



PRODUCT DOCUMENTATION

# Pivotal Cloud Foundry

PCF<sup>®</sup>

Version 2.2

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## Table of Contents

Table of Contents	2
Redis for PCF	3
Redis for PCF Release Notes	5
Is Redis for PCF right for your enterprise?	10
On-Demand Service Offering	12
Dedicated-VM and Shared-VM Service Offerings	17
Networking for On-Demand Services	22
Redis for PCF Security	24
Introduction for Operators	25
Installing Redis for PCF	28
Upgrading Redis for PCF	38
Setting Limits for On-Demand Service Instances	41
Configuring Automated Backups for Redis for PCF	47
Monitoring Redis for PCF	54
Redis for PCF Smoke Tests	62
Troubleshooting Redis for PCF	64
Introduction for App Developers	81
Quickstart Guide for App Developers	82
Using Redis for PCF	88
Troubleshooting Instances	98
Sample Redis Configuration	100

## Redis for PCF

Page last updated:

 **Note:** Redis for PCF v1.10 is no longer supported. The support period for v1.10 has expired. To stay up-to-date with the latest software and security updates, upgrade to Redis for PCF v1.11 or later.

This is documentation for Redis for Pivotal Cloud Foundry (PCF). You can download the Redis for PCF tile from [Pivotal Network](#).

This documentation:

- Describes the features and architecture of Redis for PCF.
- Instructs the PCF operator on how to install, configure, maintain, and backup Redis for PCF.
- Instructs the app developer on how to choose a service plan, create and delete Redis service instances, and bind an app.

## Product Snapshot

Element	Details
Version	v1.10.5
Release date	March 7, 2018
Software component version	Redis OSS v3.2.11
Compatible Ops Manager version(s)	v1.11.0 and v1.12.0
Compatible Elastic Runtime version(s)	v1.11.0 and v1.12.0
IaaS support	AWS, Azure, GCP, OpenStack, and vSphere
IPsec support	Yes

## About Redis

*Redis* is an easy to use, high speed key-value store that can be used as a database, cache, and message broker. It supports a range of data structures including strings, lists, hashes, sets, bitmaps, hyperloglogs, and geospatial indexes. It is easy to install and configure and is popular with engineers as a straightforward NoSQL data store. It is used for everything from a quick way to store data for development and testing through to enterprise-scale apps like Twitter.

## About Redis for PCF

*Redis for PCF* packages Redis for easy deployment and operability on Pivotal Cloud Foundry (PCF).

Redis for PCF offers On-Demand, Dedicated-VM, and Shared-VM services.

- **On-Demand Service**—Provides a dedicated VM running a Redis instance. The operator can configure up to three plans with different configurations, memory sizes, and quotas. App developers can provision an instance for any of the On-Demand plans offered, and configure certain Redis settings.
- **Dedicated-VM Service**—Provides a dedicated VM running a Redis instance. The Dedicated-VM Service is pre-provisioned by the operator with a fixed number of VMs and memory size. App developers can then use one of those pre-provisioned VMs.
- **Shared-VM Service**—Provides support for a number of Redis instances running in a single VM. It is designed for testing and development. The Shared-VM instances are pre-provisioned by the operator with a fixed number of instances and memory size. App developers can then use one of these pre-provisioned instances.

For more information on the plans, see:

- [On-Demand Service Offering](#)
- [Dedicated-VM and Shared-VM Service Offerings](#)

## Is Redis for PCF Right for your Enterprise

For information on recommended use cases, and the enterprise-readiness of Redis for PCF, see [Is Redis for PCF Right for your Enterprise](#).

## Upgrading to the Latest Version

For information on how to upgrade and the supported upgrade paths, see [Upgrading Redis for PCF](#).

## More Information

The following table lists where you can find topics related to the information on this page:

For more information about...	See...
Product compatibility	<a href="#">Product Version Matrix</a>
How to upgrade Redis for PCF	<a href="#">Upgrading Redis for PCF</a>
How to use Redis	<a href="#">Redis Documentation</a>

## Redis for PCF and Other PCF Services

Some PCF services offer *on-demand* service plans. These plans let developers provision service instances when they want.

These contrast with the more common *pre-provisioned* service plans, which require operators to provision the service instances during installation and configuration through the service tile UI.

The following PCF services offer on-demand service plans:

- MySQL for PCF v2.0 and later
- RabbitMQ for PCF
- Redis for PCF
- Pivotal Cloud Cache (PCC)

These services package and deliver their on-demand service offerings differently. For example, some services, like Redis for PCF, have one tile, and you configure the tile differently depending on whether you want on-demand service plans or pre-provisioned service plans.

For other services, like PCC, you install one tile for on-demand service plans and a different tile for pre-provisioned service plans.

The following table lists and contrasts the different ways that PCF services package on-demand and pre-provisioned service offerings.

PCF service tile	Standalone product related to the service	Versions supporting on demand	Versions supporting pre-provisioned
RabbitMQ for PCF	Pivotal RabbitMQ	v1.8 and later	All versions
Redis for PCF	Redis	v1.8 and later	All versions
MySQL for PCF	MySQL	v2.x (based on Percona Server)	v1.x (based on MariaDB and Galera)
PCC	Pivotal GemFire	All versions	NA
GemFire for PCF	Pivotal GemFire	NA	All versions

## Feedback

Please provide any bugs, feature requests, or questions to [the Pivotal Cloud Foundry Feedback list](#).

## Redis for PCF Release Notes

Page last updated:

### View Release Notes for Another Version

To view the release notes for another product version, select the version from the drop-down list at the top of this page.

### v1.10.5

Release Date: March 7, 2018

This release updates the stemcell verison.

### Compatibility

Component	Version
Stemcell	3468.x
PCF	v1.11.x and v1.12.x
cf-redis-release	v431.5.0
on-demand-service-broker	v0.19.0
consul	v187.0.0
routing	v0.163.0
service-metrics	v1.5.11
service-backup	v18.1.9
syslog-migration	v10.0.0
loggregator	v97.0
Redis OSS	v3.2.11

### Known Issues

- The redis-odb service broker listens on port `12345`. This is inconsistent with other services, but has no effect on tile operations.
- The **When Changed** option for errands has unexpected behavior. Do not select this choice as an errand run-rule. For more information about this unexpected behavior, see [Errand Run Rules](#).
- Default persistence is set to full persistence using an AOF file. If an instance is restarted frequently –for example, for upgrades–this file can grow significantly, leading to very large persistent disk usage. If your Redis instance has significantly larger persistent disk usage than expected, check the size of your `appendonly.aof` file, usually at `/var/vcap/store/redis`, to verify that this is the source of the usage. If so, you can mitigate this by running the [BGREWRITEAOF](#) command.
- The redis-odb fails if arbitrary parameters are changed in an `update-service` command.
- Switching Lua Scripting to `off` for plans with preexisting instances can cause upgrade errand failures. For information about resolving this issue, see [Upgrade errand fails with Unknown command eval](#).

### v1.10.4

Release Date: February 7, 2018

### Fixes

- Fixes a bug that blocks tile upgrades in some Pivotal Cloud Foundry (PCF) installations.

## Compatibility

Component	Version
Stemcell	3445.x
PCF	v1.11.x and v1.12.x
cf-redis-release	v431.2.0
on-demand-service-broker	v0.19.0
consul	v187.0.0
routing	v0.163.0
service-metrics	v1.5.11
service-backup	v18.1.9
syslog-migration	v10.0.0
loggregator	v97.0
Redis OSS	v3.2.11

## Known Issues

- The redis-odb service broker listens on port `12345`. This is inconsistent with other services, but has no effect on tile operations.
- The **When Changed** option for errands has unexpected behavior. Do not select this choice as an errand run-rule. For more information about this unexpected behavior, see [Errand Run Rules ↗](#).
- Default persistence is set to full persistence using an AOF file. If an instance is restarted frequently—for example, for upgrades—this file can grow significantly, leading to very large persistent disk usage. If your Redis instance has significantly larger persistent disk usage than expected, check the size of your `appendonly.aof` file (usually at `/var/vcap/store/redis`) to verify that this is the source of the usage. If so, you can mitigate this by running the [BGREWRITEAOF ↗](#) command.
- Switching Lua Scripting to `off` for plans with preexisting instances can cause upgrade errand failures. For information about resolving this issue, see [Upgrade errand fails with Unknown command eval ↗](#).

## v1.10.3

Release Date: February 2, 2018

## Compatibility

Component	Version
Stemcell	3445.x
PCF	v1.11.x and v1.12.x
cf-redis-release	v431.2.0
on-demand-service-broker	v0.19.0
consul	v187.0.0
routing	v0.163.0
service-metrics	v1.5.11
service-backup	v18.1.9
syslog-migration	v10.0.0
loggregator	v97.0
Redis OSS	v3.2.11

## Known Issues

- The redis-odb service broker listens on port `12345`. This is inconsistent with other services, but has no effect on tile operations.

- The **When Changed** option for errands has unexpected behavior. Do not select this choice as an errand run-rule. For more information about this unexpected behavior, see [Errand Run Rules ↗](#).
- Due to a bug with the properties migration logic, tile upgrades in some PCF installations may be blocked.
- Default persistence is set to full persistence using an AOF file. If an instance is restarted frequently—for example, for upgrades—this file can grow significantly, leading to very large persistent disk usage. If your Redis instance has significantly larger persistent disk usage than expected, check the size of your `appendonly.aof` file, usually at `/var/vcap/store/redis`, to verify that this is the source of the usage. If so, you can mitigate this by running the [BGREWRITEAOF ↗](#) command.
- Switching Lua Scripting to `off` for plans with preexisting instances can cause upgrade errand failures. For information about resolving this issue, see [Upgrade errand fails with Unknown command eval ↗](#).

## v1.10.2

Release Date: January 22, 2018

### Features

- `lua-timeout-limit`, a Redis configuration that is exposed to app developers through arbitrary parameters, has been disabled for security concerns.

### Compatibility

Component	Version
Stemcell	3445.x
PCF*	v1.11.x and v1.12.x
cf-redis-release	v431.2.0
on-demand-service-broker	v0.19.0
consul	v187.0.0
routing	v0.163.0
service-metrics	v1.5.11
service-backup	v18.1.9
syslog-migration	v10.0.0
loggregator	v97.0
Redis OSS	v3.2.11

### Known Issues

- The redis-odb service broker listens on port `12345`. This is inconsistent with other services, but has no effect on tile operations.
- The **When Changed** option for errands has unexpected behavior. Do not select this choice as an errand run-rule. For more information about this unexpected behavior, see [Errand Run Rules ↗](#).
- Due to a bug with the properties migration logic, tile upgrades in some PCF installations may be blocked.
- Default persistence is set to full persistence using an AOF file. If an instance is restarted frequently—for example, for upgrades—this file can grow significantly, leading to very large persistent disk usage. If your Redis instance has significantly larger persistent disk usage than expected, check the size of your `appendonly.aof` file, usually at `/var/vcap/store/redis`, to verify that this is the source of the usage. If so, you can mitigate this by running the [BGREWRITEAOF ↗](#) command.
- Switching Lua Scripting to `off` for plans with preexisting instances can cause upgrade errand failures. For information about resolving this issue, see [Upgrade errand fails with Unknown command eval ↗](#).

