



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

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>



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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 details like 'Tech Zone FS Cloud 01' and 'ID: ea243e63212643dc927f7fe26b6e726c'. Under 'Account Type', it shows 'Pay-As-You-Go' with a 'Learn more' link. A section titled 'Subscription and feature codes' explains how subscription codes add platform and support credit for purchased subscriptions, and feature codes unlock additional capabilities. Below this is a button labeled 'Apply code'. A red box highlights a section titled 'Financial Services Validated: On'. This section states that the account is enabled to use Cloud services designated as IBM Cloud for Financial Services Validated. It includes a 'Learn more' link and two buttons: 'Off' (disabled) and 'On' (enabled). A note below says: 'If you select the EU Supported option, the most common support issues will be limited to an IBM Cloud team located in the European Union.' At the bottom right is a blue circular icon with a gear and a person symbol.

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 area has a search bar at the top. Below it, there are several sections:

- Virtual routing and forwarding:** A section with a red border containing the status "On". It explains that VRF isolates IP routing for services in the account. A note states that this setting is permanently enabled and cannot be disabled.
- Service endpoints:** A section with a red border containing the status "On". It explains that service endpoints enable connection to services over the IBM Cloud private network. A note states that connecting directly to service endpoints does not require internet access, providing increased security.

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 manage menu. The "Manage" button is highlighted with a red box. A dropdown menu appears, listing several options: Account, Billing and usage, Catalogs, Enterprise, Security and access, View APIs and SDKs, View the API and SDK documentation for products and services in IBM Cloud, Context-based restrictions, and Security and Compliance. The "View APIs and SDKs" option is also highlighted with a red box.



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The screenshot shows the IBM Cloud interface for managing access control. On the left, a sidebar menu under 'Access (IAM)' lists several options: Users, Access groups, Service IDs, API keys, Authorizations, Roles, Identity providers, Trusted profiles, and Settings. The 'Settings' option is highlighted with a red rectangular border. The main content area is titled 'Manage access' and displays a large purple circular icon with a small yellow segment at the top, representing a progress bar or loading status. Below the icon, 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 in the IBM Cloud interface. The left sidebar is titled 'Access (IAM)' and includes options like 'Users', 'Access groups', 'Service IDs', 'API keys', 'Authorizations', 'Roles', 'Identity providers', 'Trusted profiles', and 'Settings'. The 'Settings' option is currently selected. The main content area is titled 'Login session' and contains three sections: 'Active sessions', 'Sign out due to inactivity', and 'Concurrent sessions'. Each section has a description and a dropdown menu. A red box highlights the 'Multifactor authentication (MFA)' section under 'Authentication', which contains a note about adding an extra layer of security for all users.

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 in the IBM Cloud interface. The left sidebar is titled 'Access (IAM)' and includes options like 'Users', 'Access groups', 'Service IDs', 'API keys', 'Authorizations', 'Roles', 'Identity providers', 'Trusted profiles', and 'Settings'. The 'Settings' option is currently selected. The main content area is titled 'Account' and contains four sections: 'Restrict user list visibility', 'Restrict API key creation', 'Restrict service ID creation', and 'Restrict IP address access'. Each section has a status indicator (radio button) and a description. A red box highlights the first three sections under 'Account'.

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' section is expanded, showing 8 resources. On the right, there's a main table with columns for Name, Group, Location, Status, and Tags. A filter sidebar is open on the right, showing a list of tags with checkboxes. The 'shared' checkbox is checked and highlighted with a red box. Other tags listed include pvc:pvc-f7dedc..., pvc:artifactory..., pvc:mongodb, reclaimpolicy:..., schematics:fss..., schematics:m..., schematics:m..., 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. The top navigation bar includes 'IBM Cloud', a search bar, and links for Catalog, Docs, Support, Manage, and Notifications. The main area is titled 'Resource list' and displays a table of resources. The columns are: Name, Group, Location, Status, and Tags. The table shows 11 Activity Tracker instances under 'Services and software', 1 Storage instance under 'Storage', and 0 Network and Functions namespaces. Each resource row includes a preview icon, name, group, location, status (Active), tags (fscloud), and a more options menu.

