



IBM Cloud for Financial Services – Tech Zone Demo Environment
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FS Cloud Reference Architecture Components

This document will walk you through the demonstration of the IBM Cloud for Financial Services Reference Architecture. It sets up the purpose of the Reference Architecture and walks through the various services and the proscribed configuration that produces a compliant deployment.

Goals for the Demo

- Review the purpose of the Reference Architecture
- Show the settings required to enable the IBM Cloud account for the Reference Architecture deployment
- Walk through the services that make up the Reference Architecture and the three main groupings – Shared services, Management network, and Workload network
- Describe the particular configuration that makes the combination of services FS Cloud compliant

Prerequisites

- If you have not already done so, request access to the FS Cloud demo environment at: <https://techzone.ibm.com/collection/ibm-cloud-for-financial-services>

Resources

- These slides can be used to set the context for the Reference Architecture before conducting the demo of the environment:
<https://ibm.box.com/s/9iygueobi419msqsnqx8x83w4lz5trd7>



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Demo Steps

Account setup

1. Login into IBM Cloud and navigate to the Dashboard at <https://cloud.ibm.com>
2. Say: “This is an IBM Cloud account that has been configured for IBM Cloud for Financial Services deployment and where the VPC with Red Hat OpenShift Reference Architecture has been deployed. Before we get to the services that make up the reference architecture, there are several settings that have been made within the account to enable the Financial Services Cloud. We will start with the Account Settings.”
3. Unfortunately, in order to view the “Account Settings” page one must be given “Editor” permission to the account which is not possible in the shared account. The following screenshots show these settings.
4. Say: “The ‘Financial Services Validated’ setting has been turned on. With this setting on, a warning will be shown in the IBM Cloud console when anyone attempts to provision a service that is not ‘FS Validated’”.

The screenshot shows the 'Account settings' page in the IBM Cloud interface. The left sidebar is collapsed. The main content area is titled 'Account settings'. It displays account information: 'Tech Zone FS Cloud 01' and 'ID: ea243e63212643dc927f7fe26b6e726c'. Below this is the 'Account Type' section, which shows 'Pay-As-You-Go' and a 'Learn more' link. The 'Subscription and feature codes' section includes an 'Apply code' button. A red box highlights the 'Financial Services Validated' section, which shows 'On' and a 'Learn more' link. Below it is the 'EU Supported' section, which shows 'Off' and a 'Learn more' link. The bottom right corner of the screenshot features the IBM logo.

5. Say: “Virtual routing and forwarding’ has also been turned on which creates a separate routing table for the account and allows private endpoints to be used for



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the provisioned services. This setting is irreversible and therefore requires a support ticket to be opened for it to be enabled.”

6. Say: “Finally, ‘Service endpoints’ have been turned on which allows IBM Cloud services to be connected to the IBM Cloud private network.”

The screenshot shows the IBM Cloud Account settings page. The left sidebar is collapsed. The main content area has a heading "Commercial Proof of Concept (PoC)". Below it, there's a section titled "Virtual routing and forwarding: On" with a note that it cannot be disabled. Another section titled "Service endpoints: On" also has a note about increased security. A "Learn more" link is present in both sections.

7. Open the Access settings from the “Manage” menu on the top menu bar: “Manage” -> “Access (IAM)” then “Settings” from the left menu.

The screenshot shows the IBM Cloud dashboard with the "Manage" menu open. The "Access (IAM)" option is highlighted with a red box. The "Manage" menu also includes options like Account, Billing and usage, Catalogs, Enterprise, Security and access, View APIs and SDKs, Security and Compliance, Context-based restrictions, and Security and Compliance.



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The screenshot shows the IBM Cloud Access (IAM) interface. On the left, a sidebar lists various IAM management options: Access (IAM), Users, Access groups, Service IDs, API keys, Authorizations, Roles, Identity providers, Trusted profiles, and Settings. The 'Settings' option is highlighted with a red border. The main content area is titled 'Manage access' and displays a large purple circular progress bar with a small yellow segment at the top. Below the progress bar, the word 'Users' is visible.

8. Say: “There are several access control settings that are required by FS Cloud SCC goals. Multifactor authentication has been enabled for all users. Additionally, user access to the account has been restricted. By default, users are not able to see the list of other users, create API keys, or create service IDs. If a user does need to perform one of these activities they can be explicitly granted the necessary policy.”



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The screenshot shows the 'Access (IAM)' settings page. The left sidebar includes 'Users', 'Access groups', 'Service IDs', 'API keys', 'Authorizations', 'Roles', 'Identity providers', 'Trusted profiles', and 'Settings'. The 'Settings' option is selected. The main content area is titled 'Login session' and contains three sections: 'Active sessions' (24 hours default), 'Sign out due to inactivity' (2 hours default), and 'Concurrent sessions' (Unlimited). Below this is the 'Authentication' section, which includes 'Multifactor authentication (MFA)' (Enabled). A red box highlights this section. The 'Public access' section notes that access is restricted.

Login session

Active sessions
Select how long each active session lasts before a user needs to enter their login credentials. An active session can last up to 720 hours.
24 hours (default)

Sign out due to inactivity
Select the maximum time it takes before an inactive user is signed out and their credentials are required again. A user can be inactive for up to 24 hours.
2 hours (default)

Concurrent sessions
Select the number of login sessions that an account user can have active.
Unlimited

Authentication

Multifactor authentication (MFA)
MFA for users with an IBMID (All users)
This option adds an extra layer of security for all users by requiring an ID, password, and a time-based one-time passcode. [Learn more.](#)
Looks like you don't have access to update this setting. Only account owners or users assigned the editor role or higher for the IAM Identity service can update it.

Public access

Looks like you don't have access to view this setting. Only account owners or users assigned the viewer role or higher for the IAM Access Groups service can view it. [Learn more.](#)

The screenshot shows the 'Access (IAM)' settings page. The left sidebar includes 'Users', 'Access groups', 'Service IDs', 'API keys', 'Authorizations', 'Roles', 'Identity providers', 'Trusted profiles', and 'Settings'. The 'Settings' option is selected. The main content area is titled 'Account' and contains three sections: 'Restrict user list visibility' (Enabled), 'Restrict API key creation' (Enabled), and 'Restrict service ID creation' (Enabled). A red box highlights these sections. Below this is the 'Restrict IP address access' section (Disabled).

Account

Restrict user list visibility
Enabled
Restricts the users each person can view on the Users page. [Learn more.](#)
Looks like you don't have access to update this setting. Only account owners or users assigned the editor role or higher for the Billing service can update it.

Restrict API key creation
Enabled
Only users with the required access assigned can create API keys. [Learn more.](#)
Looks like you don't have access to update this setting. Only account owners or users assigned the editor role or higher for the IAM Identity service can update it.

Restrict service ID creation
Enabled
Only users with the required access assigned can create service IDs. [Learn more.](#)
Looks like you don't have access to update this setting. Only account owners or users assigned the editor role or higher for the IAM Identity service can update it.

Restrict IP address access
Disabled
Access is allowed from any IP address. [Learn more.](#)
Looks like you don't have access to update this setting. Only account



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9. Say: “Now we will move on to the infrastructure and managed services that make up the Reference Architecture.”

Shared services

1. Open the Resource list: <https://cloud.ibm.com/resources>
2. Say: “The account has been provisioned with a different resource group for each subset of the architecture. We can use the ‘tags’ to filter the resources in each layer. Let’s start with the ‘shared services’.”
3. Select the “shared” tag to filter the list of services to the shared services.

