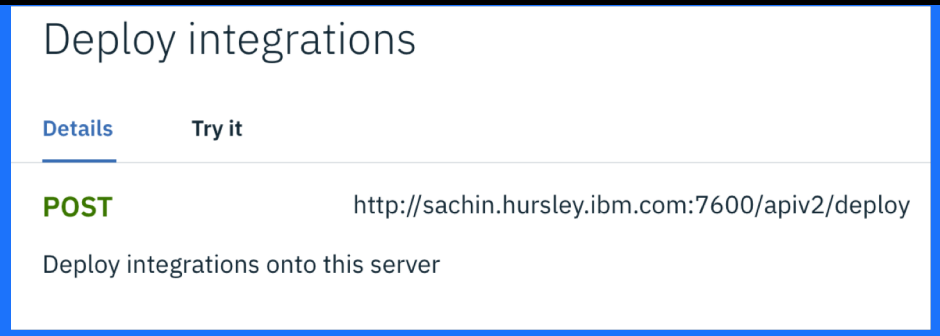
'Catalog Servers' hold location of where data is stored within the `Container Servers`

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

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

Deployment Considerations

Deployment Considerations: deploy a BAR using curl



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. "}]}

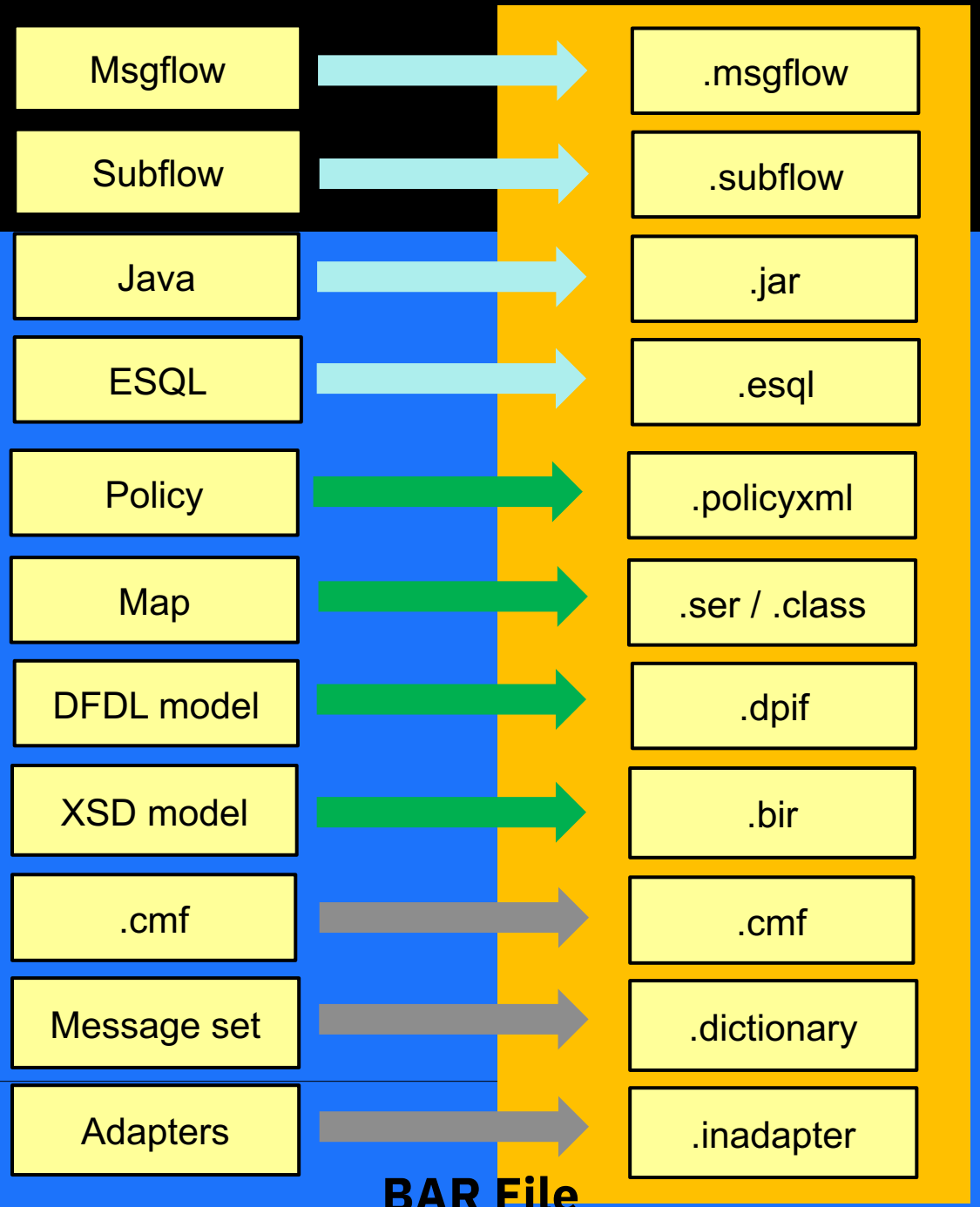
Deployment Considerations

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

mqsibar

mqsipackagebar

mqsicreatebar



Deployment Considerations: mqsibar

mqsibar -a Transformation_Map.bar -w work_fp4

```
[sanjayn@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-rw---- 1 sanjayn sanjayn 2261 Oct  9 12:30 Transformation_Map.msgflow
```

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

```
[sanjayn@sachin ~]$ IntegrationServer --name
.....2019-04-05 10:32:37.348132: .2019-04-05                    on server 'SIS' starting initialization; version '11.0.0.4' (64-bit)
.....................................2019-0                    t to 'Initialize' the deployed resource 'Transformation_Map' of type 'Appli
cation'.
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 '7800' 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 s
2019-04-05 11:32:43.674048: The HTTP                tener has started listening on po

2019-04-05 11:32:43.675348:                ation server has finished initializatio
```

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

```
[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 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$subText.class
-rw-rw---- 1 sanjayn sanjayn    452 Apr  5 11:32 xmap_default__Transformation_Mapebedbc5bf1e20805_03__Common$TunnelParam.class