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 shows the IBM Cloud Activity Tracker interface. On the left, a sidebar lists Observability, Logging, Monitoring, and Activity Tracker, with Activity Tracker selected. The main area displays a table of activity tracker instances:

Name	Status	Resource group	Region	Plan	View
activity-tracker-au-syd	Active	Default	Sydney	7 day Event Search	Open dashboard
activity-tracker-eu-de	Active	Default	Frankfurt	7 day Event Search	Open dashboard
activity-tracker-eu-gb	Active	Default	London	7 day Event Search	Open dashboard
activity-tracker-jp-osa	Active	Default	Osaka	7 day Event Search	Open dashboard
activity-tracker-jp-tok	Active	Default	Tokyo	7 day Event Search	Open dashboard
activity-tracker-us-east	Active	Default	Washington DC	7 day Event Search	Open dashboard
activity-tracker-us-south	Active	Default	Dallas	7 day Event Search	Open dashboard

Below the table, there are dropdowns for 'Items per page' (set to 25) and '1–7 of 7 items'. On the right, there are navigation links for '1' (page 1), '1 of 1 page', and arrows for navigating between pages.

This screenshot shows the detailed view for the 'activity-tracker-eu-de (Frankfurt)' instance. The left sidebar includes a 'Find a View' search bar, a 'EVERYTHING' button, and a 'VIEWS' section with a note about bookmarking frequent searches or filters. The main area has tabs for 'Everything', 'Filters', 'Sources', 'Apps', and 'Levels'. The log viewer displays 704 lines of log entries. A 'Timeline' section on the right shows a timeline from 10/12 9:50:30 to 10/12 10:50:30. The bottom of the screen shows a footer with a back arrow, a search bar containing '7566c872-4e54-48fc-a804...', a 'Read-Only | IBM-7DAY' link, and various navigation icons.



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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 various links like Catalog, Docs, Support, Manage, and a user profile. Below the navigation, the resource list shows a single entry: 'crypto-hsm-kyok'. The 'Overview' tab is selected. On the left, there's a sidebar with 'Getting started' and a list of options: Instance policies, KMS key rings, KMS keys, KMS associated resources, EP11 keystores, and EP11 keys. The main panel has three sections: 'Crypto units' (listing two operational units), 'Location' (a world map with a green dot for Frankfurt, labeled 'Operational region Frankfurt (eu-de)'), and 'Instance' (showing Instance ID: 50423a85-9f41-470d-8527-3c3c5f7295ce and Resource group: security-ops). To the right, there are 'Key management endpoint URL' (Public: https://api.eu-de.hs-crypto.cloud.ibm.com:9327) and 'Enterprise PKCS #11 endpoint URL' (Private: https://api.private.eu-de.hs-crypto.cloud.ibm.com:9327). A blue 'Actions...' button is at the top right of the main panel.

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 interface for the HPCS service. The left sidebar has a 'KMS keys' section selected. The main area displays a table of 'Key management service keys' with 78 entries. The columns are: Name, ID, Alias, Key ring ID, Type, State, Origin, and Last updated. A search bar is at the top of the table. A URL at the bottom of the page is: <https://cloud.ibm.com/services/hs-crypto/crn%3Av1%3Abuemix%3Apublic%3Ahs-crypto%3Aeu-de%3Aa%2Fea243e63212643dc9277fe26b5e726c%3A50423a85-9f41-470d-8527-3c3bf7295ce%3A%3A?panelId=manage>.

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...bebc	default	Root key	Destroyed	Created	2021-09-27 05:55:54	⋮
frontoffice-workload...						2021-09-23 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 the 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-cl...	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 '1 of 1 page'.

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

Resource groups: Filter... Region: Filter... Search Catalog Docs Support Manage 2137132 - Tec... Options

Name	Status	Resource group	Region	Sources	Plan	View
frontoffice-logging	Active	frontoffice-common	Frankfurt	Add log sources	7 day Log Search	Open dashboard

Items per page: 25 1–1 of 1 item 1 of 1 page

IBM Cloud frontoffice-logging (Frankfurt)

Find a View Filters Sources Apps Levels 22,422 lines

EVERYTHING

Views are a great way to bookmark frequent searches or filters. To create a view, search and filter your logs, then click on the [View menu](#).