The screenshot shows the IBM Cloud Resource list interface. On the left, there's a sidebar with icons for various service categories like Devices, VPC infrastructure, Clusters, Container Registry, Satellite, Cloud Foundry apps, Cloud Foundry services, Services and software, Storage, Network, Functions namespaces, Apps, Developer tools, VMware, Schematics workspaces, and Code Engine. The 'Services and software' and 'Storage' sections are expanded, showing they are currently empty. On the right, there's a table with columns: Name, Group, Location, Status, and Tags. Above the table are several search and filter inputs. A prominent feature is a 'Tags' filter panel on the right side of the table, which lists various tags with checkboxes. One checkbox, labeled 'shared', is checked and highlighted with a red border. Other tags listed include 'pvc:pvc-17dedc...', 'pvc:artifactory...', 'pvc:mongodb', 'reclaimpolicy...', 'schematics:fss...', 'schematics:m...', 'schematics:m... (continued)', 'security', 'storageclass:i...', and 'workload'.

4. Expand the “Services and software” and “Storage” sections in the resource list (these are the only two sections with resources).



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The screenshot shows the IBM Cloud Resource list interface. At the top, there's a navigation bar with links for Catalog, Docs, Support, Manage, and a user profile. Below the navigation is a search bar and a 'Create resource' button. The main area is titled 'Resource list' and contains a table with columns: Name, Group, Location, Status, and Tags. The table lists various resources, including Activity Trackers, FrontOffice components, and Storage. Most resources are in the 'fscloud' namespace and are marked as 'Active'. The table includes filters and sorting options.

Name	Group	Location	Status	Tags
activity-tracker-au-syd	Default	Sydney	Active	fscloud +1
activity-tracker-eu-de	Default	Frankfurt	Active	fscloud +1
activity-tracker-eu-gb	Default	London	Active	fscloud +1
activity-tracker-jp-osa	Default	Osaka	Active	fscloud +1
activity-tracker-jp-tok	Default	Tokyo	Active	fscloud +1
activity-tracker-us-east	Default	Washington DC	Active	fscloud +1
activity-tracker-us-south	Default	Dallas	Active	fscloud +1
crypto-hsm-kyok	security-ops	Frankfurt	Active	fscloud +2
frontoffice-cert-manager	frontoffice-common	Frankfurt	Active	fscloud +1
frontoffice-logging	frontoffice-common	Frankfurt	Active	fscloud +1
frontoffice-monitoring	frontoffice-common	Frankfurt	Active	fscloud +1
frontoffice-cos	frontoffice-common	Global	Active	fscloud +1

5. Say: “A number of Activity Tracker instances have been provisioned across different regions in the account.”
6. Click on one of the Activity Tracker instances. It will take you to the Activity Tracker landing page. Click on the “Open dashboard” link for one of the Activity Tracker instances.



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The screenshot displays two views of the IBM Cloud interface. The top view shows the 'Activity Tracker' page, listing six resource groups: 'activity-tracker-au-syd', 'activity-tracker-eu-de', 'activity-tracker-eu-gb', 'activity-tracker-jp-osa', 'activity-tracker-jp-tok', and 'activity-tracker-us-east'. Each entry includes a status (Active), resource group (Default), region (Sydney, Frankfurt, London, Osaka, Tokyo, Washington DC), plan (7 day Event Search), and a 'Create' button. The 'activity-tracker-eu-de' row is highlighted with a red border around its 'Open dashboard' button. The bottom view shows the log stream for the 'activity-tracker-eu-de' resource group in Frankfurt. The log entries are timestamped and show various system events, such as Cloud Object Storage operations and Kubernetes Service configurations. A timeline on the right side tracks these events over a 60-minute period from 10/12/2023 9:50:30 to 10:12/2023 10:50:30.



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7. Say: “Activity Tracker collects the platform logs for the various services within the IBM Cloud account. This includes user access and configuration changes. Activity Tracker and the provided auditability of all the services in the account is one of the differentiators of IBM Cloud and an enabler for FS Cloud reporting.”
8. Return to the IBM Cloud resource list – <https://cloud.ibm.com/resources>
9. Say: “A Hyper Protect Crypto Service instance has also been provisioned and initialized in the account.”
10. Click on the Hyper Protect Crypto Service instance then click on the “Overview” menu

The screenshot shows the IBM Cloud Resource List interface. At the top, there's a navigation bar with 'IBM Cloud', a search bar, and links for 'Catalog', 'Docs', 'Support', 'Manage', and a user profile. Below the navigation is a breadcrumb trail 'Resource list / crypto-hsm-kyok'. The main area displays the 'crypto-hsm-kyok' instance details. On the left, a sidebar titled 'Getting started' lists 'Overview' (which is selected), 'Instance policies', 'KMS key rings', 'KMS keys', 'KMS associated resources', 'EP11 keystores', and 'EP11 keys'. The 'Overview' section contains a table for 'Crypto units' with two rows: '[eu-de].[AZ1-CS1].[03].[06]' and '[eu-de].[AZ3-CS3].[00].[06]', both marked as 'Initialized'. To the right of the table is a 'Location' map showing the operational region 'Frankfurt (eu-de)' marked with a green dot. Below the map, there are sections for 'Instance' (with 'Instance ID' and 'Resource group') and 'Key management endpoint URL' (with 'Public' and 'Private' URLs). A blue circular icon with a gear and a plus sign is located at the bottom right.

11. Say: “The Hyper Protect Crypto Service is built on FIPS 140-2 Level 4-certified hardware security modules (HSMs) – the only such service in the industry. The service allows customers to manage root keys that are completely inaccessible by anyone but authorized users. This instance has been initialized with two crypto units in Frankfurt.” <https://www.ibm.com/security/cryptocards>



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The screenshot shows the IBM Cloud Resource List interface. The top navigation bar includes links for Catalog, Docs, Support, Manage, and a user profile. The search bar is empty. The main content area shows a resource list for 'crypto-hsm-kyok'. On the left, a sidebar menu has 'KMS keys' selected. The main table lists 'Key management service keys' with 78 entries. The columns are: Name, ID, Alias, Key ring ID, Type, State, Origin, and Last updated. The table shows various root keys created on different dates, mostly in 2021. A blue button labeled 'Add key' is visible at the top right of the table.

Name	ID	Alias	Key ring ID	Type	State	Origin	Last updated
workload-key	6681...cb84	default		Root key	Active	Created	2021-10-11 11:25:10
portieris-image-signing-public-key	4e58...9064	default		Standard key	Active	Imported	2021-10-08 13:52:51
portieris-image-signing-private-key	e363...a0b3	default		Standard key	Active	Imported	2021-10-08 13:52:47
management-key	5ac5...9ac0	default		Root key	Active	Created	2021-09-29 19:00:06
management-key	ae2e...afe7	default		Root key	Active	Created	2021-09-29 19:00:06
management-key	c2ee...5eff	default		Root key	Active	Created	2021-09-29 19:00:06
sms-mgmt-key	ea29...732b	default		Root key	Active	Created	2021-09-29 19:00:06
frontoffice-workload-key	a9f9...0ea1	default		Root key	Active	Created	2021-09-28 00:35:17
frontoffice-mgmt-key	6674...08c0	default		Root key	Active	Created	2021-09-27 23:16:37
frontoffice-workload-key	209e...beb0	default		Root key	Destroyed	Created	2021-09-27 05:55:54
frontoffice-crypt-key	https://cloud.ibm.com/services/hs-crypto/crn%3Av1%3Abluemch%3Apublic%3Ahs-crypt0%3Aeu-de%3Aa%2Fea243e63212643dc9277fe26b6e726c%3A50423a85-9f41-470d-8527-3c3cf7295ce%3A%3A?panelId=manage	Created					2021-09-27 11:11:52

12. Click on “KMS keys” in the left menu.
13. Say: “A number of root keys have been created within this HPCS instance. These root keys can be used to encrypt the data in the other IBM Cloud services, making that data inaccessible to anyone but those authorized by the customer. The root keys listed here have been used to encrypt the other services of the Reference Architecture.”
14. Return to the IBM Cloud resource list: <https://cloud.ibm.com/resources>
15. Say: “A Certificate Manager instance has been provisioned in the shared services to certificates. This instance has been encrypted by the HPCS root keys.”
16. Click on the “frontoffice-cert-manager” instance.