## v1.10.1

Release Date: November 15, 2017

## Compatibility

Component	Version
Stemcell	3445.x
PCF	v1.11.x and v1.12.x
cf-redis-release	v431.1.0
on-demand-service-broker	v0.17.2
consul	v178.0.0
routing	v0.162.0
service-metrics	v1.5.10
service-backup	v18.1.6
syslog-migration	v10.0.0
loggregator	v97.0.0
Redis OSS	v3.2.11

## v1.10.0

Release Date: October 10, 2017

## Features

- Includes metrics for the on-demand service. This enables operators to monitor the health of their Redis instances.
- Introduces a new format for on-demand metrics. This is the standard format for all services and will eventually replace other formats.
- Uses a new release for syslog that allows the operator to configure the log format to be either the pre-existing one or RFC5424. RFC5424 is the standard format for PCF services. The previous format will eventually be deprecated.
- Enables TLS encryption for syslog forwarding.
- Lua Scripting defaults to off for all on-demand service plans. Pivotal's security recommendation is to keep Lua Scripting turned off.
- Allows the operator to opt-out of the on-demand service without configuring on-demand plans.

## Compatibility

Component	Version
Stemcell	3445.x
PCF	v1.11.x and v1.12.x
cf-redis-release	v431.0.0
on-demand-service-broker	v0.17.0
consul	v178.0.0
routing	v0.162.0
service-metrics	v1.5.7
service-backup	v18.1.0
syslog-migration	v9.0.0
loggregator	v97.0.0
Redis OSS	v3.2.8

## Known Issues

- `lua-timeout-limit`, a Redis configuration that is exposed to app developers through arbitrary parameters, does not have any effect due to a bug in Redis v3.2.8.

- The redis-odb service broker listens on 12345. This is inconsistent with other services.
- The **When Changed** option for errands has [unexpected behavior](#) in what changes trigger the errand. Do not select this option for errands.
- Logs for service-backup and service-metrics releases are truncated when syslog is not configured.
- Due to a bug with the properties migration logic, tile upgrades in some PCF installations may be blocked.
- Default persistence is set to full persistence using an AOF file. If an instance is restarted frequently—for example, for upgrades—this file can grow significantly, leading to very large persistent disk usage. If your Redis instance has significantly larger persistent disk usage than expected, check the size of your `appendonly.aof` file, usually at `/var/vcap/store/redis`, to verify that this is the source of the usage. If so, you can mitigate this by running the [BGREWRITEAOF](#) command.
- Switching Lua Scripting to `off` for plans with preexisting instances can cause upgrade errand failures. For information about resolving this issue, see [Upgrade errand fails with Unknown command eval](#).

## Is Redis for PCF right for your enterprise?

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This topic provides recommended use cases for Redis for Pivotal Cloud Foundry (PCF) and information for determining the product's fit for your enterprise's use case.

### Recommended Use Cases

Dedicated-VM and Shared-VM plans are designed for datastore use cases. On-Demand plans, introduced in Redis for PCF v1.8, are configured by default for cache use cases but can also be used as a datastore.

Redis can be used in many different ways, including:

- Key/value store: For strings and more complex data structures including Hashes, Lists, Sets, and Sorted Sets
- Session cache: Persistence enabled preservation of state
- Full page cache: Persistence enabled preservation of state
- Database cache: Middle-tier database caching to speed up common queries
- Data ingestion: Because Redis is in memory, it can ingest data very quickly
- Message Queues: List and set operations. `PUSH`, `POP`, and blocking queue commands.
- Leaderboards and Counting: Increments and decrements sets and sorted sets using `ZRANGE`, `ZADD`, `ZREVRANGE`, `ZRANK`, `INCRBY`, and `GETSET`
- Pub/Sub: Built in publish and subscribe operations: `PUBLISH`, `SUBSCRIBE`, and `UNSUBSCRIBE`

Successful use cases handle the downtime that occurs with the Redis for PCF service. This happens in two ways:

- For use cases with lower availability requirements, write simple failover logic that enables the app to work while Redis for PCF is down.
- For use cases with higher availability requirements, write more complex failover logic that enables the app to failover to another singleton Redis for PCF instance.

### Service Offerings

For descriptions of the three Redis for PCF service offerings, see:

- [On-Demand Service Offering](#)
- [Dedicated-VM and Shared-VM Service Offerings](#)

 **Note:** The Shared-VM service should only be used for development and testing. Do not use for production.

### Enterprise-Readiness Checklist

Review the following table to determine if Redis for PCF has the features needed to support your enterprise.

Resilience		More Information
Availability	All Redis for PCF services are single nodes without clustering capabilities. This means that planned downtime, for example, upgrades, can result in 2–10 minutes of downtime, depending on the nature of the upgrade. Unplanned downtime, for example, VM failure, also affects the Redis service. Redis for PCF has been used successfully in enterprise-ready apps that can tolerate downtime. Pre-existing data is not lost during downtime with the default persistence configuration. Successful apps include those where the downtime is passively handled or the app handles failover logic.	<a href="#">Recommended Use Cases</a> <a href="#">Support for Multiple AZs</a>
Failure Recovery	VM failures and process failures are handled automatically by BOSH and Redis for PCF. Manual backup and restore instructions are available for all three Redis services. Automatic backup capabilities are enabled for the Dedicated-VM service.	<a href="#">Manual Backup and Restore</a> <a href="#">Flow ↗</a> <a href="#">Automatic Backups for Dedicated-VM</a>

		Service
Isolation	Isolation is provided when using the On-Demand and Dedicated-VM service. Individual apps and workflows should have their own Redis for PCF instance to maximize isolation.	
<b>Day 2 Operations</b>		<b>More Information</b>
Resource Planning	Operators can configure the number of VMs and the size of those VMs. For the On-Demand service, the operator does this by creating plans with specific VM sizes and quotas for each plan. For the Dedicated-VM and Shared-VM services, the number and size of VMs are pre-provisioned by the operator. BOSH errands used for registration, upgrade and cleanup use short-lived VMs that cannot be configured but can be turned on or off.	<a href="#">On-Demand Resource Planning ↗</a> <a href="#">Pre-provisioning Dedicated-VM and Shared-VM Instances ↗</a>
Health Monitoring	The On-Demand service and Dedicated-VM service emit metrics. These include Redis-specific metrics and Redis for PCF metrics. Guidance on critical metrics and alerting levels is captured with the Redis for PCF KPIs.	<a href="#">KPIs</a>
Scalability	For the On-Demand Service, the operator can configure three plans with different resource sizes. The operator can also scale up the VM size associated with the plan. Additionally, the operator can increase the quota, which caps the number of instances allowed for each On-Demand plan. For the Dedicated-VM Service, the operators can change the number of dedicated nodes deployed as well as change the VM size associated for the Dedicated-VMs. To prevent data loss, only scaling up is supported. For the Shared-VM Service, the operators can change the Redis instance memory limit as well as change the instance limit. To prevent data loss, only scaling up is supported.	<a href="#">Scaling the On-Demand Service</a> <a href="#">Scaling the Dedicated-VM Service</a>
Logging	All Redis services emit logs. Operators can configure syslog forwarding to a remote destination. This enables viewing logs from every VM in the Redis for PCF deployment in one place, effective troubleshooting when logs are lost on the source VM, and setting up alerts for important error logs to monitor the deployment.	<a href="#">Configuring syslog forwarding</a>
Customization	The On-Demand service can be configured to best fit the needs of a specific app. The Dedicated-VM and Shared-VM service cannot be customized.	<a href="#">Configuring the On-Demand service</a>
Upgrades	For information about preparing an upgrade and about understanding the effects on your Redis for PCF and other services, see <a href="#">Upgrading Redis for PCF</a> . Redis for PCF upgrades run a post deployment BOSH errand called smoke tests to validate the success of the upgrade.	<a href="#">Upgrades Smoke Tests</a>
<b>Encryption</b>		<b>More Information</b>
Encrypted Communication in Transit	Redis for PCF has been tested with the IPsec Add-on for PCF. Beyond that Redis for PCF does not provide additional encryption on top of Redis.	<a href="#">Securing Data in Transit with the IPsec add-on ↗</a> <a href="#">OS Redis Security ↗</a>

## Support for Multiple AZs

Redis for PCF supports configuring multiple availability zones (AZs). However, assigning multiple AZs to Redis instances does not guarantee high availability as clustered Redis is not supported. Redis instances operate as single nodes.

- On-Demand plans can be configured to deploy instances to any AZ.
- Shared-VM instances run on a single node in the AZ in which the tile is deployed.
- Dedicated-VM instances can be assigned to any of the configured AZs.

## On-Demand Service Offering

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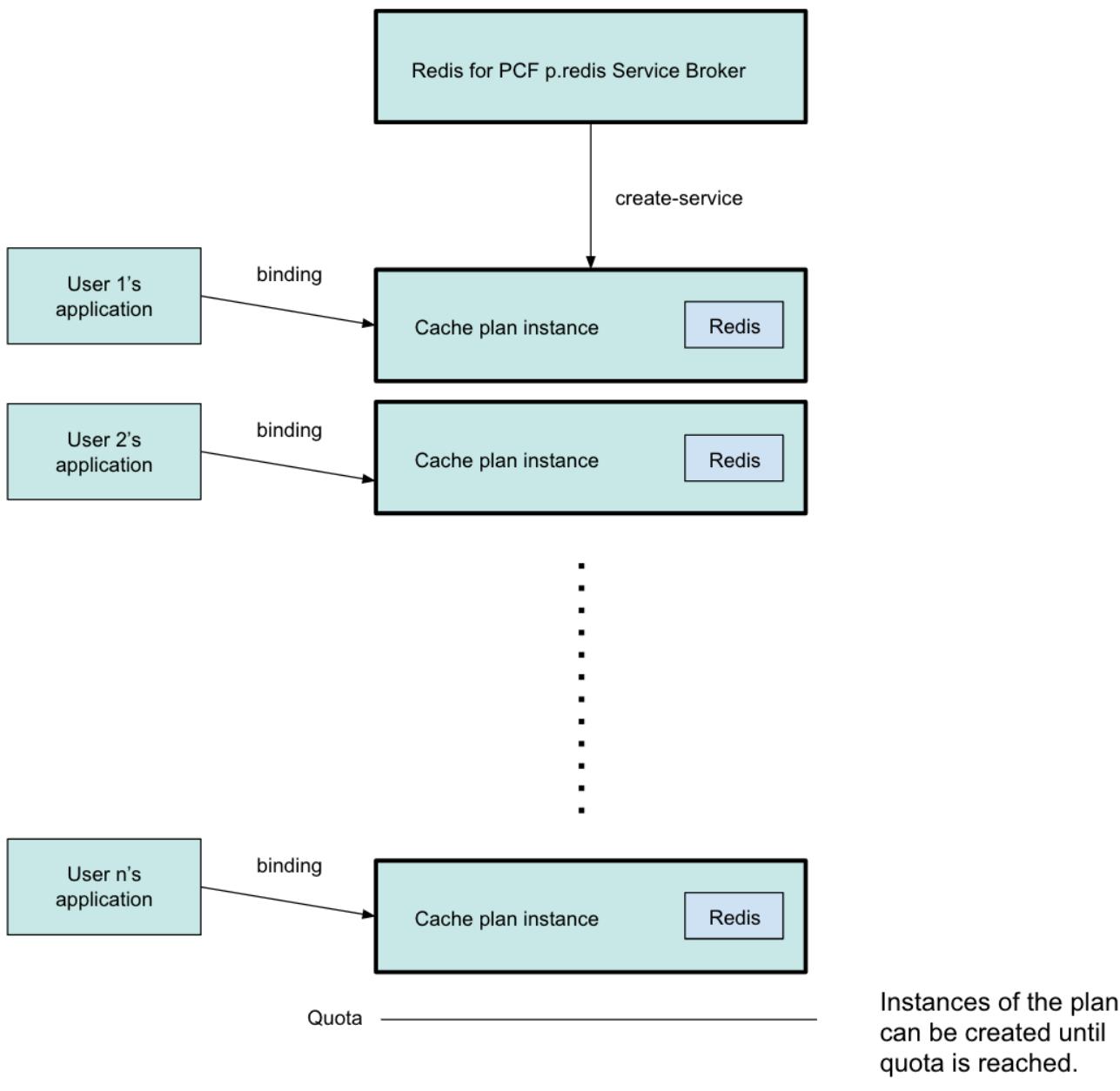
Redis for PCF offers On-Demand, Dedicated-VM, and Shared-VM service plans. This section describes the architecture, lifecycle, and configurations of the on-demand plan, as well as networking information for the on-demand service. For similar information for the Dedicated-VM and Shared-VM plans, see [Dedicated-VM and Shared-VM Service Offerings](#).