-rw-rw---- 1 sanjayn sanjayn    560 Apr  5 11:32 xmap_default__Transformation_Mapebedbc5bf1e20805_03__Common$tuple_boolean_boolean.class
-rw-rw---- 1 sanjayn sanjayn    560 Apr  5 11:32 xmap_default__Transformation_Mapebedbc5bf1e20805_03__Common$tuple_boolean_double.class
-rw-rw---- 1 sanjayn sanjayn    556 Apr  5 11:32 xmap_default__Transformation_Mapebedbc5bf1e20805_03__Common$tuple_boolean_float.class
-rw-rw---- 1 sanjayn sanjayn    564 Apr  5 11:32 xmap_default__Transformation_Mapebedbc5bf1e20805_03__Common$tuple_boolean_integer.class
-rw-rw---- 1 sanjayn sanjayn    658 Apr  5 11:32 xmap_default__Transformation_Mapebedbc5bf1e20805_03__Common$tuple_boolean_java_math_BigDecimal.class
-rw-rw---- 1 sanjayn sanjayn    610 Apr  5 11:32 xmap_default__Transformation_Mapebedbc5bf1e20805_03__Common$tuple_boolean_XDMItem.class
-rw-rw---- 1 sanjayn sanjayn    626 Apr  5 11:32 xmap_default__Transformation_Mapebedbc5bf1e20805_03__Common$tuple_boolean_XDMSequence.class
-rw-rw---- 1 sanjayn sanjayn    542 Apr  5 11:32 xmap_default__Transformation_Mapebedbc5bf1e20805_03__Common$tuple_charZZ_int.class
-rw-rw---- 1 sanjayn sanjayn    524 Apr  5 11:32 xmap_default__Transformation_Mapebedbc5bf1e20805_03__Common$tuple_int_int.class
-rw-rw---- 1 sanjayn sanjayn    622 Apr  5 11:32 xmap_default__Transformation_Mapebedbc5bf1e20805_03__Common$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$XPath20TimeZone.class
-rw-rw---- 1 sanjayn sanjayn   1216 Apr  5 11:32 xmap_default__Transformation_Mapebedbc5bf1e20805_03__Common$XSLT20ContextInfo.class
-rw-rw---- 1 sanjayn sanjayn   5267 Apr  5 11:32 xmap_default__Transformation_Map.ser
```