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The screenshot shows the 'Your certificates' section of the IBM Cloud interface. On the left, a sidebar menu includes 'Getting started', 'Your certificates' (which is selected and highlighted in blue), 'Order certificate', 'Import certificate', 'Notifications', and 'Settings'. The main content area is titled 'Your certificates' and contains a sub-instruction: 'Order SSL/TLS certificates or import your certificates to store them securely and manage their lifecycle.' Below this is a search bar labeled 'Search for Name, Domain, or Issuer'. A table lists two certificates:

<input type="checkbox"/>	Name	Domain	Issuer	Status	Expires In	Actions
<input type="checkbox"/>	frontoffice-vpn-ser...	vpn-server.vpn.ib...	cloud.ibm.com	Valid	805 days	⋮
<input type="checkbox"/>	frontoffice-vpn-cli...	client1.vpn.ibm.com	cloud.ibm.com	Valid	805 days	⋮

At the bottom of the table, there are pagination controls: 'Certificates per page' (set to 10), '1–2 of 2 certificates', and navigation arrows. A small blue circular icon with a white face is located in the bottom right corner of the screenshot area.

17. Say: “There are currently two certificates here that are used by the VPN server that provides access to the resources in the account.”
18. Return to the IBM Cloud resource list: <https://cloud.ibm.com/resources>
19. Say: “IBM Log Analysis has been provisioned to aggregate the logs across the various servers and the OpenShift clusters in the reference architecture.”
20. Click on the “frontoffice-logging” service to get to the Logging landing page. Click on “Open dashboard” for the instance.



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IBM Cloud Observability Logging interface:

The screenshot shows the IBM Cloud Observability Logging interface. On the left, a sidebar menu includes Observability, Logging (selected), Monitoring, and Activity Tracker. The main area displays a table of logs for a resource group named "frontoffice-logging". The table columns are Name, Status, Resource group, Region, Sources, Plan, and View. A single row is shown: "frontoffice-logging" is Active and belongs to the "frontoffice-common" group in Frankfurt. The "View" column contains a link labeled "Open dashboard", which is highlighted with a red box.

frontoffice-logging (Frankfurt) Log Details:

This section provides detailed log information for the "frontoffice-logging" resource in Frankfurt. It includes a log viewer with a timestamp range from Oct 12 12:49:00 to Oct 12 13:49:00, showing 22,422 lines of log data. The log entries are in JSON format, detailing events like logins, metrics collection, and network requests. A timeline chart on the right visualizes the log flow over time.

```
len=9/z94 to collector
Oct 12 13:52:10 sysdig-agent-xlrrn sysdig-agent 10.140, 26080.26155, Information, connection_manager:1660: Sent msgtype=1
len=163852 to collector
Oct 12 13:52:10 logdno-agent-2tjpr logdno-agent [INFO] metrics] ["fs": {"events":113,"creates":0,"deletes":0,"writes":113,"lines":145,"bytes":23381,"partial_reads":105}, "memory": {"active":21262396,"allocated":187776,"resident":23691264}, "ingest": {"requests":74,"throughput":230,"latency":10,"retries":0}, "k8s": {"events":0,"polls":0,"creates":0,"deletes":0,"errors":0,"notifies":0}, "journald": {"lines":0,"bytes":0}}
Oct 12 13:52:10 logdno-agent-2tjpr logdno-agent [INFO] metrics] ["fs": {"events":108,"creates":0,"deletes":0,"writes":108,"lines":145,"bytes":23381,"partial_reads":105}, "memory": {"active":21262396,"allocated":187776,"resident":23691264}, "ingest": {"requests":74,"throughput":230,"latency":10,"retries":0}, "k8s": {"events":0,"polls":0,"creates":0,"deletes":0,"errors":0,"notifies":0}, "journald": {"lines":0,"bytes":0}}
[12/Oct/2021:18:52:10.254] masterapiserverfrontend masterapiserverbackend/c599eq6f0ctch2mcn83g.vpe.private.eu-de.containers.cloud.ibm.com/1/2/26 3827 -- 21/21/20/20/0.0/0
Oct 12 13:52:10 logdno-agent-n9lyv logdno-agent [INFO] metrics] ["fs": {"events":103,"creates":0,"deletes":0,"writes":103,"lines":148,"bytes":23381,"partial_reads":105}, "memory": {"active":22962176,"allocated":19682768,"resident":25427968}, "ingest": {"requests":117,"throughput":68324,"rate_limit":0,"retries":0}, "k8s": {"events":0,"polls":0,"creates":10,"deletes":10,"errors":0,"notifies":0}, "journald": {"lines":0,"bytes":0}}
Oct 12 13:52:10 packagesserver-6f65bb8f-1vrgp packagesserver II012 18:52:10.757876 1 httplog.go:89] "HTTP" verb="GET" URL="/apis/packages/operators.coreos.com/v1;timeout=32s" latency=3.907931ms userAgent="kubectl/v1.21.2 (linux/amd64) kubernetes-0.74@bf9f"
Oct 12 13:52:10 iks-vpc-block-csi-node-4hr9q iks-vpc-block-node-driver II012 18:52:10.884526 1 server.go:145] GRPC call: /csi.v1.Identity/Probe
Oct 12 13:52:10 iks-vpc-block-csi-node-4hr9q iks-vpc-block-node-driver II012 18:52:10.884552 1 server.go:146] GRPC response:
Oct 12 13:52:10 iks-vpc-block-csi-node-4hr9q iks-vpc-block-node-driver [info] {"level": "info", "ts": "2021-10-17T08:52:10.88427", "caller": "ibmcidriver/identity.go:77", "msg": "CSIIdentityServer_Probe", "RequestID": "f1e5962a-3f47-4213-998c-e74ad0147f53", "Request": []}
Oct 12 13:52:10 iks-vpc-block-csi-node-4hr9q iks-vpc-block-node-driver II012 18:52:10.884654 1 server.go:151] GRPC response:
Oct 12 13:52:11 sysdig-agent-cwxdj sysdig-agent 11.027, 26614.26712, Information, analyzer:5472: ts=1634064731, ne=29346, de=0, c=4.92, fp=0.52, sr=1, st=0, fl=33
Oct 12 13:52:11 sysdig-agent-n9kjx sysdig-agent 11.030, 20669.20809, Information, analyzer:5472: ts=1634064731, ne=12728, de=0, c=2.28, fp=0.45, sr=1, st=0, fl=14
Oct 12 13:52:11 sysdig-agent-xlrrn sysdig-agent 11.047, 26080.26175, Information, analyzer:5472: ts=1634064731, ne=43915, de=0, c=7.22, fp=0.47, sr=1, st=0, fl=44
Oct 12 13:52:11 service-co-operator-7f557f89-2qdmh service-co-operator II012 18:52:11.474056 1 reflector.go:530] k8s.io/apiserver/pkg/server/dynamiccertificates/configmap_file_content.go:206: Watch close - *v1.ConfigMap total 0 items received
Oct 12 13:52:11 packagesserver-6f65bb8f-1vrgp packagesserver II012 18:52:11.474058 1 httplog.go:89] "HTTP" verb="GET" URL="/healthz" latency="2.088796ms" userAgent="kube-probe/1.20" srcIP="10.20.10.8:609" resp=200
Oct 12 13:52:11 packagesserver-6f65bb8f-5f78m packagesserver II012 18:52:11.527202 1 reflector.go:530] k8s.io/apiserver/pkg/server/dynamiccertificates/configmap_file_content.go:206: Watch close - *v1.ConfigMap total 0 items received
```