## Architecture Diagram for On-Demand Plan

This diagram shows the architecture of the service broker and on-demand plans and how the user's app binds to a Redis instance.

The p.redis service broker manages the On-Demand service plan instances.

Plans are configured by the operator in Ops Manager. Instances of the plans are created by the App Developer on-demand up to a set quota. The per-plan and global quota is specified by the operator.



## On-Demand Service Plans

## Three On-Demand Cache Plans

On-demand plans are best fit for cache use cases and are configured as such by default.

Redis for PCF offers three on-demand plans as the `p.redis` service within the PCF Redis tile. Below is a description of each plan as it appears in the Marketplace and its intended use case.

- **Small Cache Plan:** A Redis instance deployed to a dedicated VM, suggested to be configured with ~1 GB of memory and >3.5 GB of persistent disk.
- **Medium Cache Plan:** A Redis instance deployed to a dedicated VM, suggested to be configured with ~2 GB of memory and >10 GB of persistent disk.
- **Large Cache:** A Redis instance deployed to a dedicated VM, suggested to be configured with ~4 GB of memory and >14 GB of persistent disk.

For each service plan, the operator can configure the **Plan name**, **Plan description**, **Server VM type** and **Server Disk type**, or choose to disable the plan completely.

## Features of On-Demand Service Plans

- Each on-demand service instance is deployed to its own VM and is suitable for production workloads.
- The service plans are operator-configured and enabled. Once enabled, app developers can view the available plans in the Marketplace and provision a Redis instance from that plan.
- Operators can update the cache plan settings, including the VM size and disk size, after the plans have been created.
- Operators and app developers can change certain Redis configurations from the default. See [Configuration for On-Demand Service Plans](#) for more information.
- The default `maxmemory-policy` is `allkeys-lru` and can be updated for other cache policies.
- The maximum number of instances is managed by a per-plan and global quota. The maximum number of instances cannot surpass 50. For information on setting quotas, see [Setting Limits for On-Demand Service Instances](#).

## Configuration of On-Demand Service Plans

For on-demand plans, certain Redis configurations can be set by the operator during plan configuration, and by the app developer during instance provisioning. Other Redis configurations cannot be changed from the default.

## Operator Configurable Redis Settings

The Redis settings that an operator can configure in the tile UI include:

- Redis Client Timeout
- Redis TCP Keepalive
- Max Clients
- Lua Scripting
- Plan Quota

For more information, see [Additional Redis Configurations](#).

## App Developer Configurable Redis Settings

The Redis settings that an app developer can configure include:

- `maxmemory-policy`
- `notify-keyspace-events`
- `slowlog-log-slower-than`
- `slowlog-max-len`.

For more information, see [Customize an On-Demand Service Instance](#).

## Operator Notes for On-Demand Service Plans

- Instances of the on-demand plan can be deployed until their number reaches either an operator-set per-plan quota or a global quota. For information on setting quotas, see [Setting Limits for On-Demand Service Instances](#).

- Instances are provisioned based on the [On-Demand Services SDK](#) and service broker adapter associated with this plan.
- `maxmemory` in `redis.conf` is set to 45% of the system memory.
- Any on-demand plan can be disabled from the plan page in Ops Manager.

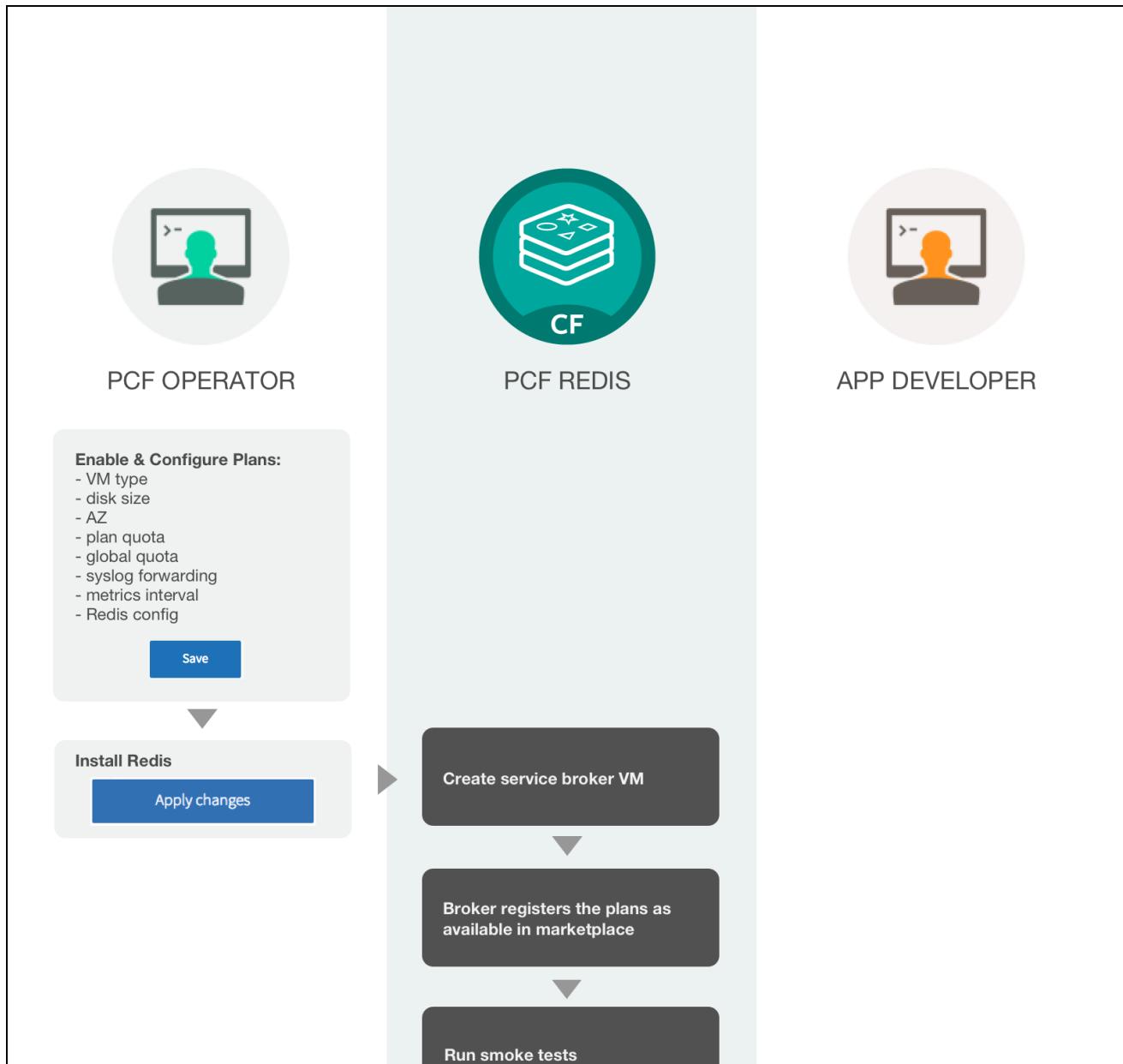
## Known Limitations for On-Demand Service Plans

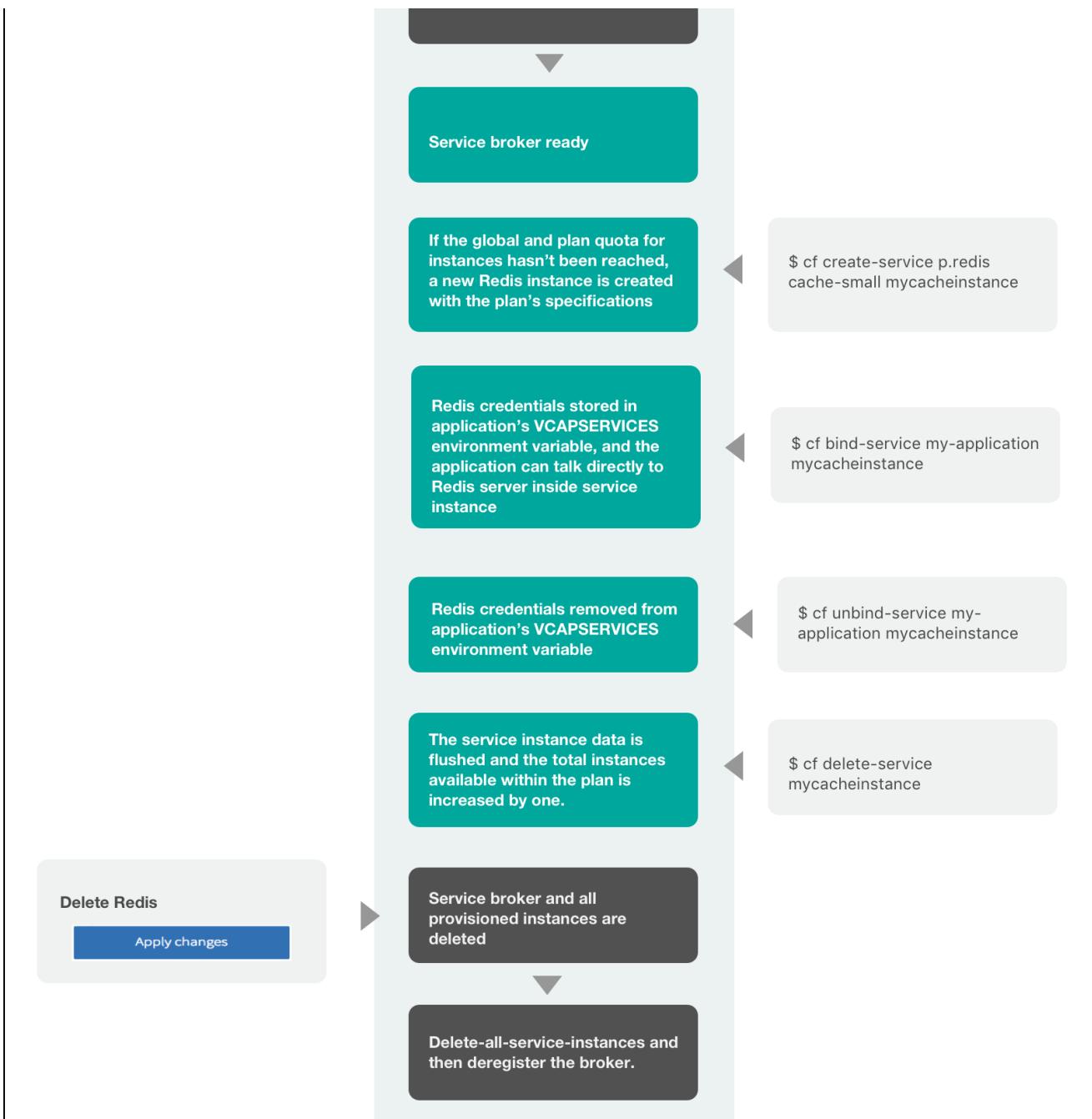
Limitations for the On-Demand Service include:

- Operators must not downsize the VMs or disk size as this can cause data loss in pre-existing instances.
- Operators can update certain plan settings after the plans have been created. To ensure upgrades happen across all instances, set the `upgrade instances` errand to `On`.
- If the operator updates the VM size, disk size, or the Redis configuration settings (enabling Lua Scripting, max-clients, timeout, and TCP keep-alive), these settings are implemented in all instances already created.
- Backups are not available for on-demand plans.