Deployment Considerations: mqsibar

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

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

BIP8071I: Successful command completion.
```

-c option to compile the maps

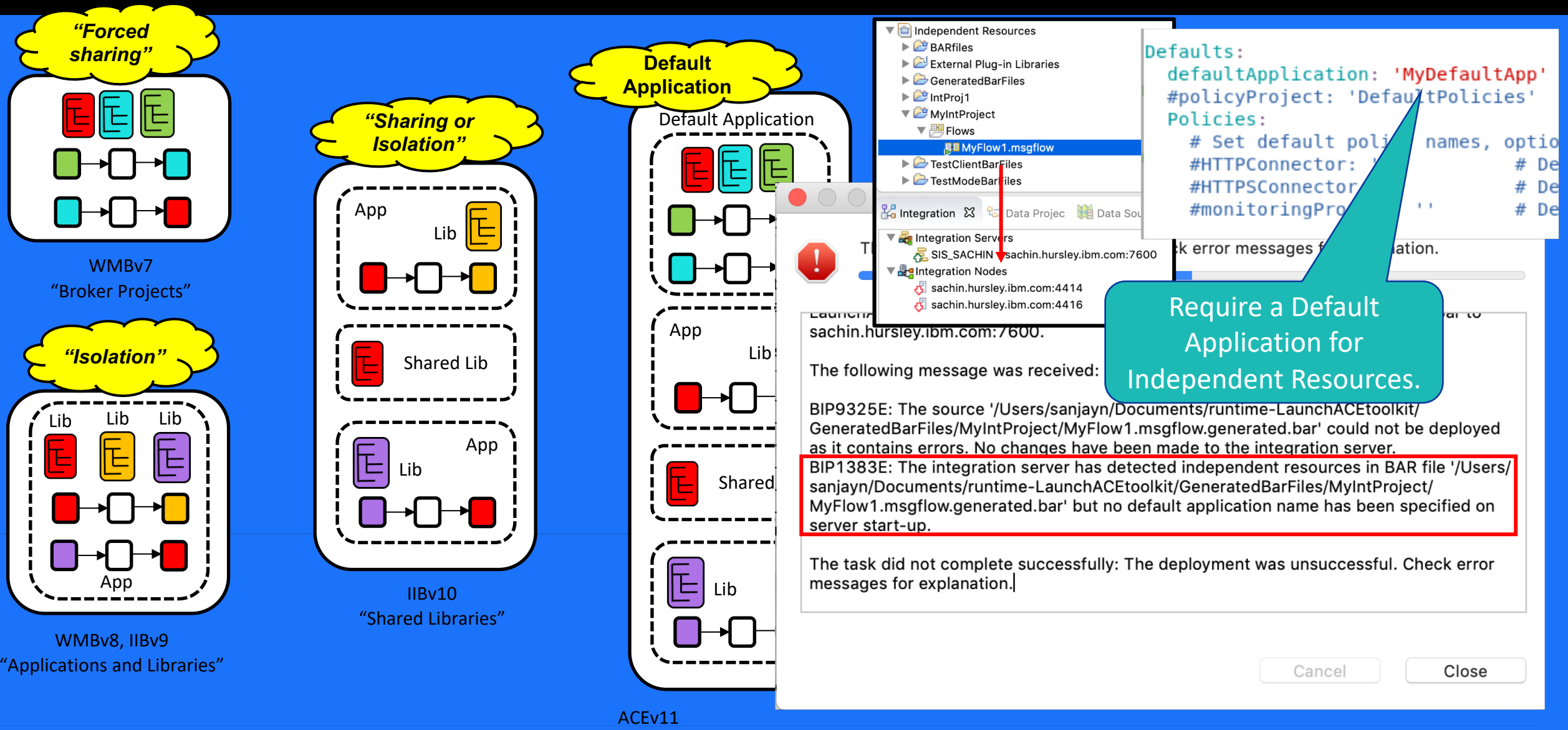
```
[sanjayn@sachin ~]$ ls -l work_fp4/run/Transformation_Map
total 320
-rw-rw---- 1 sanjayn sanjayn    210 Oct  9 12:30 application.descriptor
-rw-rw---- 1 sanjayn sanjayn   1527 Oct  9 12:30 input.xml
-rw-rw---- 1 sanjayn sanjayn   2250 Oct  9 12:30 InputXMLSchema.xsd
drwxrwx--- 2 sanjayn sanjayn   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_Map
-rw-rw---- 1 sanjayn sanjayn    604 Apr  5 11:32 xmap_default__Transformation_M
-rw-rw---- 1 sanjayn sanjayn    554 Apr  5 11:32 xmap_default__Transformatio
-rw-rw---- 1 sanjayn sanjayn   1028 Apr  5 11:32 xmap_default__Transformat
-rw-rw---- 1 sanjayn sanjayn    508 Apr  5 11:32 xmap_default__Transfor
```

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.
```

```
-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$tuple_XDMSequence_XDMSequence.class
-rw-rw---- 1 sanjayn sanjayn    450 Apr  5 11:32 xmap_default__Transformation_Mapebedbc5bf1e20805_03__Common$XPath20TimeZone.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
```