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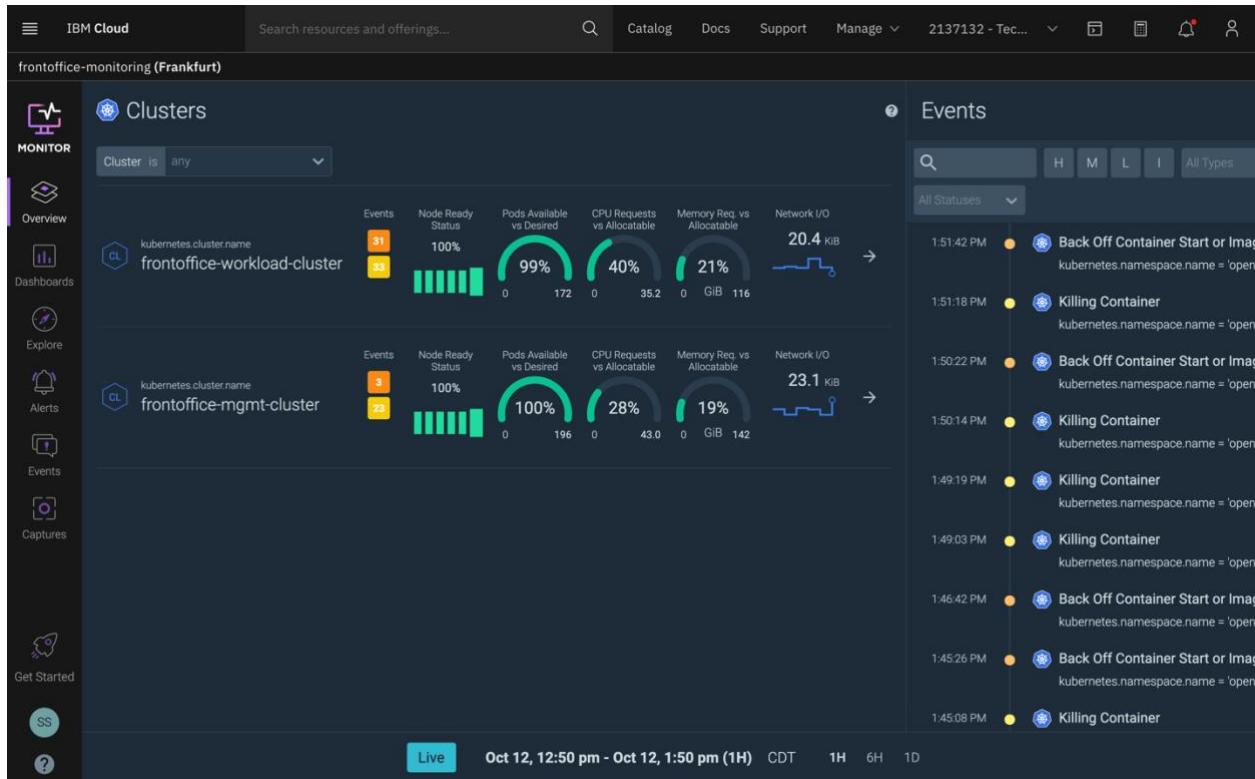
21. Say: “The Log Analysis instance shows an aggregated view of the logs across the various servers.”
22. Return to the IBM Cloud resource list – <https://cloud.ibm.com/resources>
23. Say: “IBM Monitoring provides monitoring for the servers environment, particularly the OpenShift clusters.”
24. Click on the “frontoffice-monitoring” service. Click on “Open dashboard” for the instance. Click on “Overview” and select the “Clusters” view.

The screenshot shows the IBM Cloud interface with the 'Monitoring' service selected in the sidebar. The main view displays a table with one item: 'frontoffice-monitoring'. The 'Open dashboard' button for this item is highlighted with a red box. The table columns include Name, Status, Resource group, Region, Sources, Plan, and View. The 'frontoffice-monitoring' entry has an Active status, belongs to the 'frontoffice-common' resource group, is located in Frankfurt, and uses Platform metrics as a source. The 'View' column shows 'Graduated Tier' and the 'Open dashboard' button.

Name	Status	Resource group	Region	Sources	Plan	View
frontoffice-monitoring	Active	frontoffice-common	Frankfurt	Platform metrics	Add sources	Graduated Tier Open dashboard



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25. Say: “This view provides the monitor dashboard for the clusters in the reference architecture. From here we can drill down on particular nodes and deployed applications to get more information about specific components.”
26. Return to IBM Cloud resource list – <https://cloud.ibm.com/resources>
27. Say: “Finally, the Cloud Object Storage instance has been provisioned to manage the various storage buckets required by the Reference Architecture.”
28. Click on the “frontoffice-cos” instance.



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The screenshot shows the IBM Cloud Object Storage interface. The top navigation bar includes links for Catalog, Docs, Support, Manage, and a user profile. The main page title is "frontoffice-cos" with status "Active". Below the title, there are tabs for "Transfers", "Details", and "Actions...". On the left, a sidebar menu lists "Getting started", "Buckets" (which is selected), "Integrations", "Endpoints", "Service credentials", "Connections", "Usage details", and "Plan". The main content area is titled "Buckets" and displays a table of eight buckets. The columns are "Name", "Public access", "Location", "Storage class", and "Created". The buckets listed are:

Name	Public access	Location	Storage class	Created
frontoffice-mgmt-activitytracker	No	eu-de	Smart Tier	2021-10-08 4:11 PM
frontoffice-mgmt-flow-logs	No	eu-de	Standard	2021-09-27 11:16 PM
frontoffice-workload-flow-logs	No	eu-de	Standard	2021-09-28 12:35 AM
roks-c55nd3df0fqg82hpc380-1369	No	eu-geo	Standard	2021-09-22 1:31 PM
roks-c56afb06e0u9v8hhm0-6cb3	No	eu-geo	Standard	2021-09-23 11:13 AM
roks-c58q772f09q81cqdfkc0-b0ad	No	eu-geo	Standard	2021-09-27 5:57 AM
roks-c599eq6f0cth2mcnk83g-cfff	No	eu-geo	Standard	2021-09-27 11:17 PM
roks-c59ajpaf05muae24gojog-c29f	No	eu-geo	Standard	2021-09-28 12:36 AM

At the bottom, there are buttons for "Items per page: 10", "1-8 of 8 items", "1 of 1 pages", and navigation arrows.

29. Say: “Within this Object Storage instance a number of buckets have been created, each for a different purpose.”
30. Click on the “frontoffice-mgmt-flow-logs” bucket.



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The screenshot shows the IBM Cloud Storage interface. The top navigation bar includes links for Catalog, Docs, Support, Manage, and a user profile. The main area shows the path 'Storage / frontoffice-cos / frontoffice-mgmt-flow-logs'. On the left, a sidebar menu lists various options like Getting started, Buckets, Objects (which is selected), Configuration, Integrations (New!), Endpoints, Service credentials, Connections, Usage details, and Plan. The main content area displays a table of objects in the 'frontoffice-mgmt-flow-logs' bucket. The table columns are Object name, Archived (with a question mark icon), Size, and Last modified. Seven log files are listed, each with a download icon and a more options menu (three dots). The log file names follow a pattern: ibm_vpc_flowlogs_v1/account...11001T181710Z/00000000.gz through ibm_vpc_flowlogs_v1/account...11001T181710Z/00000006.gz.