## Lifecycle for On-Demand Service Plan

Here is the lifecycle of Redis for PCF, from an operator installing the tile through an app developer using the service then an operator deleting the tile.





## Dedicated-VM and Shared-VM Service Offerings

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Redis for Pivotal Cloud Foundry (PCF) offers On-Demand, Dedicated-VM, and Shared-VM service plans. This section describes the architecture, lifecycle, and configurations of Dedicated-VM and Shared-VM plans. For similar information for the On-Demand service plan, see [On-Demand Service Offering](#).

### About the Pre-Provisioned Plans

Redis for PCF includes two pre-provisioned service plans:

- **Dedicated-VM Plan**

An instance of this plan provisions a single Redis process on a single **dedicated VM**. This plan is suitable for production workloads and workloads that require isolation or dedicated hardware.

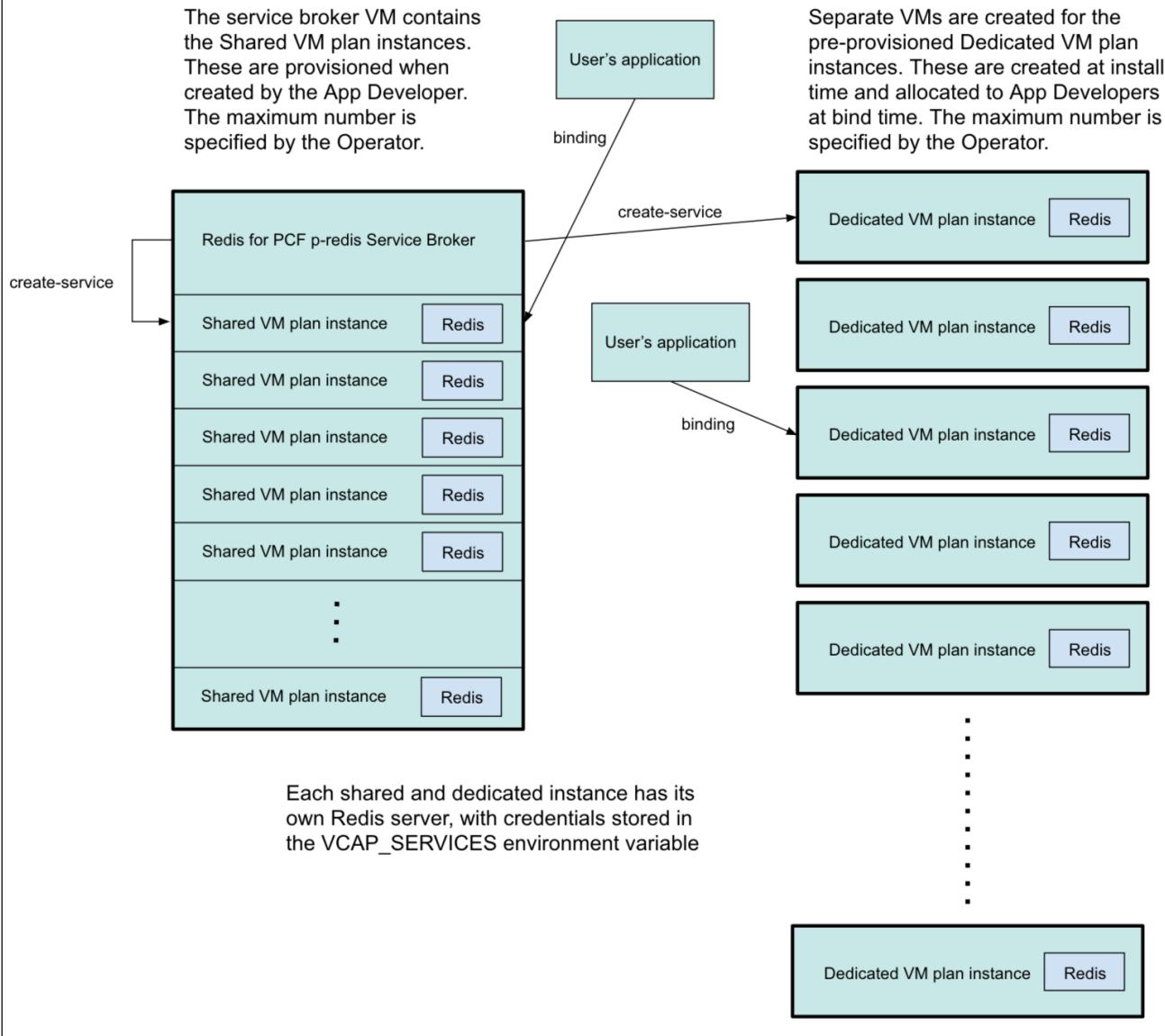
- **Shared-VM Plan**

An instance of this plan provisions a single Redis process on a single **shared VM**. This plan is suitable for workloads which do not require dedicated hardware.

### Architecture Diagram for Shared and Dedicated Plans

This diagram shows how the architecture of the service broker and Shared-VM and Dedicated-VM plans and how the user's app binds to a Redis instance.

The p-redis service broker manages the shared-vm and dedicated-vm plan service instances.



## Configuration for Dedicated-VM and Shared-VM Service Plans

For Dedicated-VM and Shared-VM plans, the default Redis configurations cannot be changed. A sample `redis.conf` from a Dedicated-VM plan instance is provided [here](#).

- Redis is configured with a `maxmemory-policy` of `no-eviction`. This policy means that when the memory is full, the service does not evict any keys or perform any write operations until memory becomes available.
- Persistence is configured for both `RDB` and `AOF`.
- By default, the maximum number of connections, `maxclients`, is set at 10000. Redis might reduce this number when run on a system with a low maximum number of file descriptors. You can retrieve the actual setting on your Redis service instances with the Redis command `CONFIG GET maxclients`. You can use the Redis command `CONFIG SET maxclients` to temporarily reduce `maxclients`, but you cannot increase it above 10000. There is no way to configure shared and dedicated plans to use a custom limit.
- Replication and event notification are not configured.

## Configuration for the Dedicated-VM Service Plan

An instance of this plan provisions a single Redis process, on a single dedicated VM. This plan is suitable for production workloads and workloads that require isolation or dedicated hardware.

## Operator Notes for the Dedicated-VM Service Plan

- The following Redis commands are enabled:
  - MONITOR
  - SAVE
  - BGSAVE
  - BGREWRITEAOF
- The `maxmemory` value for the Redis process is set to be 45% of the RAM for that instance.
- The persistent disk should be set to be at least the size of the RAM available to the VM or greater, in order to account for the final and temporary RDB file generated by the Redis background save.
- This plan deploys the operator-configured number of dedicated Redis VMs alongside a single service broker VM.
- These instances are pre-provisioned during the deployment of the tile from Ops Manager into a **pool**. The VMs are provisioned and configured with a Redis process ready to be used when an instance of the `dedicated-vm` plan is requested.
- A default deployment provisions `5 instances` of the `dedicated-vm` plan into the **pool**. This number can be increased on the `Resource Config` tab in Ops Manager, either in the initial deployment or thereafter. The number of VMs **cannot** be decreased once deployed.
- When a user provisions an instance, it is marked as in use and taken out of the **pool**.
- When a user deprovisions an instance, the instance is cleansed of any data and configuration to restore it to a fresh state and placed back into the pool, ready to be used again.
- This plan can be disabled by setting the number of instances of the `Dedicated node` job in Ops Manager to `0`.
- The number of Dedicated-VM plan instances available to developers is set by the operator. Configurations of up to 100 Dedicated-VM plan instances have been tested.
- You can disable this plan by setting the number of instances of the `Dedicated node` job in Ops Manager to `0`.

## Known Limitations of the Dedicated-VM Service Plan

Limitations of the `dedicated-vm` plan include:

- No ability to change the Redis configuration. The `CONFIG` command is disabled.
- Cannot scale down the number of VMs on the plan once deployed.
- Cannot scale down the size of VMs on the plan once deployed (this protects against data loss).

## Configuration for the Shared-VM Service Plan

An instance of this plan provisions a single Redis process on a single **shared VM**. This plan is suitable for workloads which do not require dedicated hardware.

## Operator Notes for the Shared-VM Plan

- This plan deploys a Redis instance in a shared VM and a single service broker VM.
- This plan can be disabled by setting the `Max instances limit` on the `Shared-VM Plan` tab in Ops Manager to be `0`.
- The maximum number of instances can be increased from the default 5 to the value that you want. If you increase the number of instances that can be run on this single VM, you should consider increasing the resources allocated to the VM, in particular RAM and CPU. You can overcommit to some extent, but may start to see performance degradations.
- You can also increase the maximum amount of RAM allocated to each Redis process (service instance) that is running on this VM
- If you decrease the service instance limit, any instances that are running where the count is now greater than the limit are not terminated. They are left to be removed naturally, until the total count drops below the new limit you cannot create any new instances.

For example if you had a limit of 10 and all were used and reduced this to 8, the two instances will be left running until you terminate them yourself.

- The number of Shared VM instances available to developers is set by the operator. The maximum number of shared VM instances is relative to the memory allocated to each Shared VM instance and the total memory of the Redis service broker. For details, see [Configuring Service Plans](#).

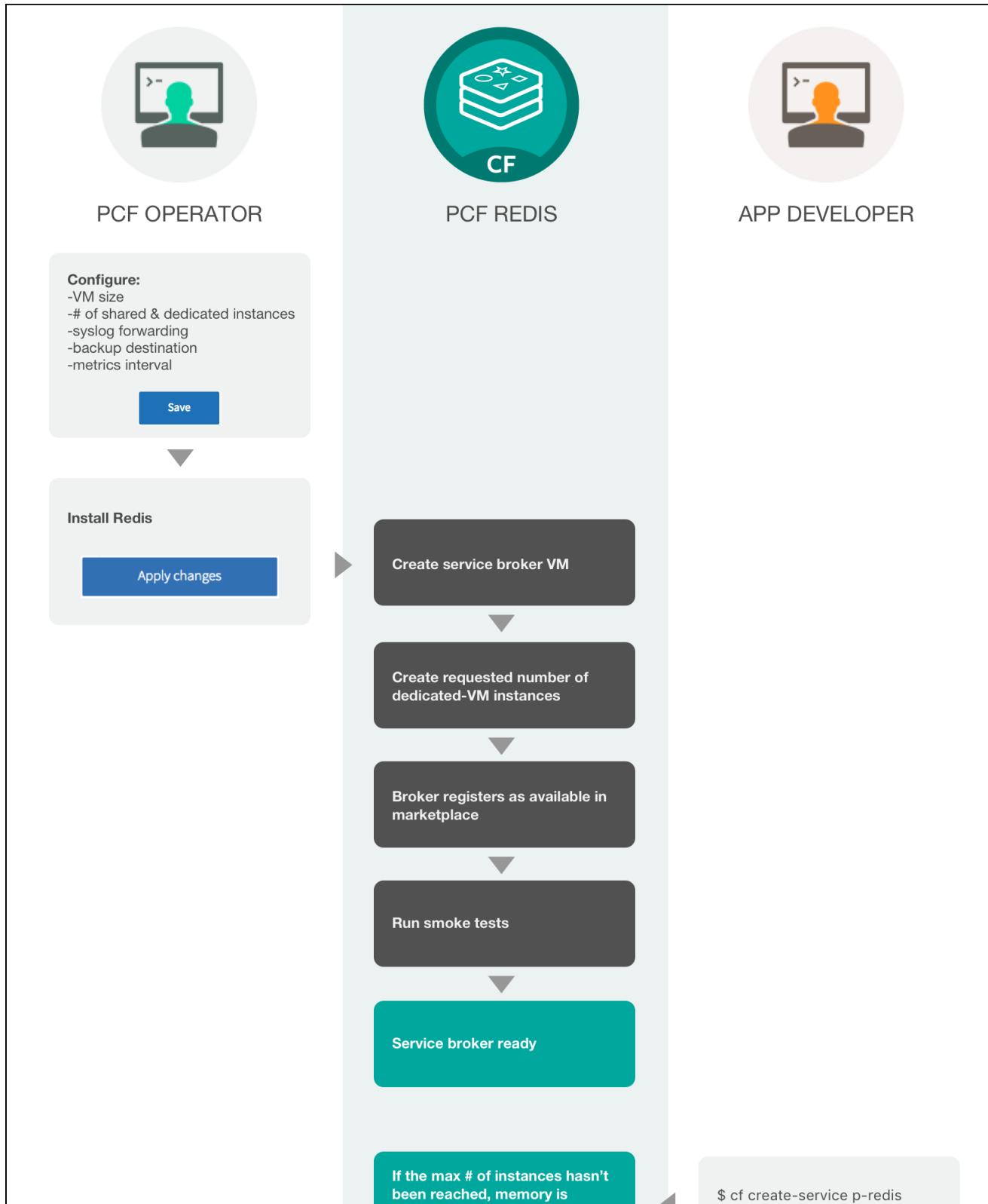
## Known Limitations of the Shared-VM Plan