Timeline

Time scale: 60 minutes (default) 10/12 12:49:00 - 10/12 13:49:00 Oct 12 12:55:00 13:01:00 13:07:00 13:13:00 13:19:00 13:25:00 13:31:00 13:37:00 13:43:00 13:49:00

Logs

```
[{"@version": "1", "log_id": "1", "source": "sysdig-agent-xlrrn", "type": "sysdig-agent", "level": "INFO", "msg": "connection_manager:1660: Sent msgtype=1 len=163852 to collector", "time": "2021-10-12T13:52:10Z"}, {"@version": "1", "log_id": "2", "source": "logdago-agent-ztjpr", "type": "logdago-agent", "level": "INFO", "msg": "metrics] [\"fs\": {\"events\":113,\"creates\":0,\"deletes\":0,\"writes\":113,\"lines\":145,\"bytes\":23381,\"partial_reads\":105},\"memory\": {\"active\":21262336,\"allocated\":1807776,\"resident\":23691264},\"ingest\": {\"throughput\":23782,\"rate_limits\":0,\"retries\":0},\"ks\": {\"lines\":0,\"polls\":0},\"creates\":10,\"deletes\":2,\"events\":0,\"notifies\":0},\"journal\":{\"lines\":0,\"bytes\":0}}", "time": "2021-10-12T13:52:10Z"}, {"@version": "1", "log_id": "3", "source": "ibm-master-proxy-static-10.30.10.8", "type": "ibm-master-proxy-static", "level": "INFO", "msg": "masterapiserverFrontend masterapiserverBackend/c599eqf08tch2mcnk83g.vpe.private.eu-de.containers.cloud.ibm.com 1/2/26 3827 -- 21/21/20/0 0/0/0", "time": "2021-10-12T13:52:10Z"}, {"@version": "1", "log_id": "4", "source": "ibm-master-proxy-static-10.30.10.8", "type": "ibm-master-proxy-static", "level": "INFO", "msg": "masterapiserverFrontend masterapiserverBackend/c599eqf08tch2mcnk83g.vpe.private.eu-de.containers.cloud.ibm.com 1/2/26 3827 -- 21/21/20/0 0/0/0", "time": "2021-10-12T13:52:10Z"}, {"@version": "1", "log_id": "5", "source": "logdago-agent-nbly", "type": "logdago-agent", "level": "INFO", "msg": "metrics] [\"fs\": {\"events\":117,\"creates\":0,\"deletes\":0,\"writes\":68357,\"partial_reads\":2663},\"memory\": {\"active\":22062176,\"allocated\":19682768,\"resident\":25427968},\"ingest\": {\"throughput\":68324,\"rate_limits\":0,\"retries\":0},\"ks\": {\"lines\":0,\"polls\":0},\"creates\":10,\"deletes\":2,\"events\":0,\"notifies\":0},\"journal\":{\"lines\":0,\"bytes\":0}}", "time": "2021-10-12T13:52:10Z"}, {"@version": "1", "log_id": "6", "source": "packageServer-6fb5bb8f-1vrg", "type": "packageServer", "level": "INFO", "msg": "sysdig-server 11012 18:52:10.757876 1 httplog.go:89] \"HTTP\" verb=\"GET\" URL=\"/apis/packages/operators.coreos.com/v1?timeout=32s\" latency=\"3.90793ms\" userAgent=\"kubectl/v1.21.2 (linux/amd64) kubernetes/092fbfb\"", "time": "2021-10-12T13:52:10Z"}, {"@version": "1", "log_id": "7", "source": "ibm-vpc-block-csi-node-4hr9q", "type": "ibm-vpc-block-csi-node-4hr9q", "level": "INFO", "msg": "iks-vpc-block-node-driver I1012 18:52:10.884526 1 server.go:145] GRPC call: /csi.v1.Identity/Probe", "time": "2021-10-12T13:52:10Z"}, {"@version": "1", "log_id": "8", "source": "ibm-vpc-block-csi-node-4hr9q", "type": "ibm-vpc-block-csi-node-4hr9q", "level": "INFO", "msg": "iks-vpc-block-node-driver I1012 18:52:10.884552 1 server.go:146] GRPC request:", "time": "2021-10-12T13:52:10Z"}, {"@version": "1", "log_id": "9", "source": "ibm-vpc-block-csi-node-4hr9q", "type": "ibm-vpc-block-csi-node-4hr9q", "level": "INFO", "msg": "iks-vpc-block-node-driver I1012 18:52:10.88447 1 server.go:145] GRPC response:", "time": "2021-10-12T13:52:10Z"}, {"@version": "1", "log_id": "10", "source": "sysdig-agent-cwds", "type": "sysdig-agent", "level": "INFO", "msg": "analyzer:5472: ts=1634064731, ne=29346, de=0, c=1, fp=0.52, snr=1, st=0, fl=33", "time": "2021-10-12T13:52:11Z"}, {"@version": "1", "log_id": "11", "source": "sysdig-agent", "type": "sysdig-agent", "level": "INFO", "msg": "analyzer:5472: ts=1634064731, ne=20669, 20809, de=0, c=2.28, fp=0.45, snr=1, st=0, fl=14", "time": "2021-10-12T13:52:11Z"}, {"@version": "1", "log_id": "12", "source": "sysdig-agent-xlrrn", "type": "sysdig-agent", "level": "INFO", "msg": "analyzer:5472: ts=1634064731, ne=43915, de=0, c=7.22, fp=0.47, snr=1, st=0, fl=44", "time": "2021-10-12T13:52:11Z"}, {"@version": "1", "log_id": "13", "source": "service-ca-operator-7f557f89-2ad9", "type": "service-ca-operator", "level": "INFO", "msg": "reflector.go:530] k8s.io/apiserver/pkg/server/dynamiccertificates/configmap_file_content.go:206: Watch close - +v1.ConfigMap total 0 items received", "time": "2021-10-12T13:52:11Z"}, {"@version": "1", "log_id": "14", "source": "packageServer-6fb5bb8f-1vrg", "type": "packageServer", "level": "INFO", "msg": "sysdig-server 11012 18:52:11.474058 1 httplog.go:89] \"HTTP\" verb=\"GET\" URL=\"/healthz\" latency=\"2.08879ms\" userAgent=\"kube-probe/1.20\" srcIP=\"10.20.10.8:2600\" resp=200", "time": "2021-10-12T13:52:11Z"}, {"@version": "1", "log_id": "15", "source": "packageServer-6fb5bb8f-1vrg", "type": "packageServer", "level": "INFO", "msg": "sysdig-server 11012 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", "time": "2021-10-12T13:52:11Z"}]
```