Object name	Archived ⓘ	Size	Last modified
ibm_vpc_flowlogs_v1/account...11001T181710Z/00000000.gz		3.4 KB	2021-10-01 1:17 PM
ibm_vpc_flowlogs_v1/account...11001T181710Z/00000001.gz		5.4 KB	2021-10-01 1:22 PM
ibm_vpc_flowlogs_v1/account...11001T181710Z/00000002.gz		5.2 KB	2021-10-01 1:27 PM
ibm_vpc_flowlogs_v1/account...11001T181710Z/00000003.gz		5.4 KB	2021-10-01 1:32 PM
ibm_vpc_flowlogs_v1/account...11001T181710Z/00000004.gz		5.8 KB	2021-10-01 1:37 PM
ibm_vpc_flowlogs_v1/account...11001T181710Z/00000005.gz		5.9 KB	2021-10-01 1:42 PM
ibm_vpc_flowlogs_v1/account...11001T181710Z/00000006.gz		4.9 KB	2021-10-01 1:47 PM

31. Say: “Within the flow logs bucket, a number of objects have been created to hold the log data.”
32. Click on the “Configuration” menu on the left. Scroll down to the “Key management” section.



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The screenshot shows the IBM Cloud Storage service details page for the 'frontoffice-mgmt-flow-logs' bucket. The top navigation bar includes 'IBM Cloud', a search bar, and links for Catalog, Docs, Support, Manage, and a user profile. The main content area displays the bucket's properties under 'Associated key management services' and 'Activity Tracker'. A red box highlights the 'Associated key management services' section, which lists the Key Service (Hyper Protect Crypto Services), Key ID (667475cd-e53f-4646-b896-980816a708c0), Service instance (crypto-hsm-kyok), and Key name (frontoffice-mgmt-key). The 'Activity Tracker' section shows the service instance (activity-tracker-eu-de), resource group (Default), location (eu-de), plan (7 day Event Search), and data events (read & write). The 'Monitoring' section shows the service instance (frontoffice-monitoring) and resource group (frontoffice-common). There are also 'Edit' and 'Logs' buttons.

33. Say: “You can see that the contents of this bucket are encrypted with the root key from the Hyper Protect Crypto Service.”
34. Return to the IBM Cloud resource list – <https://cloud.ibm.com/resources>
35. Say: “The Reference Architecture can be extended with additional shared services depending upon the requirements of the particular application being deployed.”

Management VPC

1. Select the “management” tag to filter the list of services for the Management VPC.



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The screenshot shows the IBM Cloud Resource list interface. The top navigation bar includes links for Catalog, Docs, Support, Manage, and a user profile. The main area is titled "Resource list" and displays a table with columns: Name, Group, Location, Status, and Tags. The "Tags" column contains a dropdown menu with several options, one of which, "management", is highlighted with a red box.

	Name	Group	Location	Status	Tags
VPC infrastructure (12 / 38)	frontoffice-mgmt-bastion01	frontoffice-management	Frankfurt 2	Running	<input type="checkbox"/> All untagged
	frontoffice-mgmt-vpc	frontoffice-management	Frankfurt	Available	<input type="checkbox"/> bastion
	frontoffice-mgmt-vpc-base	frontoffice-management	Frankfurt	—	<input type="checkbox"/> clusterid:c59aj...
	frontoffice-mgmt-vpc-default	frontoffice-management	Frankfurt	—	<input type="checkbox"/> clusterid:c599...
	frontoffice-mgmt-vpc-flowlog	frontoffice-management	Frankfurt	Active	<input type="checkbox"/> cos
	frontoffice-mgmt-vpc-vpn	frontoffice-management	Frankfurt	—	<input type="checkbox"/> fscloud
	frontoffice-mgmt-vpc-vpn-1	frontoffice-management	Frankfurt	Available	<input checked="" type="checkbox"/> management
	frontoffice-mgmt-vpe-cos	frontoffice-management	Frankfurt	Healthy	<input type="checkbox"/> mgmt-mgmt-p...
	frontoffice-mgmt-vpn-server	frontoffice-management	Frankfurt	Stable	<input type="checkbox"/> mgmt-tools
	iks-c599eq6f0cth2mcnk83g	frontoffice-management	Frankfurt	Healthy	<input type="checkbox"/> namespace:op...
	kube-c599eq6f0cth2mcnk83g	frontoffice-management	Frankfurt	—	<input type="checkbox"/> openshift
	kube-c599eq6f0cth2mcnk83g-629dba34d...	frontoffice-management	Frankfurt	Active	<input type="checkbox"/> fscloud +1
Clusters (1 / 2)	frontoffice-mgmt-cluster	frontoffice-management	Frankfurt	Normal	<input type="checkbox"/> fscloud +1
	Container Registry (1 / 1)				

2. Expand the “VPC infrastructure”, “Clusters”, and “Services and software” sections of the resource list.
3. Say: “Under the ‘VPC Infrastructure’ section there are many resources listed. We will look at in more detail shortly from the VPC service page.”
4. Take note of the region in which the VPC resources have been provisioned. You will need it when you look at the services in the VPC service page later.
5. Say: “Under the Clusters tab, we can see the management cluster which has been provisioned in subnets within the Management VPC network. We will come back to this cluster in a bit. Finally, under the ‘Services and software’ section we have an App Id instance that provides authentication services for the test instance of the OpenFn server and the Certificate Manager instance that was automatically provisioned with the OpenShift cluster.”
6. Click on the “Hamburger menu” in the top left and select “VPC Infrastructure” -> “VPCs”. Make sure the region filter has been set to the region where the VPC infrastructure has been provisioned. Both the Management and Workload VPC will be listed.



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The screenshot shows the IBM Cloud VPC Infrastructure dashboard. On the left, there's a sidebar with various service links like Dashboard, Resource list, Classic Infrastructure, Cloud Foundry, Code Engine, Functions, Kubernetes, OpenShift, Satellite, Security and Compliance, VMware, VPC Infrastructure, API Management, App Development, Container Registry, DevOps, Interconnectivity, Observability, and Schematics. The VPC Infrastructure link is currently selected. The main area displays a table titled "Group" with columns for Group, Location, Status, and Tags. The table lists several VPCs, such as "frontoffice-management", "frontoffice-workload-vpc", and "frontoffice-mgmt-vpc", each with its location (Frankfurt), status (Active, Available, Healthy, Stable), and tags (fscloud). A "Create resource" button is located at the top right of the main area.

7. Click on the Management VPC.

The screenshot shows the "Virtual private clouds" page under the VPC Infrastructure section. The sidebar on the left has the "VPCs" link selected. The main table lists two VPCs: "frontoffice-mgmt-vpc" and "frontoffice-workload-vpc". Both are marked as "Available" in the "Status" column. The "frontoffice-mgmt-vpc" row is highlighted with a red box. The table includes columns for Name, Status, Resource group, Subnets, Default ACL, and Default security group. Below the table, there's a message: "What do you want to do next? Since you already created a virtual private cloud, you can add other services." A blue feedback icon is in the bottom right corner.



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8. Say: “This is the Management VPC. The allocated IP address ranges per zone are listed on the right-hand side.”

The screenshot shows the IBM Cloud VPC Infrastructure Overview page for the VPC named "frontoffice-mgmt-vpc". The left sidebar is collapsed. The main content area has two tabs: "Overview" (selected) and "Address prefixes". The "Overview" tab displays detailed information about the VPC, including its name, resource group, ID, creation date, region, default ACL, security group, and routing table. The "Address prefixes" tab shows three IP address ranges assigned to the VPC across three locations: Frankfurt 1, Frankfurt 2, and Frankfurt 3. A red box highlights this table. Below it, there are sections for "Routing tables" and "Cloud Service Endpoint source addresses", both of which are currently empty.

IP Range	Location
10.10.0.0/18	Frankfurt 1
10.20.0.0/18	Frankfurt 2
10.30.0.0/18	Frankfurt 3

9. Say: “At the bottom, we see the subnets that have been provisioned within this VPC. There are nine subnets, matching the 3 by 3 grid shown in the Reference Architecture diagram. Each grouping has three subnets, one for each availability zone. The group of subnets named “frontoffice-mgmt-vpc-subnet-workerXX” contain the OpenShift worker nodes. The group of subnets named “frontoffice-mgmt-vpc-subnet-vpeXX” are used for the Virtual Private Endpoint Gateways. And finally the “frontoffice-mgmt-vpc-subnet-vpn00” and the two “frontoffice-mgmt-vpc-subnet-bastionXX” subnets contain the VPN server and the bastion servers.”