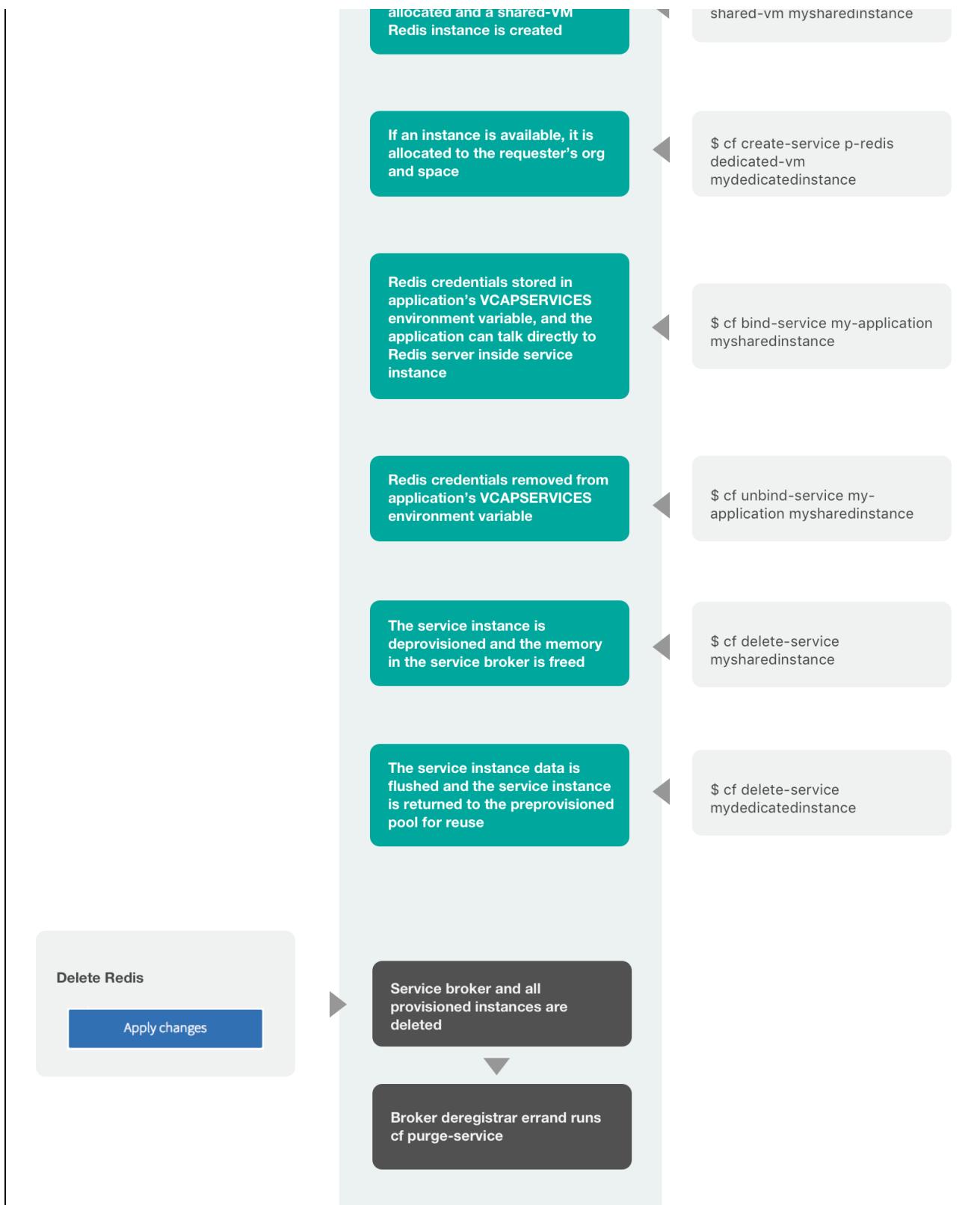
Limitations of the `shared-vm` plan include:

- It cannot be scaled beyond a single VM.
- The following commands are disabled: `CONFIG`, `MONITOR`, `SAVE`, `BGSAVE`, `SHUTDOWN`, `BGREWRITEAOF`, `SLAVEOF`, `DEBUG`, and `SYNC`.
- Constraining CPU and/or disk usage is not supported.
- Because the Shared-VM plan does not manage “noisy neighbor” problems, Pivotal does not recommend it for production apps.

## Lifecycle for Dedicated-VM and Shared-VM Service Plans

Here is the lifecycle of Redis for PCF, from an operator installing the tile through an app developer using the service then an operator deleting the tile.





## Networking for On-Demand Services

Page last updated:

This section describes networking considerations for the Redis for Pivotal Cloud Foundry (PCF) on-demand service.

## BOSH 2.0 and the Service Network

When you deploy PCF, you must create a statically defined network to host the component virtual machines that constitute the PCF infrastructure.

PCF components, like the Cloud Controller and UAA, run on this infrastructure network. In PCF v2.0 and earlier, on-demand PCF services require that you host them on a network that runs separately from this network.

Cloud operators pre-provision service instances from Ops Manager. Then, for each service, Ops Manager allocates and recovers static IP addresses from a pre-defined block of addresses.

To enable on-demand services in PCF v2.0 and earlier, operators must create a service networks in Ops Manager Director and select the **Service Network** checkbox. Operators then can select the service network to host on-demand service instances when they configure the tile for that service.

## Default Network and Service Network

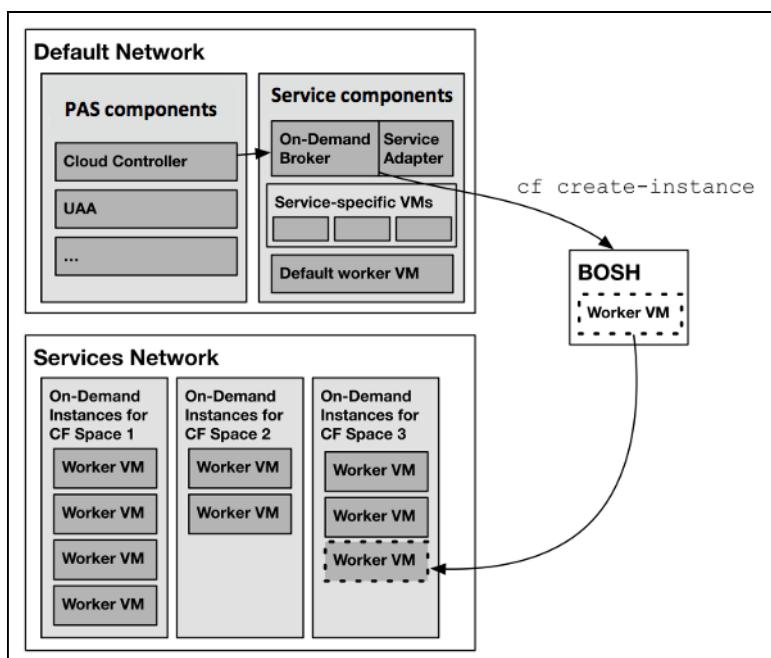
On-demand PCF services rely on the BOSH 2.0 ability to dynamically deploy VMs in a dedicated network. The on-demand service broker uses this capability to create single-tenant service instances in a dedicated service network.

On-demand services use the dynamically-provisioned service network to host the single-tenant worker VMs that run as service instances within development spaces. This architecture lets developers provision IaaS resources for their service instances at creation time, rather than the operator pre-provisioning a fixed quantity of IaaS resources when they deploy the service broker.

By making services single-tenant, where each instance runs on a dedicated VM rather than sharing VMs with unrelated processes, on-demand services eliminate the “noisy neighbor” problem when one application hogs resources on a shared cluster. Single-tenant services can also support regulatory compliance where sensitive data must be compartmentalized across separate machines.

An on-demand service splits its operations between the default network and the service network. Shared components of the service, such as executive controllers and databases, run centrally on the default network along with the Cloud Controller, UAA, and other PCF components. The worker pool deployed to specific spaces runs on the service network.

The diagram below shows worker VMs in an on-demand service instance running on a separate services network, while other components run on the default network.



## Required Networking Rules for On-Demand Services

Prior to deploying any service tile that uses the on-demand broker (ODB), the operator must request the network connections needed to allow various components of Pivotal Cloud Foundry (PCF) to communicate with ODB. The specifics of how to open those connections varies for each IaaS.

The following table shows the responsibilities of the key components in an on-demand architecture.

Key Components	Their Responsibility
BOSH Director	Creates and updates service instances as instructed by ODB
BOSH Agent	BOSH includes an Agent on every VM that it deploys. The Agent listens for instructions from the Director and carries out those instructions. The Agent receives job specifications from the Director and uses them to assign a role, or Job, to the VM.
BOSH UAA	As an OAuth2 provider, BOSH UAA issues tokens for clients to use when they act on behalf of BOSH users.
ERT	Contains the apps that are consuming services
ODB	Instructs BOSH to create and update services, and connects to services to create bindings
Deployed service instance	Runs the given data service (for example, the deployed Redis for PCF service instance runs the Redis for PCF data service)

Regardless of the specific network layout, the operator must ensure network rules are set up so that connections are open as described in the table below.

This component...	Must communicate with...	Default TCP Port	Communication direction(s)	Notes
ODB	<ul style="list-style-type: none"> <li>BOSH Director</li> <li>BOSH UAA</li> </ul>	<ul style="list-style-type: none"> <li>25555</li> <li>8443</li> </ul>	One-way	The default ports are not configurable.
ODB	ERT	8443	One-way	The default port is not configurable.
Errand VMs	<ul style="list-style-type: none"> <li>ERT</li> <li>ODB</li> <li>Deployed Service Instances</li> </ul>	<ul style="list-style-type: none"> <li>8443</li> <li>8080</li> <li>6379</li> <li>12345</li> </ul>	One-way	The default ports are not configurable.
BOSH Agent	BOSH Director	4222	Two-way	The BOSH Agent runs on every VM in the system, including the BOSH Director VM. The BOSH Agent initiates the connection with the BOSH Director. The default port is not configurable.
Deployed apps on ERT	Deployed service instances	6379	One-way	This is the default port where Redis is deployed.
ERT	ODB	12345	One-way	The default port is not configurable.

For a complete list of ports and ranges used in Redis for PCF, see [Network Configuration](#).