^ eb94b314-2896-4147-9455... Read-Only | IBM-7DAY

LIVE



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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.

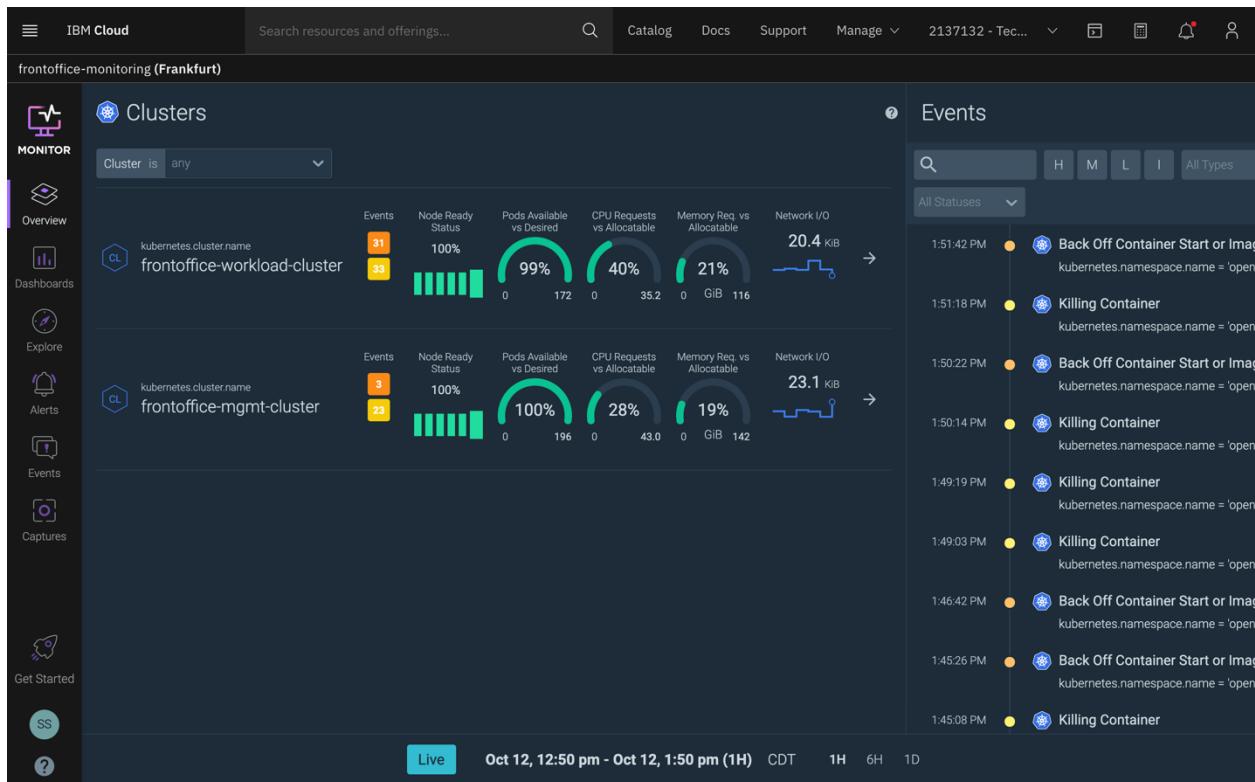
The screenshot shows the IBM Cloud interface with the 'Monitoring' service selected in the sidebar. The main view displays a table of monitoring instances. One instance, 'frontoffice-monitoring', is listed with the following details:

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

The 'View' column for this instance contains a red-bordered button labeled 'Open dashboard'. Below the table, pagination controls show '1 of 1 page'.



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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 for the 'frontoffice-cos' instance. The left sidebar has 'Buckets' selected. The main area displays a table of buckets with columns: Name, Public access, Location, Storage class, and Created. There are 8 items listed, each with a three-dot menu icon. The first item is 'frontoffice-mgmt-activitytracker'. At the bottom, there are pagination controls for 'Items per page' (set to 10), '1-8 of 8 items', and '1 of 1 pages'.

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-c56afb kf06e0u9v8hhm0-6cb3	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-c59ajpaf05mue24gojog-c29f	No	eu-geo	Standard	2021-09-28 12:36 AM

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 left sidebar has a navigation tree: Storage / frontoffice-cos / frontoffice-mgmt-flow-logs. The 'Objects' tab is selected. The main area displays a table of objects:

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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Associated key management services

Key Service	Hyper Protect Crypto Services
Key ID	667475cd-e53f-4646-b896-980816a708c0
Service instance	crypto-hsm-kyok
Key name	frontoffice-mgmt-key

Activity Tracker

All bucket management events will be recorded with IBM Cloud Activity Tracker.

Service instance	activity-tracker-eu-de
Resource group	Default
Location	eu-de
Plan	7 day Event Search
Data events	read & write

Monitoring

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 left sidebar has a tree view with sections like 'VPC infrastructure' (12 / 38), 'Clusters' (1 / 2), and 'Container Registry' (1 / 1). The main table lists resources under 'VPC infrastructure'. A filter bar at the top allows filtering by name, group, location, status, and tags. A 'Tags' column on the right shows checkboxes for various tags, with 'management' checked and highlighted with a red box.