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Name	Status	Location	IP range	Public gateway
frontoffice-mgmt-vpc-subnet-vpe00	Available	Frankfurt 1	10.10.20.0/24	—
frontoffice-mgmt-vpc-subnet-vpn00	Available	Frankfurt 1	10.10.30.0/24	—
frontoffice-mgmt-vpc-subnet-worker00	Available	Frankfurt 1	10.10.10.0/24	158.177.2.178
frontoffice-mgmt-vpc-subnet-bastion00	Available	Frankfurt 2	10.20.30.0/24	—
frontoffice-mgmt-vpc-subnet-worker01	Available	Frankfurt 2	10.20.20.0/24	—
frontoffice-mgmt-vpc-subnet-worker02	Available	Frankfurt 3	10.30.10.0/24	149.81.164.94
frontoffice-mgmt-vpc-subnet-vpe02	Available	Frankfurt 3	10.30.20.0/24	—
frontoffice-mgmt-vpc-subnet-bastion01	Available	Frankfurt 3	10.30.30.0/24	—

10. Click on the “Virtual server instances” menu on the left.

Name	Status	Resource group	Virtual Private Cloud	Profile	Reserved IP	Floating IP
frontoffice-mgmt-bastion02	Running	frontoffice-management	frontoffice-mgmt-vpc	bx2-2x8	10.30.30.4	—
frontoffice-mgmt-bastion01	Running	frontoffice-management	frontoffice-mgmt-vpc	bx2-2x8	10.20.30.5	—
frontoffice-workload-vpc-server00	Running	frontoffice-workload-vpc	frontoffice-workload-vpc	cx2-2x4	10.50.30.4	—
frontoffice-workload-vpc-server01	Running	frontoffice-workload-vpc	frontoffice-workload-vpc	cx2-2x4	10.60.30.4	—



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11. Say: “Here we see the Virtual server instances (VSIs) provisioned within the VPCs. The Management VPC has two VSIs – “frontoffice-mgmt-bastion01” and “frontoffice-mgmt-bastion02” – that are used as Bastion servers to provide terminal access into the VPC network.”
12. Click on “Virtual private endpoint gateways” on the left menu.

The screenshot shows the IBM Cloud VPC Infrastructure dashboard. On the left, a sidebar lists various VPC-related services: Getting started, Overview, VPC layout, Compute (Virtual server instances, Dedicated hosts, Placement groups, SSH keys, Custom images), Network (VPCs, Subnets, Floating IPs, Public gateways, Virtual private endpoint gateways - which is currently selected and highlighted in blue), Access control lists, Security groups, Routing tables, and VPNs. The main content area is titled "Virtual private endpoint gateways for VPC" and displays a table of existing gateways. The table includes columns for Name, Status, Service details, Service endpoint, and Virtual Private Cloud. The table shows six entries:

Name	Status	Service details	Service endpoint	Virtual Private Cloud
iks-c599eq6f0cth2mcnk83g	Stable	Kubernetes Service (frontoffice-mgmt-cluster)	c599eq6f0cth2mcnk83g...	frontoffice-mgmt-vpc
frontoffice-mgmt-vpc-cos	Stable	Cloud Object Storage	s3.direct.eu-de.cloud... +1 more	frontoffice-mgmt-vpc
frontoffice-mgmt-vpc-icr	Stable	Container Registry	vpe.eu-de.container-...	frontoffice-mgmt-vpc
frontoffice-workload-vpc-cos	Stable	Cloud Object Storage	s3.direct.eu-de.cloud... +1 more	frontoffice-workload-vpc
iks-c59ajpaf05muae24gojog	Stable	Kubernetes Service (frontoffice-workload-cluster)	c59ajpaf05muae24gojog...	frontoffice-workload-vpc
frontoffice-workload-vpc-icr	Stable	Container Registry	vpe.eu-de.container-...	frontoffice-workload-vpc

At the bottom of the table, there are pagination controls: "Items per page: 25" and "1-6 of 6 items".

13. Say: “The Virtual private endpoints assign a local IP address to an IBM Cloud service within the subnet. This allow local network traffic between the components running in the VPC network (like the OpenShift cluster) and the IBM Cloud service. This environment has VPEs for Cloud Object Storage, the Container Registry, and the Kubernetes service.”
14. Click on the “Access control lists” menu the left.



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Access control lists for VPC

Name	Virtual Private Cloud	Resource group	Default	Inbound rules	Outbound rules	Attached s
frontoffice-workload-vpc-subnet-worker	frontoffice-workload-vpc	frontoffice-workload		2	5	3
frontoffice-workload-vpc-default	frontoffice-workload-vpc	frontoffice-workload	✓	1	1	0
frontoffice-workload-vpc-subnet-bastion	frontoffice-workload-vpc	frontoffice-workload		1	7	2
frontoffice-workload-vpc-subnet-vpe	frontoffice-workload-vpc	frontoffice-workload		1	4	3
frontoffice-mgmt-vpc-subnet-vpe	frontoffice-mgmt-vpc	frontoffice-management		1	4	3
frontoffice-mgmt-vpc-subnet-vpn	frontoffice-mgmt-vpc	frontoffice-management		3	5	1
frontoffice-mgmt-vpc-default	frontoffice-mgmt-vpc	frontoffice-management	✓	1	1	0
frontoffice-mgmt-vpc-subnet-worker	frontoffice-mgmt-vpc	frontoffice-management		2	5	3
frontoffice-mgmt-vpc-subnet-bastion	frontoffice-mgmt-vpc	frontoffice-management		2	4	2

15. Say: “The defined access control lists define network rules that control the flow of network traffic into and out of the subnets in the VPCs.”
16. Click on “Flow logs” in the left menu.



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Name	Status	Active	Target	Object Storage Bucket	Resource group	Date created
frontoffice-workload-vpc-flowlog	Stable	●	frontoffice-workload-vpc	frontoffice-workload-flow-logs	frontoffice-workload	September
frontoffice-mgmt-vpc-flowlog	Stable	●	frontoffice-mgmt-vpc	frontoffice-mgmt-flow-logs	frontoffice-management	September

17. Say: “The Flow logs capture the logs of the network traffic through the VPC. These logs can be used to audit the traffic and configured in the Security and Compliance Center to provide proactive notifications of network threats and suspicious activity.”
18. Click on the “VPNs” menu on the left. Click on the “Client-to-site servers” tab on the top.



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Name	Server status	Health status	Hostname	Virtual Private Cloud	Active client:
frontoffice-mgmt-vpn-server	Stable	Healthy	c8013dec0aa6.eu-de.vpn-server.appdomain.cloud	frontoffice-mgmt-vpc	2

19. Say: “In this environment a client-to-site VPN server has been provisioned to allow access from a client computer to the VPC network using a VPN client. This VPN client connection is required to be able to access the OpenShift cluster and any of the VSIs in the network (like the bastion servers).”
20. Say: “Now lets take a look at the OpenShift cluster.”
21. Make sure the VPN connection for the environment is running. Click on the “Resource list” from the “Hamburger menu” – <https://cloud.ibm.com/resources>. Expand the “Clusters” section and click on the “frontoffice-mgmt-cluster”.



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IBM Cloud Search resources and offerings... Catalog Docs Support Manage 2137132 - Tec... Actions... Help OpenShift web console Actions...