Deployment Considerations: Default Application



Deployment Considerations

Cloud

IBM-Managed Cloud Service

IBM Cloud

Azure

Microsoft Azure

Google

...

AWS

amazon web services

docker

kubernetes

vmware

...

On-premises

IBM System Z

IIB v10

ACE Distributed platforms

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

IIB Distributed platforms

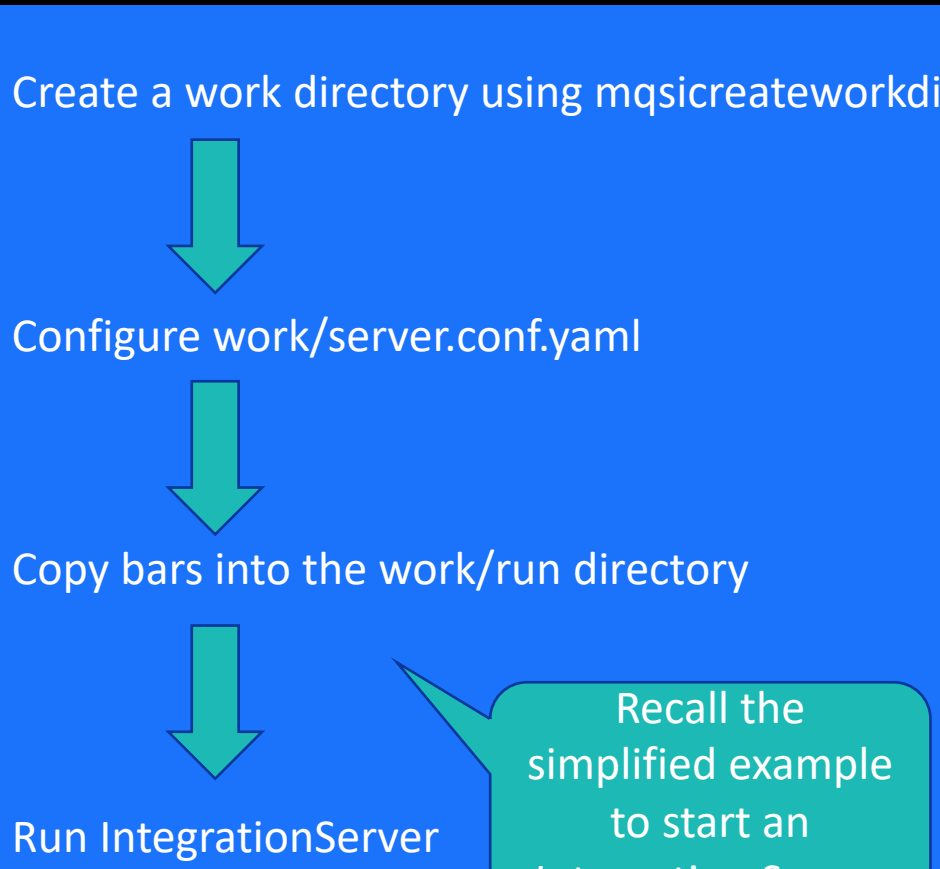
IBM AIX