Name	Group	Location	Status	Tags
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"/> fscloud
kube-c599eq6f0cth2mcnk83g-629dba34d...	frontoffice-management	Frankfurt	Active	<input type="checkbox"/> fscloud
frontoffice-mgmt-cluster	frontoffice-management	Frankfurt	Normal	<input type="checkbox"/> fscloud

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 interface with the 'VPC Infrastructure' section selected in the sidebar. The main area displays a table of VPC resources, including:

Group	Location	Status	Tags
Office-management	Frankfurt	—	fscloud +1
Office-management	Frankfurt	—	fscloud +1
Office-management	Frankfurt	Active	fscloud +1
Office-management	Frankfurt	—	fscloud +1
Office-management	Frankfurt	Available	fscloud +1
Office-management	Frankfurt	Healthy	cos +2
Office-management	Frankfurt	Stable	fscloud +1
Office-management	Frankfurt	Healthy	fscloud +1
Office-management	Frankfurt	—	fscloud +1
Office-management	Frankfurt	Active	fscloud +1

Below the table, there are sections for Subnets, Floating IPs, Public gateways, Virtual private endpoint gateways, and Access control lists.

7. Click on the Management VPC.

The screenshot shows the 'Virtual private clouds' page in the IBM Cloud interface. The sidebar has 'VPCs' selected. The main area displays a table of VPCs:

Name	Status	Resource group	Subnets	Default ACL	Default security group
frontoffice-mgmt-vpc	Available	frontoffice-management	9	frontoffice-mgmt-vpc-default	frontoffice-mgmt-vpc-default
frontoffice-workload-vpc	Available	frontoffice-workload	8	frontoffice-workload-vpc-default	frontoffice-workload-vpc-default

A message at the bottom suggests adding other services.



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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, showing the main navigation menu. The main content area has two tabs: "Overview" (selected) and "Address prefixes". The "Overview" tab displays basic VPC details such as Name, Resource group, ID, Created, Region, Default ACL, Default security group, and Default routing table. The "Address prefixes" tab displays three IP address ranges: 10.10.0.0/18, 10.20.0.0/18, and 10.30.0.0/18, each associated with Frankfurt 1, Frankfurt 2, or Frankfurt 3. A red box highlights the "Address prefixes" table. At the bottom of the page, there are sections for "Routing tables" and "Cloud Service Endpoint source addresses", both of which are currently empty.

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	10.20.10.0/24	161.156.167.67
frontoffice-mgmt-vpc-subnet-vpe01	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	frontoffice-workload-vpc	cx2-2x4	10.50.30.4	—
frontoffice-workload-vpc-server01	Running	frontoffice-workload	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 interface. The left sidebar is titled "VPC Infrastructure" and includes sections for 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 six entries. The table columns are Name, Status, Service details, Service endpoint, and Virtual Private Cloud. The entries are:

Name	Status	Service details	Service endpoint	Virtual Private Cloud
iks-c599eq6f0cth2mcnk83g	Stable	Kubernetes Service (frontoffice-mgmt-cluster)	c599eq6f0cth2mcnk83g...	frontoffice-mgmt-vpc
frontoffice-mgmt-vpe-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-vpe-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", "1-6 of 6 items", "1 of 1 page", and navigation arrows.

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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Resource list

Create resource +

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

Devices (0 / 0)
VPC infrastructure (12 / 39)
Clusters (1 / 2)
Container Registry (1 / 1)
Satellite (0 / 0)
Cloud Foundry apps (0 / 0)
Cloud Foundry services (0 / 0)
Services and software (2 / 17)
Storage (0 / 1)
Network (0 / 1)
Functions namespaces (0 / 0)
Apps (0 / 0)

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frontoffice-mgmt-cluster

Normal fscloud management

Help OpenShift web console Actions...

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

Worker nodes Worker pools DevOps New Details ↓ Details ↓ Docs ↗ Docs ↗

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 Worker node details

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 interface for managing clusters. The top navigation bar includes links for Catalog, Docs, Support, Manage, and Actions. The main content area is titled 'Clusters / frontoffice-mgmt-cluster'. The 'Overview' tab is selected, displaying the following information:

- Node status:** 6 of 6 (Normal)
- Add-on status:** 1 of 1 (Normal)
- Master status:** Normal
- Ingress status:** Healthy

Below the overview, there are sections for **Details**, **Node health** (showing 6 total nodes, all normal), and **Networking**. The 'OpenShift web console' button is located in the top right corner of the main cluster details area, and it is highlighted with a red box.