Resource list

Name	Group	Location	Status	Tags
frontoffice-mgmt-cluster	frontoffice-management	Frankfurt	Normal	fscloud +1
openfn-frontoffice	frontoffice-management	Frankfurt	-	fscloud +1
frontoffice-mgmt-appid	frontoffice-management	Frankfurt	Active	fscloud +1
kube-certmgr-c599eq6f0cth2mcnk83g	frontoffice-management	Frankfurt	Active	fscloud +1

frontoffice-mgmt-cluster Normal fscloud management

Overview

Node status 6 of 6 Normal	Add-on status 1 of 1 Normal	Master status Normal	Ingress status Healthy
---------------------------------	-----------------------------------	-------------------------	---------------------------

Details

Cluster ID c599eq6f0cth2mcnk83g	Version 4.7.30_1532	Infrastructure VPC Gen2	Zones eu-de-1, eu-de-2, eu-de-3
Created 9/27/2021, 11:17 PM	Resource group frontoffice-management	Image security enforcement Disable	

Node health

6 total nodes

Critical 0% Warning 0% Normal 100% Pending 0%

Networking

Service endpoint URL
Private enabled Copy link

Ingress subdomain
frontoffice-mgmt-cluster-48d3a96f95acca62076e928d79df50c



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22. Say: “This cluster has provisioned as a multi-zone cluster against the three availability zones in the Frankfurt region with two worker nodes in each zone. This cluster also has provisioned with only private endpoints. Since we have the VPN client running, we will be able to access the OpenShift console.”
23. Click on the “Openshift web console” button.

The screenshot shows the IBM Cloud Cluster Overview page for the 'frontoffice-mgmt-cluster'. The cluster has 6 worker nodes, 1 add-on, and is in a normal master status. It is healthy and located in the eu-de region. The 'OpenShift web console' button is highlighted with a red box. The page includes sections for Overview, Details, Node health, and Networking.

Overview

- Worker nodes: 6 of 6 (Normal)
- Worker pools: 1 (Normal)
- DevOps: New

Details

Cluster ID: c599eq6f0cth2mcnk83g	Version: 4.7.30_1532	Infrastructure: VPC Gen2	Zones: eu-de-1, eu-de-2, eu-de-3
Created: 9/27/2021, 11:17 PM	Resource group: frontoffice-management	Image security enforcement: Disable	

Node health

6 total nodes: 100% Normal, 0% Pending, 0% Warning, 0% Critical

Networking

Service endpoint URL: Private enabled (Copy link)

Ingress subdomain: frontoffice-mgmt-cluster-48d3a96f95acca62076e928d79df50c



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The screenshot shows the Red Hat OpenShift Container Platform Management interface. The left sidebar is dark with white text, listing various management options: Developer, +Add, Topology (which is selected and highlighted in blue), Monitoring, Search, Builds, Pipelines, Environments, Helm, Project, ConfigMaps, and Secrets. The main content area has a light background. At the top, there's a banner with the text "Management". Below it, the title "Topology" is displayed, followed by the sub-instruction "Select a Project to view the topology or [create a Project](#)". There is a search bar labeled "Search by name..." with a magnifying glass icon. A table follows, showing two projects: "openfn-dev" and "openfn-test". The table columns are: Name, Display name, Status, Requester, and Created. The data is as follows:

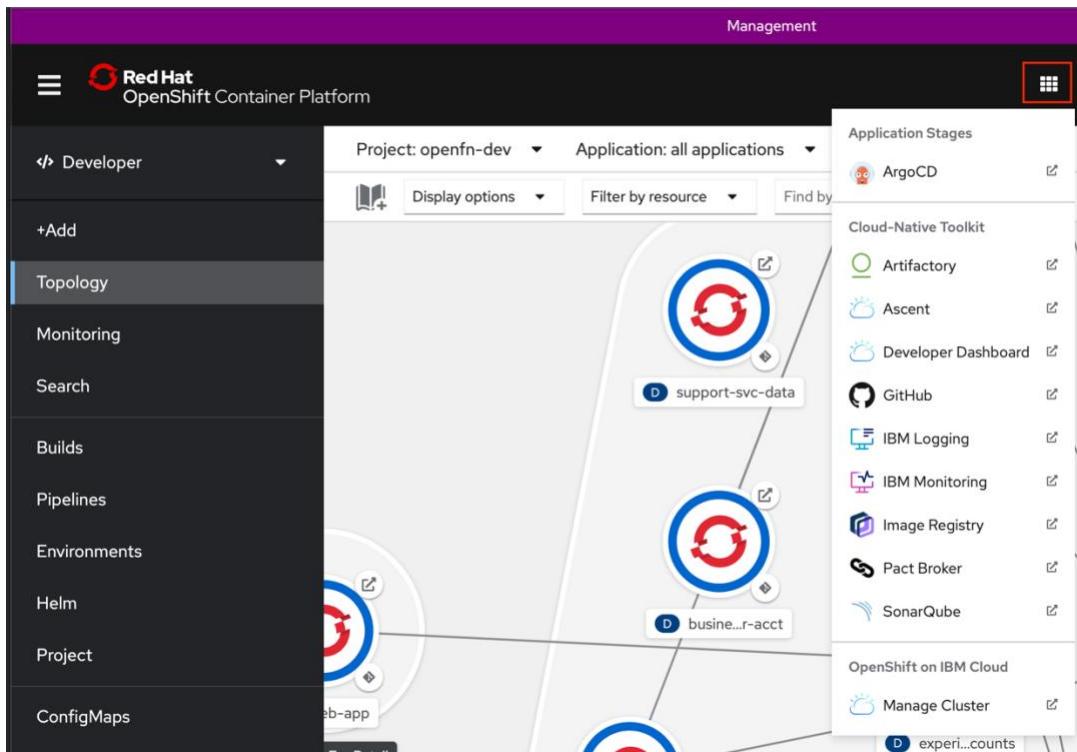
Name	Display name	Status	Requester	Created
PR openfn-dev	OpenFn Dev	Active	IAM#ramragh1@in.ibm.com	Oct 1, 2021, 10:24 AM
PR openfn-test	OpenFn Test	Active	IAM#seansund@us.ibm.com	Sep 28, 2021, 9:54 PM

24. Say: “The OpenShift cluster in the management VPC has been set up as a development environment. The banner at the top helps distinguish this cluster from the Workload cluster. Also, tools to support the development process have been installed in the cluster.”
25. Click on the application menu along the top (the 3x3 grid icon near the middle-right).



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26. Say: “Artifactory, GitHub, Pact Broker, and SonarQube are tools that support the Continuous Integration process. ArgoCD is a tools that provides Continuous Delivery following a GitOps approach. IBM Logging, IBM Monitoring, and Image Registry provide links to the tools that support the management of the cluster. And Ascent and Developer Dashboard are additional tools that support the overall development lifecycle.”
27. Select the “openfn-dev” project and click on the “Pipelines” menu on the left.



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Name	Last run	Task status	Last run status
support-service-data	[PLR] support-service-data-8ehu7u	[green bar]	Succeeded
web-app	[PLR] web-app-4me582	[green bar]	Succeeded
business-service-savings-account	[PLR] business-service-savings-account-xqkk2y	[green bar]	Succeeded
experience-service-accounts	[PLR] experience-service-accounts-t0fooe	[green bar]	Succeeded
business-service-current-account	[PLR] business-service-current-account-vaxi34	[green bar]	Succeeded
business-service-credit-card	[PLR] business-service-credit-card-qaf38r	[green bar]	Succeeded
business-service-customer-position	[PLR] business-service-customer-position-0q76jy	[green bar]	Succeeded

28. Say: “This cluster has a number of CI pipelines provisioned to build the microservices that make up the Open Fn application. A detailed walkthrough of these development tools and the development lifecycle is provided in a subsequent video in this series.”

Workload VPC

1. Return to the IBM Cloud resource list – <https://cloud.ibm.com/resources>. Select the “workload” tag to filter the list of services for the Workload VPC.