## Redis for PCF Security

Page last updated:

### Security

Pivotal recommends the following best practices for security:

- (Required) To allow this service to have network access you must create Application Security Groups. For more information, see [Networks, Security, and Assigning AZs](#).
- Run Redis for PCF in its own network. For more information about creating service networks, see [Creating Networks in Ops Manager](#).
- You can use Redis for PCF with the IPsec Add-on for PCF. For information about the IPsec Add-on for PCF, see [Securing Data in Transit with the IPsec Add-on](#).
- Do not use a single Redis for PCF instance for multi-tenancy. A single Redis instance of the On-Demand or Dedicated-VM service should only support a single workload.
- The Shared-VM service is designed for multi-tenancy, but you should not use it for production use cases because it is not considered adequately secure for that purpose.
- Never change the network that a pre-existing Dedicated-VM deployment works with. If the network is changed, the bindings for the existing Dedicated-VM instances stop working, but these instances still appear as available to new apps. Because the existing instances might have data on them and new apps can bind to them, data might unintentionally be leaked to new apps that bind to these instances.

## Introduction for Operators

Page last updated:

This topic is for Pivotal Cloud Foundry (PCF) operators. It introduces some best practices, but does not provide details about operation.

## Best Practices

Pivotal recommends that operators follow these guidelines:

- **Resource Allocation**—Work with app developers to anticipate memory requirements and to configure VM sizes. Instances of Dedicated-VM and Shared-VM services have identical VM sizes. However, with the On-Demand service, app developers can choose from three different plans, each with its own VM size and quota. See the service offering for the [On-Demand Plan](#) and [Resource Usage Planning for On-Demand plans](#).
- **Logs**—Configure a syslog output. Storing logs in an external service helps operators debug issues both current and historical. See [Configure Syslog Output](#).
- **Monitoring**—Set up a monitoring dashboard for metrics to track the health of the installation.
- **Backing Up Data**—When using Redis for persistence, configure automatic backups so that data can be restored in an emergency. Validate the backed-up data with a test restore. On-Demand instances are configured for cache uses and are not intended for backups. See [Configuring Automated Backups](#) and [Manually Backing up and Restoring ↗](#).
- **Using**—Instances of the On-Demand and Dedicated-VM services run on dedicated VMs. Apps in production should have a dedicated instance to prevent performance issues caused by sharing an instance. The Shared-VM service does not provide a Dedicated-VM per instance, and Pivotal recommends that you only use it for development and testing. See the service offerings for the [On-Demand Plan](#) and the [Dedicated and Shared Plans](#).

## Redis Key Count and Memory Size

Redis can handle up to  $2^{32}$  keys, and was tested in practice to handle at least 250 million keys per instance. Every hash, list, set, and sorted set, can hold  $2^{32}$  elements. VM memory is more likely to be a limiting factor than number of keys that can be handled.

## Errands

Redis for PCF includes the errands listed below.

### Post-Deploy Errands

- **Broker Registrar**—Registers the cf-redis-broker with PCF to offer the `p-redis` service (`shared-vm` and `dedicated-vm` plans).
- **Smoke Tests**—Runs lifecycle tests for `shared-vm` and `dedicated-vm` plans if these have been enabled and there is remaining quota available. The tests cover provisioning, binding, reading, writing, unbinding, and deprovisioning of service instances.
- **Register On-Demand Broker**—Registers the on-demand Redis broker with PCF to offer the `p.redis` service (on-demand plans).
- **On-Demand Smoke Tests**—Runs lifecycle tests for enabled plans of the `p.redis` service if there is remaining quota available. The tests cover provisioning, binding, reading, writing, unbinding and deprovisioning of service instances.
- **Upgrade All On-Demand Service Instances**—Upgrades on-demand service instances to use the latest plan configuration, service releases, and stemcell.

The above post-deploy errands are run by default whenever **Apply Changes** is triggered, whether or not there has been a configuration change in the Redis for PCF tile itself.

### Pre-Delete Errands

- **Broker Deregistrar**—Deregisters the `cf-redis-broker`.
- **Delete All On-Demand Service Instances and Deregister Broker**—Deletes all on-demand instances and deregisters the on-demand Redis broker.

The above pre-delete errands are run by default whenever the Redis for PCF tile is deleted.

## Turning off Post-Deploy Errands

Pivotal recommends that you run the post-deploy errands at any trigger of [Apply Changes](#). However, this practice can extend the duration of applying changes by several minutes every time. This section helps you decide when it is safe to skip some post-deploy errands.

### Changes to Redis for PCF Tile Configuration

If the changes include configuration changes on the Redis for PCF tile or a new stemcell version, the operator must run all post-deploy errands.

### Installing Another Tile

When installing another tile that does not make any changes to the BOSH Director or Elastic Runtime tile, it is not necessary to run any of the Redis for PCF tile's post-deploy errands.

### Changes to Other Tiles

Sometimes the change does not include changes to the Redis for PCF tile's configuration. Then it might not be necessary to run all of the Redis for PCF tile's post-deploy errands.

#### Broker Registrar Errand

- Required to run if the CF system domain is changed in the Elastic Runtime tile.
- Not necessary to run if the change only involves other tiles except Elastic Runtime tile.

#### Register On-Demand Broker Errand

- Required to run if the network range that the Redis On-demand Broker is deployed in is changed in the BOSH Director tile.
- Not necessary to run if the change only involves other tiles except BOSH Director.

 Pivotal [recommends](#) against changing the BOSH Director's network configuration in a way that changes the ranges where the Redis for PCF tile deploys VMs.

#### Smoke Tests and On-Demand Smoke Tests Errands

- Required to run if their respective register broker errand is required.
- Required to run both if a newer stemcell minor version is uploaded. The Redis for PCF tile floats to the newest minor version. For more information, see [Understanding Floating Stemcells](#).
- Good practice to run both for any change in the BOSH Director or Elastic Runtime tile.
- Not necessary to run either if the change only involves other tiles except Elastic Runtime and BOSH Director.

#### Upgrade All On-Demand Service Instances Errand

- Required to run if a newer stemcell minor version is uploaded. The Redis for PCF tile floats to the newest minor version. For more information, see [Understanding Floating Stemcells](#).
- Not necessary to run if there are no on-demand instances provisioned.

## Smoke Tests

Ops Manager runs Redis for PCF smoke tests as a post-install errand. The operator can also run the smoke tests errand by running the command:

```
bosh2 -d REDIS-DEPLOYMENT-NAME run-errand smoke-tests
```

For more information, see [Redis for PCF Smoke Tests](#).

 **Note:** Smoke tests fail unless you enable global default application security groups (ASGs). You can enable global default ASGs by binding the ASG to the `system` org without specifying a space. To enable global default ASGs, use `cf bind-running-security-group`.

## Installing Redis for PCF

Page last updated:

### Download and Install the Tile

To add Redis for Pivotal Cloud Foundry (PCF) to Ops Manager, follow the procedure for adding PCF Ops Manager tiles:

1. Download the product file from [Pivotal Network](#). Select the latest release from the **Releases**: drop-down menu.
2. Upload the product file to your Ops Manager installation.
3. Click **Add** next to the uploaded product description in the Available Products view to add this product to your staging area.
4. (Optional) Click the newly added tile to configure your [possible service plans](#), [syslog draining](#), and [backups](#).
5. Click **Apply Changes** to install the service.

See the [network configuration](#) section for guidance on the ports and ranges used in the Redis service.

### Configure Redis for PCF Service Plans

Select the **Redis** tile in the Ops Manager Installation Dashboard to display the configuration page, and allocate resources to Redis service plans.

The screenshot shows the Redis configuration interface. At the top, there's a navigation bar with a back arrow labeled 'Installation Dashboard' and the title 'Redis'. Below the title are four tabs: 'Settings' (which is selected), 'Status', 'Credentials', and 'Logs'. On the left side, there's a sidebar with several configuration items, each preceded by a checked checkbox: 'Assign AZs and Networks', 'Shared-VM Plan', 'On-Demand Service Settings' (selected), 'Cache Plan 1', 'Cache Plan 2', 'Cache Plan 3', 'Metrics', 'Backups', 'Syslog', 'Errands', 'Resource Config', and 'Stemcell'. To the right of the sidebar, under 'On-Demand Service Settings', there's a field labeled 'Maximum service instances across all on-demand plans (min: 0, max: 50)\*' with the value '20' entered. A note says 'Upper limit is 50 instances'. Below this, there's a section for 'VM options' with a checkbox labeled 'Allow outbound internet access from service instances (IaaS-dependent)'. At the bottom right of the configuration area is a blue 'Save' button.

## On-Demand Service Settings

1. Create a [service network](#). From an IAAS perspective, creation of a service network is identical to any other network previously created for tiles on Ops Manager. The only change is that the Operator needs to mark the network as a “Service Network” in Ops Manager to instruct Ops Manager to not perform IP management in that network. If you wish to use Redis for PCF without the On-Demand service, you will still need to create an [empty service network](#) to install the tile.
2. Click **On-Demand Service Settings**, and then enter the **Maximum service instances across all on-demand plans**. The maximum number of instances you set for all your cache plans combined cannot exceed this number.

On-Demand Service Settings

Maximum service instances across all on-demand plans ( min: 0, max: 50 ) \*

20

VM options

Allow outbound internet access from service instances (IaaS-dependent)

List of VM options for Service Instances

Save

Review the guidance to understand the resource implications for on-demand instances. See [Resource Usage Planning for On-Demand plans](#).

3. Select the **Allow outbound internet access from service instances** checkbox. This checkbox must be ticked to allow external log forwarding, sending backup artifacts to external destinations, and communicating with an external BOSH blob store.

**Note:** Outbound network traffic rules also depend on your IaaS settings. Consult your Ops Manager administrator to ensure that your IaaS allows outbound traffic to the external networks you need.

4. Click **Cache Plan 1, 2, or 3** to configure it.

You can configure up to three cache plans with appropriate memory and disk sizes for your use case(s). Resource configuration options may vary on different IAASs.

The default names of the three cache plans provided reflect that instances of these plans are intended to be used for different cache sizes, as follows:

- **cache-small**: A Redis instance deployed to a dedicated VM, suggested to be configured with ~1 GB of memory and >3.5 GB of persistent disk
- **cache-medium**: A Redis instance deployed to a dedicated VM, suggested to be configured with ~2 GB of memory and >10 GB of persistent disk
- **cache-large**: A Redis instance deployed to a dedicated VM, suggested to be configured with ~4 GB of memory and >14 GB of persistent disk

Cache Plan 1 Configuration

Plan\*

Plan Inactive

Plan Active

Plan name \*

cache-small

Plan description \*

This plan provides a small dedicated Redis instance for your application.

Plan Quota ( min: 1, max: 100 ) \*

CF Service Access\*

Enabled for all orgs and spaces

Controls whether this service plan is displayed on the marketplace.

AZ to deploy Redis instances of this plan \*

- europe-west1-b
- europe-west1-c
- europe-west1-d

Server VM type\*

micro (cpu: 1, ram: 1 GB, disk: 8 GB)

Server Disk type\*

1 GB

Redis Client Timeout ( min: 0 ) \*

Redis TCP Keepalive ( min: 0 ) \*

Max Clients ( min: 1, max: 10000 ) \*

Lua Scripting

Configure the following settings for your cache plan(s). Any pre-populated default settings have been pre-configured according to the memory/disk size of each plan.

Field	Description
Plan	Select Active or Passive. An inactive plan does not need any further configuration.
Plan Name	Enter a name that will appear in the service catalog.
Plan Description	Enter a description that will appear in the service catalog. Specify details that will be relevant to app developers.
Plan Quota	App developers can create instances until this quota is reached. For more information, see <a href="#">Setting Limits for On-Demand Service Instances</a> .
CF Service Access	Select a service access level. This setting does not modify the permissions that have been previously set, and allows for manual access to be configured from the CLI.