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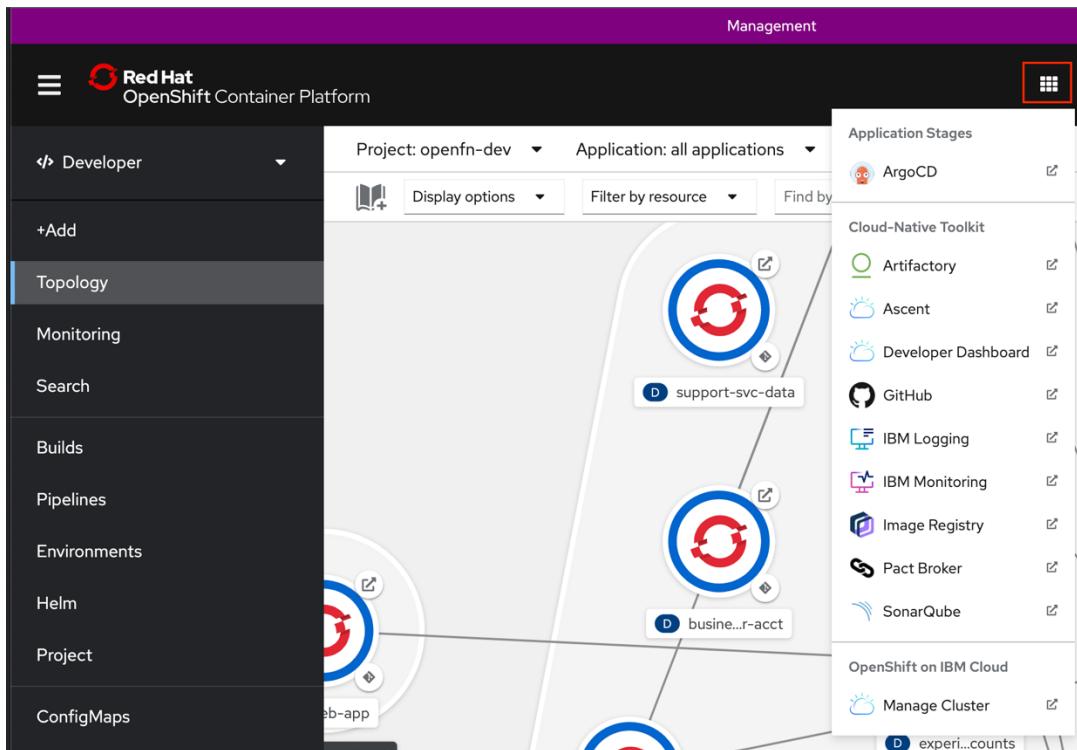
The screenshot shows the Red Hat OpenShift Container Platform Management interface. The left sidebar has a dark theme with white text and includes sections like Developer, +Add, Topology (which is selected and highlighted in blue), Monitoring, Search, Builds, Pipelines, Environments, Helm, Project, ConfigMaps, and Secrets. The main content area is titled "Topology" and displays a table of projects. The table has columns for Name, Display name, Status, Requester, and Created. It shows two entries: "openfn-dev" (Display name: OpenFn Dev, Status: Active, Requester: IAM#ramragh1@in.ibm.com, Created: Oct 1, 2021, 10:24 AM) and "openfn-test" (Display name: OpenFn Test, Status: Active, Requester: IAM#seansund@us.ibm.com, Created: Sep 28, 2021, 9:54 PM). A search bar at the top of the main content area allows searching by project name.

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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The screenshot shows the Red Hat OpenShift Container Platform interface. The top navigation bar is purple with the text "Management". Below it, the header includes the Red Hat logo and "OpenShift Container Platform". On the left, a sidebar menu is visible with options like "Developer", "+Add", "Topology", "Monitoring", "Search", "Builds", "Pipelines" (which is selected and highlighted in grey), "Environments", "Helm", "Project", "ConfigMaps", and "Secrets". The main content area is titled "Pipelines" with a "Tech preview" badge. It displays a table of CI pipelines for the "openfn-dev" project. The table has columns for "Name", "Last run", "Task status", and "Last run status". There are eight entries, each with a green progress bar indicating success ("Succeeded").