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The screenshot shows the IBM Cloud Resource list interface. The left sidebar displays a tree view of resource categories: Devices (0/0), VPC infrastructure (14/39), Clusters (1/2) containing frontoffice-workload-cluster, Container Registry (0/1), Satellite (0/0), Cloud Foundry apps (0/0), Cloud Foundry services (0/0), Services and software (2/17) containing frontoffice-workload-appid and kube-certmgr, Storage (0/1), Network (1/1), Functions namespaces (0/0), Apps (0/0), and Developer tools (0/0). The main table lists resources under these categories. A filter bar at the top right allows filtering by Name, Group, Location, Status, and Tags. A modal dialog is open on the right side, titled 'Tags', showing a list of tags with checkboxes. One tag, 'workload', is checked and highlighted with a gray background.

Name	Group	Location	Status	Tags
frontoffice-workload-cluster	frontoffice-workload	Frankfurt	Normal	<input type="checkbox"/> pvc:pvc-17dedc... <input type="checkbox"/> pvc:artifactory... <input type="checkbox"/> pvc:mongodb <input type="checkbox"/> reclaimpolicy:... <input type="checkbox"/> schematics:fss... <input type="checkbox"/> schematics:m... <input type="checkbox"/> schematics:m... <input type="checkbox"/> security <input type="checkbox"/> shared <input type="checkbox"/> storageclass:i... <input checked="" type="checkbox"/> workload
frontoffice-workload-appid	frontoffice-workload	Frankfurt	Active	
kube-certmgr-c59ajpaf05muae24gojog	frontoffice-workload	Frankfurt	Active	

2. Say: “As with the Management VPC, we have a number of VPC resources that have been provisioned for the Workload network. The structure of the VPC mirrors that of the Management VPC with the three sets of subnets across the three availability zones. An OpenShift cluster has also been provisioned in the Workload network.”
3. Expand the “Network” section in the resource list.



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The screenshot shows the IBM Cloud Resource list interface. On the left is a sidebar with various icons for different service categories like VPC infrastructure, Clusters, Container Registry, Satellite, Cloud Foundry apps, Cloud Foundry services, Services and software, and Storage. The 'Network' section under Storage is highlighted with a red box. It contains one entry: 'frontoffice-workload-tg-gateway'. The main table has columns for Name, Group, Location, Status, and Tags. The 'frontoffice-workload-tg-gateway' entry has a Group of 'frontoffice-workload', a Location of 'Frankfurt', a Status of 'Available', and a Tag of 'fscloud +1'.

Name	Group	Location	Status	Tags
frontoffice-workload-tg-gateway	frontoffice-workload	Frankfurt	Available	fscloud +1

4. Say: “The Workload setup matches the Management network with two exceptions: 1) there is no VPN server provisioned in the workload network and 2) a transit gateway has been provisioned to connect the management network with the workload network.”
5. Click on the “frontoffice-workload-tg-gateway” entry.



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The screenshot shows the IBM Cloud interface for managing a Transit Gateway. At the top, there's a navigation bar with links for Catalog, Docs, Support, Manage, and a user profile. Below the navigation is a search bar and a breadcrumb trail: Interconnectivity / Transit Gateway / frontoffice-workload-tg-gateway. The main content area displays the resource details and its connections.

Details:

Date created 9/28/21, 12:35 AM	Resource group frontoffice-workload	Routing Global	Location Frankfurt
-----------------------------------	--	-------------------	-----------------------

Connections:

Connection type	Name	Network	Region	Status
VPC	connection_instance1	frontoffice-mgmt-vpc Gen 2	Frankfurt	Attached
VPC	connection_instance0	frontoffice-workload... Gen 2	Frankfurt	Attached

6. Say: “This Transit gateway shows two members: the Management VPC and the Workload VPC. It allows traffic to flow between the Management network and the Workload network so we are able to use a single VPN server in the Management network to access resources in both.”
7. Return to the IBM Cloud resource list – <https://cloud.ibm.com/resources>. Expand the “Clusters” section and click on the Workload cluster



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The screenshot shows the IBM Cloud Resource list interface. On the left, there's a sidebar with various icons for different service categories like Devices, VPC infrastructure, Clusters, Container Registry, Satellite, Cloud Foundry apps, Cloud Foundry services, Services and software, Storage, Network, Functions namespaces, Apps, Developer tools, and VMware. The 'Clusters' section is expanded, and its first item, 'frontoffice-workload-cluster', is highlighted with a red box. The main table lists resources under 'VPC infrastructure'. The 'Clusters' row has 'frontoffice-workload' as the group, 'Frankfurt' as the location, 'Normal' as the status, and 'fscloud +1' as the tags. The 'Network' row has 'frontoffice-workload-tg-gateway' as the name, 'frontoffice-workload' as the group, 'Frankfurt' as the location, 'Available' as the status, and 'fscloud +1' as the tags.

Name	Group	Location	Status	Tags
frontoffice-workload-cluster	frontoffice-workload	Frankfurt	Normal	fscloud +1
frontoffice-workload-tg-gateway	frontoffice-workload	Frankfurt	Available	fscloud +1

8. Say: “Like the Management cluster, the Workload cluster has been provisioned as a multi-zone cluster with private endpoints only. Since the VPN is running we can access the Workload cluster console as well.”
9. Click on the “OpenShift web console” button.



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The screenshot shows the Red Hat OpenShift Container Platform interface. At the top, there's a navigation bar with the IBM logo, the title "IBM Cloud for Financial Services – Tech Zone Demo Environment Hybrid Cloud Ecosystem – Ecosystem Labs", and a user dropdown showing "IAM#seansund@gmail.com". Below the navigation is a dark sidebar with various menu items: Developer (+Add), Topology (which is selected and highlighted in blue), Monitoring, Search, Builds, Pipelines, Environments, Helm, Project, ConfigMaps, and Secrets. The main content area is titled "Workload" and "Topology". It displays a message: "Select a Project to view the topology or [create a Project](#)". Below this is a search bar with "Search by name..." and a table. The table has columns: Name, Display name, Status, Requester, and Created. One row is visible: "openfn-prod", "No display name", "Active", "IAM#seansund@us.ibm.com", and "Oct 6, 2021, 1:47 PM".

10. Say: “This cluster has been set up to deploy and run the production workload for the Open Fn application. The banner at the top marks this as the workload cluster.”
11. Click on the application menu.



IBM Cloud for Financial Services – Tech Zone Demo Environment Hybrid Cloud Ecosystem – Ecosystem Labs

The screenshot shows the Red Hat OpenShift Container Platform Workload interface. The top navigation bar includes the IBM logo, the title "IBM Cloud for Financial Services – Tech Zone Demo Environment Hybrid Cloud Ecosystem – Ecosystem Labs", and a user dropdown. The main menu on the left is titled "Developer" and includes options like "+Add", "Topology", "Monitoring", "Search", "Builds", "Pipelines", "Environments", "Helm", "Project", "ConfigMaps", and "Secrets". The "Topology" section displays a message "Select a Project to view the topology or create a Project." Below this is a search bar and a table listing a single project:

Name	Display name	Status
PR openfn-prod	No display name	Active

A sidebar on the right lists "Application Stages" including ArgoCD, IBM Logging, IBM Monitoring, and Image Registry, each with a link icon. At the bottom of the sidebar, it says "OpenShift on IBM Cloud" and "Manage Cluster". The bottom right corner shows the creation date: "Created Oct 6, 2021, 1:47 PM".

12. Say: “Since we are using this cluster to run the application workloads, the development tools have not been installed here. ArgoCD has been provisioned to manage software deployments into the cluster using GitOps. Also, links to the IBM Logging, IBM Monitoring, and Image Registry have been added to make it easier to navigate to the services.”
13. Return to the IBM Cloud resource list – <https://cloud.ibm.com/resources>

THIS CONCLUDES THE DEMO STEPS