Linux on IBM Power

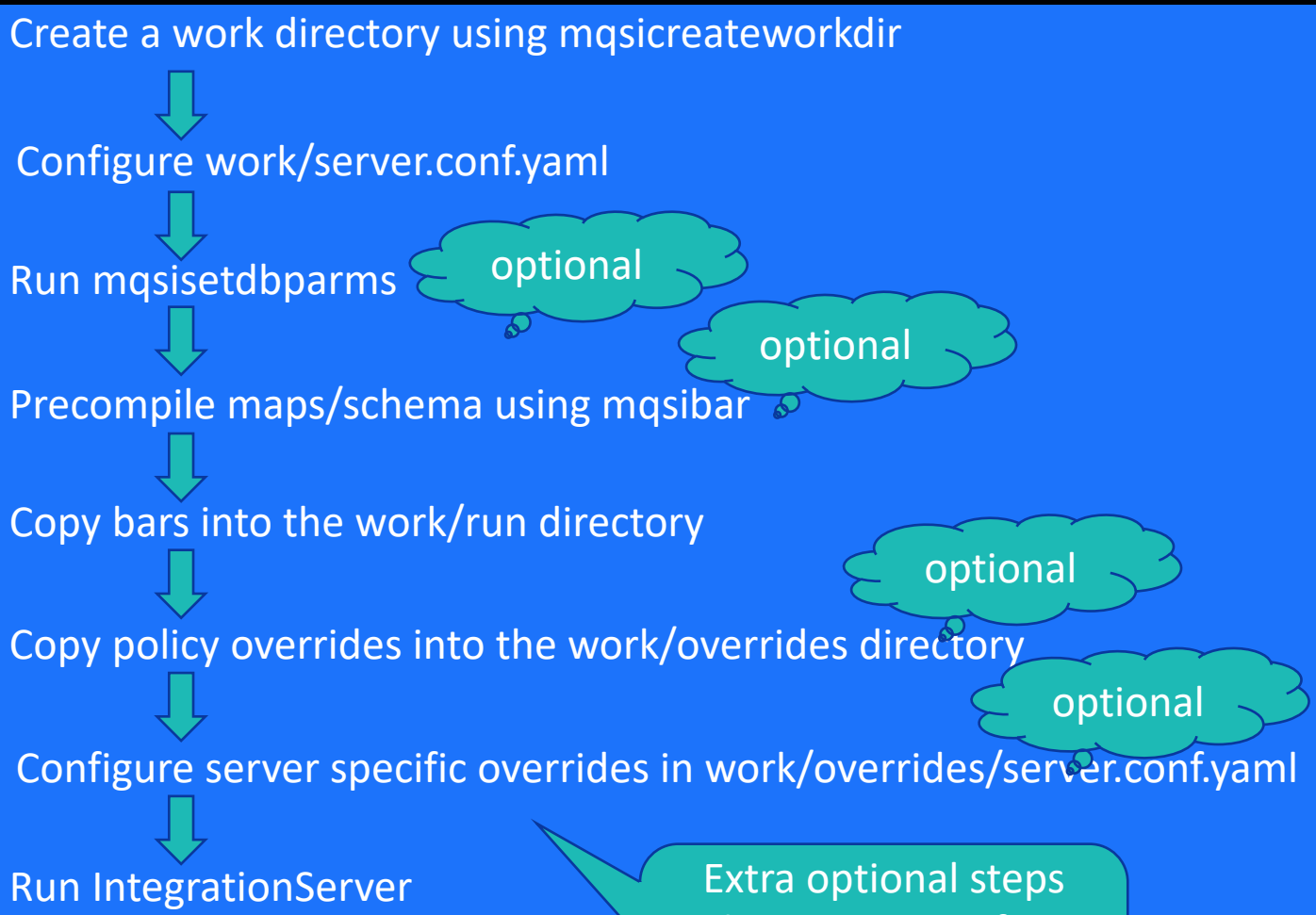
IIB v10

Private cloud

IBM Cloud Private

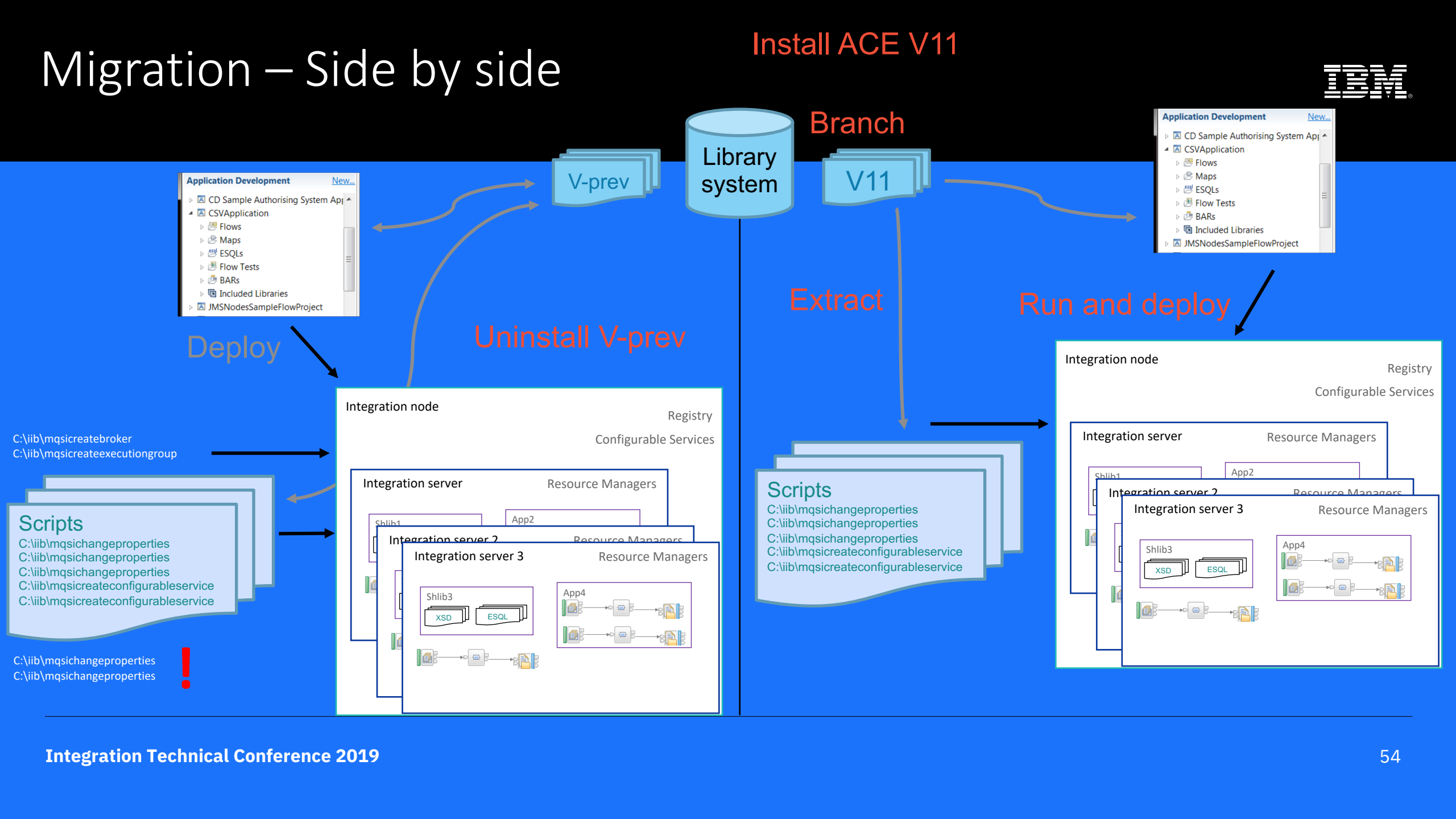
Deployment Considerations: Extra optional steps for unzip & go