Name	Last run	Task status	Last run status
PL support-service-data	PLR support-service-data-8ehu7u	[Green Progress Bar]	✓ Succeeded
PL web-app	PLR web-app-4me582	[Green Progress Bar]	✓ Succeeded
PL business-service-savings-account	PLR business-service-savings-account-xqkk2y	[Green Progress Bar]	✓ Succeeded
PL experience-service-accounts	PLR experience-service-accounts-t0fooe	[Green Progress Bar]	✓ Succeeded
PL business-service-current-account	PLR business-service-current-account-vaix34	[Green Progress Bar]	✓ Succeeded
PL business-service-credit-card	PLR business-service-credit-card-qaf38r	[Green Progress Bar]	✓ Succeeded
PL business-service-customer-position	PLR business-service-customer-position-0q76jy	[Green Progress 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 top navigation bar includes 'IBM Cloud', a search bar, and various management links like Catalog, Docs, Support, Manage, and a user profile. A sidebar on the left provides a hierarchical tree view of resources, including Devices, VPC infrastructure, Clusters, Container Registry, Satellite, Cloud Foundry apps, Cloud Foundry services, Services and software, Storage, Network, Functions namespaces, Apps, and Developer tools. The main table lists resources under 'Services and software'. One row is selected, showing 'frontoffice-workload-appid' as a service in the 'frontoffice-workload' group, located in Frankfurt, with a status of 'Normal'. To the right of the table is a 'Tags' panel containing a list of tags with checkboxes, where 'workload' is checked. Other visible tags include 'pv:pvc-f7dedc...', 'pvc:artifactory...', 'pvc:mongodb', 'reclaimpolicy...', 'schematics:fss...', 'schematics:m...', 'schematics:m...', 'security', 'shared', and 'storageclass:i...'. A 'Create resource' button is located at the top right of the table area.

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. The left sidebar contains a tree view of resource categories: 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 'Network' category is expanded, and its single entry, 'frontoffice-workload-tg-gateway', is highlighted with a red box. The main table lists resources by Name, Group, Location, Status, and Tags. The 'frontoffice-workload-tg-gateway' entry has a status of 'Available' and is tagged with 'fscloud +1'. Other visible entries include 'frontoffice-workload-cluster' in the 'Clusters' group and 'Cloud Foundry apps' in the 'Cloud Foundry apps' group.

Name	Group	Location	Status	Tags
frontoffice-workload-cluster	frontoffice-workload	Frankfurt	Normal	fscloud +1
frontoffice-workload-tg-gateway	frontoffice-workload	Frankfurt	Available	fscloud +1
Cloud Foundry apps	Cloud Foundry apps			
Cloud Foundry services	Cloud Foundry services			
Services and software	Services and software			
Storage	Storage			

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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IBM Cloud

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Catalog Docs Support Manage 2137132 - Tec... Actions...

Interconnectivity / Transit Gateway / frontoffice-workload-tg-gateway Available fscloud workload

Details

Date created	Resource group	Routing	Location
9/28/21, 12:35 AM	frontoffice-workload	Global	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 resource 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. A cluster named 'frontoffice-workload-cluster' is selected and highlighted with a red box. The main table lists resources with columns for Name, Group, Location, Status, and Tags. The 'frontoffice-workload-cluster' entry shows it belongs to the 'frontoffice-workload' group, is located in Frankfurt, is in a 'Normal' status, and has a tag 'fscloud +1'.

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 red banner with the word "Workload". Below it is a header bar with the Red Hat logo and the text "OpenShift Container Platform". On the right side of the header, there are icons for settings, help, and user authentication (IAM#seansund@gmail.com). The main content area has a sidebar on the left with various navigation options: Developer (selected), +Add, Topology (highlighted in blue), Monitoring, Search, Builds, Pipelines, Environments, Helm, Project, ConfigMaps, and Secrets. The main panel is titled "Topology" and displays a message: "Select a Project to view the topology or [create a Project](#)". Below this is a search bar with "Name" and "Search by name..." placeholder text. A table follows, showing one item: "openfn-prod" (PR icon), "No display name", "Active" status, requester "IAM#seansund@us.ibm.com", and creation date "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.



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

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