AZ to deploy Redis instances of this plan	This is the AZ in which to deploy the Redis instances from the plan. This must be one of the AZs of the service network (configured in the Ops Manager Director tile).
Server VM type	Select the VM type. Pivotal recommends that the persistent disk should be at least 3.5x the VM memory.
Server Disk type	Select the disk type. Pivotal recommends that the persistent disk should be at least 3.5x the VM memory.
Redis Client Timeout	Redis Client Timeout refers to the server timeout for an idle client specified in seconds. The default setting is 3600. Adjust this setting as needed.
Redis TCP Keepalive	Redis TCP Keepalive refers to the interval (in seconds) at which TCP ACKS are sent to clients. The default setting is 60. Adjust this setting as needed.
Max Clients	Max Clients refers to the maximum number of clients that can be connected at any one time. Per plan, the default setting is 1000 for small, 5000 for medium and 10000 for large. Adjust this setting as needed.
Lua Scripting	Enable or disable Lua Scripting as needed. Pivotal recommends that Lua Scripting be disabled.

- Click the **Save** button.

## Updating On-Demand Service Plans

Operators can update certain settings after the plans have been created. If the Operator updates the VM size, disk size, or the Redis configuration settings (enabling Lua Scripting, max-clients, timeout and TCP keep-alive), these settings will be implemented in all instances that are already created.

Operators should not downsize the VMs or disk size as this can cause data loss in pre-existing instances. Additionally, Operators cannot make a plan that was previously active, inactive, until all instances of that plan have been deleted.

## Removing On-Demand Service Plans

If you want to remove the On-Demand Service from your tile, do the following:

- Go to the **Resource Config** page on the Redis for PCF tile, and set the **Redis On-Demand Broker** job instances to 0.
- Navigate to the **Errands** page on the Redis for PCF tile, and set the following errands to **off**:
  - Register On-demand Redis Broker
  - On-demand Broker Smoke Tests
  - Upgrade all On-demand Redis Service Instances
  - Deregister On-demand Redis Broker
- Create an empty service network. For instructions, see this [Knowledge Base article](#).
- Go to each of the three Cache Plan pages on the Redis for PCF tile, and set each cache plan to **Plan Inactive**. For example:

The screenshot shows the Redis On-Demand Service Settings page. On the left, there's a sidebar with tabs: Settings (which is selected), Status, Credentials, and Logs. Below the tabs is a list of options: Assign AZs and Networks (unchecked), Shared-VM Plan (checked), On-Demand Service Settings (checked), Cache Plan 1 (unchecked), Cache Plan 2 (unchecked), and Cache Plan 3 (unchecked). The main content area is titled "Cache Plan 1 Configuration". It contains a "Plan\*" label with two radio buttons: "Plan Inactive" (selected) and "Plan Active". At the bottom right of this section is a blue "Save" button.

## Shared-VM Plan

Shared-VM plan configuration

Redis Instance Memory Limit \*

Enter the maximum memory limit per Redis instance. Examples: 50KB, 100MB, 1G, etc.

Redis Service Instance Limit \*

**Save**

1. Select the **Shared-VM Plan** tab.

2. Configure these fields:

- **Redis Instance Memory Limit**—Maximum memory used by a shared-VM instance
- **Redis Service Instance Limit**—Maximum number of shared-VM instances

Memory and instance limits depend on the total system memory of your Redis broker VM and require some additional calculation. For more information, see [Memory Limits for Shared-VM Plans](#) below.

3. Click **Save**.

4. If you do not want to use the on-demand service, you must make all of the on-demand service plans inactive. Click the tab for each on-demand plan, and select **Plan Inactive**. See the example in Step 4 of [Removing On-Demand Service Plans](#) above.

5. To change the allocation of resources for the Redis broker, click the **Resource Config** tab.

The Redis broker server runs all of the Redis instances for your Shared-VM plan. From the **Resource Config** page, you can change the CPU, RAM, Ephemeral Disk, and Persistent Disk made available, as needed.

### Memory Limits for Shared-VM Plans

Additional calculation is required to configure memory limits for shared-VM plans. With these plans, several service instances share the VM, and the Redis broker also runs on this same VM. Therefore, the memory used by all the shared-vm instances combined should be at most 45% of the memory of the Redis broker VM.

To configure the limits in these fields, estimate the maximum memory that could be used by all your Redis shared-VM instances combined. If that figure is higher than 45% of the Redis broker VM's total system memory, you can do one of the following:

- Decrease the **Redis Instance Memory Limit**.
- Decrease the number of instances in **Redis Service Instance Limit**.
- Increase the RAM for the Redis Broker in the **Resource Config** tab as shown below.

<b>Redis Broker</b>	Automatic: 1	Automatic: 10 GB	Automatic: medium (cpu: 2, ram: 4 GB, disk: 100 GB)
Dedicated Node	Automatic: 5	Automatic: 5 GB	Automatic: micro.cpu (cpu: 2, ram: 2 GB, disk: 100 GB)
Broker Registrar	Automatic: 1	None	Automatic: micro (cpu: 1, ram: 1 GB, disk: 100 GB)
Broker Deregistrar	Automatic: 1	None	Automatic: micro (cpu: 1, ram: 1 GB, disk: 100 GB)
Smoke Tests	Automatic: 1	None	Automatic: micro (cpu: 1, ram: 1 GB, disk: 100 GB)

**Save**

Here are some examples for setting these limits:

Redis Broker VM Total Memory	Redis Instance Memory Limit	Redis Service Instance Limit
100 GB	512 MB	5

16 GB 16 GB 64 GB	512 MB 256 MB 512 MB	14 28 56
-------------------------	----------------------------	----------------

**Note:** It is possible to configure a larger **Redis Service Instance Limit**, if you are confident that the majority of the deployed instances will not use a large amount of their allocated memory, for example in development or test environments.

However, this practice is not supported and can cause your server to run out of memory, preventing users from writing any more data to any Redis shared-VM instance.

## Dedicated-VM Plan

**Note:** As of Redis for PCF v1.11, the on-demand service is at feature parity with the dedicated-VM service. The dedicated-VM service plan will be deprecated. Pivotal recommends using the on-demand service plan.

- To configure the Dedicated-VM plan, click the **Resource Config** tab to change the allocation of resources for the **Dedicated Node**.

- The default configuration creates five dedicated nodes (VMs). Each node can run one Redis dedicated-VM instance.
- You can change the number of dedicated nodes, and configure the size of the persistent and ephemeral disks, and the CPU and RAM for each node.
- The default VM size is small. It is important that you set the correct VM size to handle anticipated loads.
- With dedicated-VM plans, there is one Redis service instance on each VM. The maximum memory an instance can use should be at most 45% of the total system RAM on the VM. You can set this with the `maxmemory` configuration. The app can use 100% of `maxmemory` –that is, up to 45% of the system RAM.
- Pivotal recommends the persistent disk be set to 3.5x the amount of system RAM.

- Click the **Save** button.
- You must disable the On-Demand Service if you do not wish to use it. Please see the directions [here](#).

## Configure Resources for Dedicated-VM and Shared-VM Plans

To configure resources for the Shared-VM and Dedicated-VM plans, click the **Resource Config** settings tab on the Redis for PCF tile.

- The Shared-VM plan is on the **Redis Broker** resource.
- The Dedicated-VM plan is on the **Dedicated Node** resource.

The following are the default resource and IP requirements for Redis for PCF when using the Shared-VM or Dedicated-VM plans:

Product	Resource	Instances	CPU	Ram	Ephemeral	Persistent	Static IP	Dynamic IP
Redis	Redis Broker	1	2	3072	4096	9216	1	0
Redis	Dedicated Node	5	2	1024	4096	4096	1	0
Redis	Broker Registrar	1	1	1024	2048	0	0	1
Redis	Broker De-Registrar	1	1	1024	2048	0	0	1
Redis	Compliation	2	2	1024	4096	0	0	1

## Disable Shared and Dedicated VM Plans

You can disable Shared and Dedicated VM Plans by doing the following while configuring Redis tile:

1. Ensure at least one On-Demand plan is active.
2. Configure the following tabs:
  - o **Shared-VM Plan:**
    - a. Set **Redis Service Instance Limit** to 0.
    - b. Click **Save**.
  - o **Errands:**
    - a. Set **Broker Registrar** to Off.
    - b. Set **Smoke Tests** to Off.
    - c. Set **Broker Deregistrar** to Off.
    - d. Leave all four On-Demand errands On.
    - e. Click **Save**.
  - o **Resource Config:**
    - a. Decrease **Redis Broker** Persistent disk type to the smallest size available.
    - b. Decrease **Redis Broker** VM type to the smallest size available.
    - c. Set **Dedicated Node Instances** to 0.
    - d. Click **Save**.

## Additional Redis Configurations

The operator can configure further properties per plan beyond memory and disk sizes. Appropriate defaults have been pre-configured according to the memory/disk size of each plan.

Operators can update certain plan settings after the plans have been created. If the Operator updates the VM size, disk size, or the Redis configuration settings (enabling Lua Scripting, max-clients, timeout and TCP keep-alive), these settings will be implemented in all instances already created. Operators should not downsize the VMs or disk size as this can cause data loss in pre-existing instances.

The following table describes properties that operators can update in the [configuration page](#).

Property	Default	Description
Redis Client Timeout	3600	Server timeout for an idle client specified in seconds (e.g., 3600)
Redis TCP Keepalive	60	The max number of connected clients at the same time
Max Clients	1000/5000/10000 (small/medium/large)	The max number of connected clients at the same time
Lua Scripting	Enabled	Enable/Disable Lua scripting
Plan Quota	20	Maximum number of Redis service instances for this plan, across all orgs and spaces. For more information, see <a href="#">Setting Limits for On-Demand Service Instances</a> .

For settings that app developers can configure, see [Customize an On-Demand Service Instance](#).

## Configure Syslog Forwarding

Pivotal recommends that operators configure syslog forwarding to a remote destination. Forwarding your system logs to a remote destination enables:

- Viewing logs from every VM in the Redis for PCF deployment in one place
- Effective troubleshooting when logs are lost on the source VM
- Setting up alerts for important error logs to monitor the deployment

All logs follow the RFC5424 format.

Follow these steps to configure syslog forwarding:

1. Click the Redis for PCF tile to display the configuration page, and then click the **Syslog** tab on the sidebar navigation.

### Configure properties for PCF Redis syslog forwarding

Do you want to configure syslog forwarding for PCF Redis?\*

No  
 Yes without encryption  
 Yes with TLS encryption

Address \*

Port \*

Transport protocol \*

Format for logs from dedicated-vm and shared-vm services \*

Permitted peer \*

TLS CA certificate \*  

```
-----BEGIN CERTIFICATE-----
MIICWjCCAcMCAgGIMA0GCSqGSIb3DQEBAUAMHuxCzAJBgNVBAYTAIVTMRgwFgYDVQ
QKEw9HVEUg
Q29ycG9yYXRpb24xJzAlBgNVBAsThkdURSBDeWJlclRydXN0IFNvbHV0aW9ucywgSW5jLj
EjMCEG
-----END CERTIFICATE-----
```

**Save**

2. Select either the **Yes without encryption** or the **Yes with TLS encryption** radio button.

**Note:** To use syslog for on-demand instances you must enable outbound internet access in the **On-Demand Service Settings** tab.

3. Enter the Syslog address and port, and select the transport protocol of your remote destination. You can only use TCP if you are using TLS encryption.

The information required for these fields is provided by your remote destination. Address should be something such as `logs.papertrailapp.com`, and the port will be a number such as `41635`.

4. Select the format for your logs. [RFC5424](#) is the suggested format.

For instances of the Redis on-demand plan, all logs follow RFC5424 format. Instances of the Dedicated-VM and Shared-VM plans allow for the Operator to select their log format to be either their legacy format or RFC5424. PCF is moving toward all syslogs consistently using RFC5424 format.