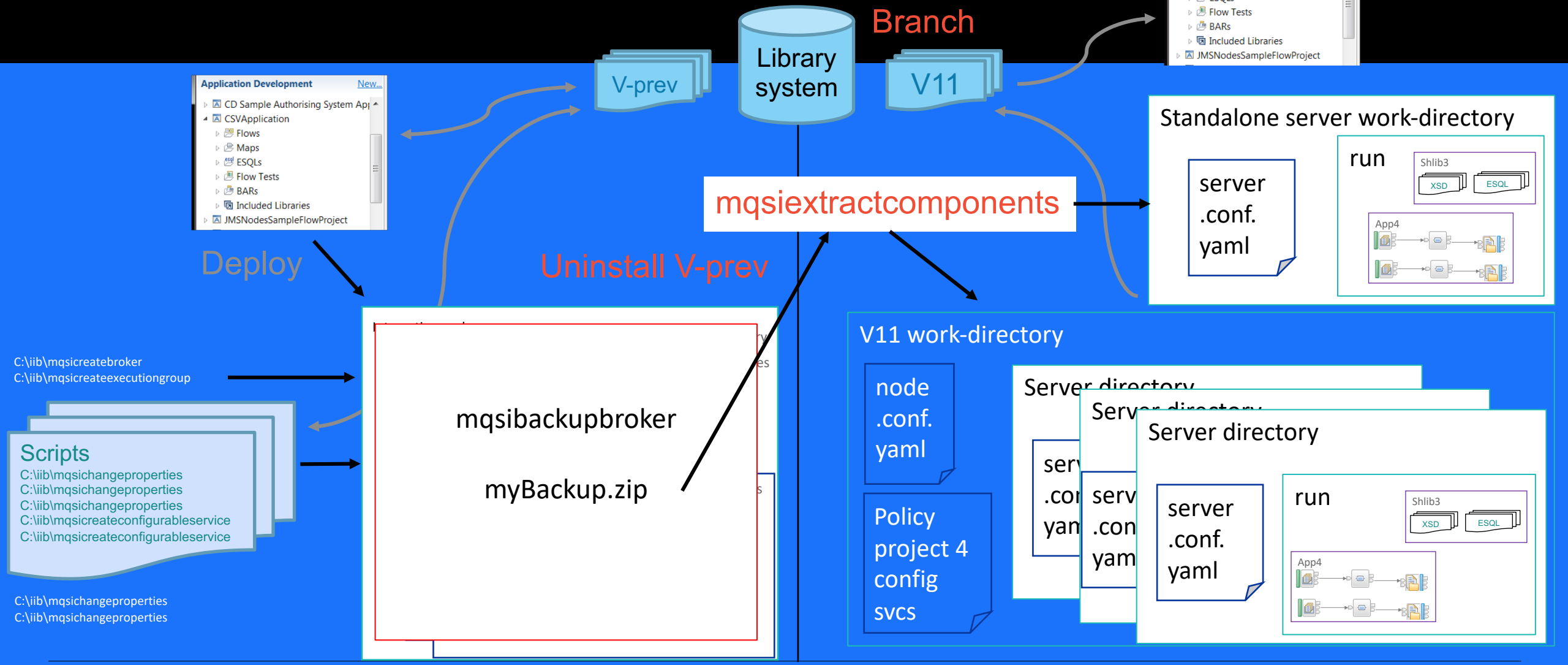


Migration

Migration – Side by side

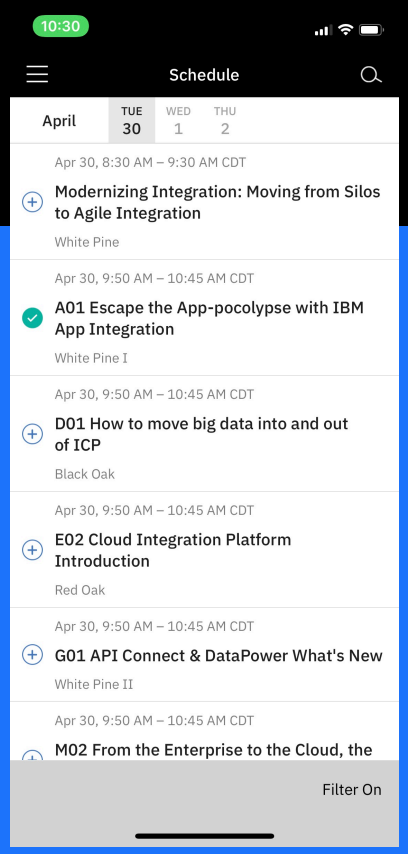


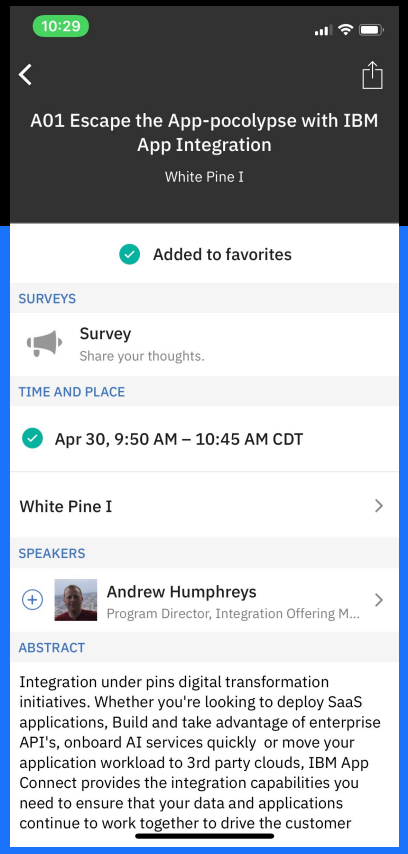
Migration – Extract

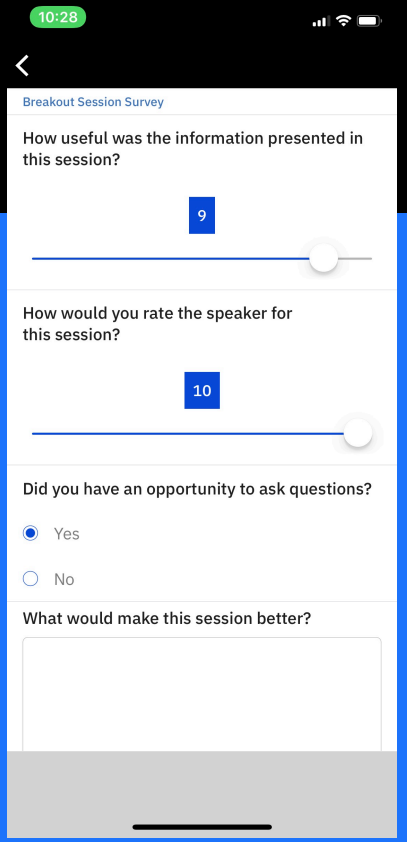


Migration: mqsiextractcomponents

- 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







Don’t forget to fill out the survey!

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

Thank You