5. If you selected **Yes with TLS encryption**, complete these fields:

- Permitted Peer refers to the remote syslog destination. It allows each VM to establish an encrypted tunnel with the remote syslog destination.

The Permitted Peer is either the accepted fingerprint (SHA1) or name of the remote peer, for example `*.example.com`.

- **TLS CA certificate** refers to the trusted certificate authorities for the remote syslog destination. Large certificate chains (> 8kb) are not supported.

6. Click **Save**.

## Networks, Security, and Assigning AZs

### Network Configuration

Pivotal recommends that each type of Redis for PCF service run in its own network. For example, run a Redis for PCF on-demand service on a separate network from a Redis for PCF shared-VM service.

The following ports and ranges are used in this service:

Port	Protocol	Direction and Network	Reason
8300 8301	TCP TCP and UDP	Inbound to CloudFoundry network, outbound from service broker and service instance networks*	Communication between the CF consul_server and consul_agents on Redis deployment; used for metrics
4001 (for PCF v1.11 only)	TCP	Inbound to CloudFoundry network, outbound from service broker and service instance networks*	Used by the Redis metron_agent to forward metrics to the CloudFoundry etcd server (for PCF v1.11 only)
12350	TCP	Outbound from CloudFoundry to the cf-redis-broker service broker network	(Only if using a cf-redis-broker) Access to the cf-redis-broker from the cloud controllers.
12345	TCP	Outbound from CloudFoundry to the on-demand service broker network	(Only if using an On-Demand service) For access to the on-demand service broker from the cloud controllers
6379	TCP	Outbound from CloudFoundry to any service instance networks (dedicated-node and on-demand)	Access to all dedicated nodes and on-demand nodes from the Diego Cell and Diego Brain network(s)
32768-61000	TCP	Outbound from CloudFoundry to the cf-redis-broker service broker network	From the Diego Cell and Diego Brain network(s) to the service broker VM. This is only required for the shared service plan.
80 or 443 (Typically)	http or https respectively	Outbound from any service instance networks	Access to the backup blobstore
8443 25555	TCP	Outbound from any on-demand service broker network to the bosh director network	For the on-demand service, the on-demand service broker needs to talk to <code>bosh director</code>

\* Typically the service broker network and service instance network(s) are the same.

### Application Security Groups

To allow this service to have network access you must create [Application Security Groups \(ASGs\)](#). Ensure your security group allows access to the Redis Service Broker VM and Dedicated VMs configured in your deployment. You can obtain the IP addresses for these VMs in Ops Manager under the **Resource Config** section for the Redis tile.

 **Note:** Without ASGs, this service is unusable.

### Application Container Network Connections

Application containers that use instances of the Redis service require the following outbound network connections:

Destination	Ports	Protocol	Reason
<code>ASSIGNED_NETWORK</code>	32768-61000	tcp	Enable application to access shared vm service instance
<code>ASSIGNED_NETWORK</code>	6379	tcp	Enable application to access dedicated vm service instance

Create an ASG called `redis-app-containers` with the above configuration and bind it to the appropriate space or, to give all started apps access, bind to the `default-running` ASG set and restart your apps. Example:

```
[  
 {  
   "protocol": "tcp",  
   "destination": "ASSIGNED_NETWORK",  
   "ports": "6379"  
 }  
]
```

## Assigning AZs

As of Redis for PCF 1.9, you can assign multiple AZs to Redis jobs, however this will not guarantee high availability.

For more information, see [About Multiple AZs in Redis for PCF](#).

### AZ and Network Assignments

Place singleton jobs in

eu-west-1a  
 eu-west-1b

Balance other jobs in

eu-west-1a  
 eu-west-1b

Network

**Save**

## Validating Installation

Smoke tests are run as part of Redis for PCF installation to validate that the install succeeded. Smoke tests are described [here](#).

## Uninstalling Redis for PCF

To uninstall Redis for PCF, do the following:

1. In the PCF Ops Manager Installation dashboard, click the trash can icon in the lower right hand corner of the Redis for PCF tile.
2. Confirm deletion of the product, and then click **Apply Changes**.

## Upgrading Redis for PCF

Page last updated:

This section contains the upgrade procedure and upgrade paths for Redis for PCF.

### Compatible Upgrade Paths

Consider the following compatibility information before upgrading Redis for PCF.

For more information, see the [Product Version Matrix](#).

Ops Manager Version	Supported Upgrades for Redis Installations	
	From	To
<b>v1.5.x, v1.6.x</b>	v1.4.0 – v1.4.3	v1.4.4 – latest v1.4.x v1.5.0 – v1.5.7
	v1.4.4 – latest v1.4.x	Next v1.4.x – latest v1.4.x v1.5.0 – latest v1.5.x
	v1.5.0 – latest v1.5.x	Next v1.5.x – latest v1.5.x
<b>v1.7.x</b>	v1.5.0 – latest version	v1.5.1 – latest version
<b>v1.8.x</b>	v1.5.17 – latest version	v1.6.0 – latest version
<b>v1.9.x – latest version</b>	v1.6.0 – latest version	v1.8.0 – latest version
<b>v1.10.0 – v1.10.2</b>	v1.7.2 – latest version	v1.8.0 – latest version
<b>v1.10.9 – latest version</b>	v1.7.2 – latest version	v1.9.0 – latest version
<b>v1.11.x</b>	v1.9.0 – latest version	1.10.0 – latest version
<b>v1.12.x</b>	v1.10.0 – latest version	

### Upgrade Redis for PCF

This product enables a reliable upgrade experience between versions of the product that is deployed through Ops Manager.

For information on the upgrade paths for each released version, see the above table.

To upgrade Redis for PCF, do the following:

1. Download the latest version of the product from [Pivotal Network](#).
2. Upload the new `.pivotal` file to Ops Manager.
3. If required, upload the stemcell associated with the update.
4. If required, update any new mandatory configuration parameters.
5. Click **Apply changes**. The rest of the process is automated.

During the upgrade deployment each Redis instance experiences a small period of downtime as each Redis instance is updated with the new software components. This downtime is because the Redis instances are single VMs operating in a non HA setup.

The length of the downtime depends on whether there is a stemcell update to replace the operating system image, or whether the existing VM can simply have the redis software updated. Stemcell updates incur additional downtime while the IaaS creates the new VM, whereas updates without a stemcell update are faster.

Ops Manager ensures the instances are updated with the new packages and any configuration changes are applied automatically.

Upgrading to a newer version of the product does not cause any loss of data or configuration.

## Downtime During Upgrades and Redeploys

A redeploy causes downtime of the Redis for PCF tile. This section clarifies what events trigger a redeploy.

### Ops Manager Changes

In Ops Manager, any field that changes the manifest causes a redeploy of the Redis for PCF tile.

### Elastic Runtime Changes

In Elastic Runtime, changes to any of the following properties can trigger downtime:

- `..cf.consul_apis` —Consul Server Resource Config
- `$runtime.system_domain` —Runtime System Domain
- `..cf.ha_proxy.skip_cert_verify.value` —Disable SSL certificate verification for this environment in Elastic Runtime
- `$runtime.apps_domain` —Runtime Apps Domain
- `..cf.nats.ips` —NATS Resource Config
- `$self.service_network` —Service Networks in Ops Manager

When the operator applies any of the above changes to Elastic Runtime, downtime is triggered for the following:

- Redis On-Demand Broker in Redis for PCF v1.8 and later
- Dedicated-VM and Shared-VM Services in Redis for PCF v1.9 and earlier

### Upgrading all Service Instances

- For Redis for PCF v1.8 and later, downtime for service instances occurs only after the operator runs the `upgrade-all-service-instances` BOSH errand, after all tile upgrades are completed successfully.
- Any change to a field on the Redis for PCF tile causes BOSH to redeploy both the legacy and the On-Demand Redis Brokers after the operator runs the `upgrade-all-service-instances` errand.

## Network Changes after Deployment

This section explains how changing the network after deploying Redis for PCF affects instances and apps.

### Dedicated and Shared VMs

To change the network for dedicated-VM and shared-VM services, click **Assign AZs and Networks** in the Redis for PCF tile configuration and use the **Network** dropdown. The network applies to both shared-VM and dedicated-VM services.

You can also change the network by altering the CIDR in the Ops Manager Director tile.

Pivotal discourages changing the network that a pre-existing dedicated-VM deployment or shared-VM deployment works with.

If the network is changed, app bindings for existing dedicated-VM and shared-VM instances might stop working. Dedicated-VMs might also be reallocated as new service instances without their data being cleaned, resulting in a data leak between apps.

### On-Demand Service Instances

To change the service network for on-demand service instances, click **Assign AZs and Networks** in the Redis tile configuration and use the **Service Network** dropdown. The service network applies to on-demand service instances.

You can also change the service network by altering the CIDR in the Ops Manager Director tile.

If you change the service network, you must unbind and rebind existing apps to the on-demand Redis instance.

New on-demand service instances are placed into the new service network, but existing on-demand service instances are not moved. If you need to move the data in on-demand Redis instances to a new service network, you must create a new instance, migrate the data manually, and delete the old instance.

Similarly, changing the availability zone for an on-demand plan only applies to new on-demand instances and does not alter existing instances.

## Release Policy

When a new version of Redis is released, Pivotal aims to release a new version of Redis for PCF containing the new Redis version soon after.

When a new version of Redis or another dependent software component, such as the stemcell, is released due to a critical CVE, Pivotal's goal is to release a new version of the Redis for PCF within 48 hours.

## Setting Limits for On-Demand Service Instances

On-demand provisioning is intended to accelerate app development by eliminating the need for development teams to request and wait for operators to create a service instance. However, to control costs, operations teams and administrators must ensure responsible use of resources.

There are several ways to control the provisioning of on-demand service instances by setting various **quotas** at these levels:

- [Global](#)
- [Plan](#)
- [Org](#)
- [Space](#)

After you set quotas, you can:

- [View Current Org and Space-level Quotas](#)
- [Monitor Quota Use and Service Instance Count](#)
- [Calculate Resource Costs for On-Demand Plans](#)

## Create Global-level Quotas

Each Pivotal Cloud Foundry (PCF) service has a separate service broker. A global quota at the service level sets the maximum number of service instances that can be created by a given service broker. If a service has more than one plan, then the number of service instances for all plans combined cannot exceed the global quota for the service.

The operator sets a global quota for each PCF service independently. For example, if you have Redis for PCF and RabbitMQ for PCF, you must set a separate global service quota for each of them.

When the global quota is reached for a service, no more instances of that service can be created unless the quota is increased, or some instances of that service are deleted.

The global quota is set in the service tile in Ops Manager, shown for an example service below.

 **Note:** This is an example image only. The following screen may look slightly different for your service or release version.

 PCF Ops Manager

[◀ Installation Dashboard](#)

## RabbitMQ

Settings Status Credentials Logs

- Assign AZs and Networks
- RabbitMQ
- Networking
- RabbitMQ Policy
- Syslog
- On Demand Instance: Global Settings
- On Demand Instance: Plan 1
- On Demand Instance: Plan 2
- On Demand Instance: Plan 3
- On Demand Instance: Plan 4
- On Demand Instance: Plan 5
- Errands
- Resource Config
- Stemcell

### Global Service Plan Configuration

Service Instance Quota ( min: 0, max: 50 ) \*

Set the total number of dedicated service instances which can be deployed (max = 50)

VM Options

Allow outbound internet access (IaaS-dependent)

**Save**

## Create Plan-level Quotas

A service may offer one or more plans. You can set a separate quota per plan so that instances of that plan cannot exceed the plan quota. For a service with multiple plans, the total number of instances created for all plans combined cannot exceed the [global quota](#) for the service.

When the plan quota is reached, no more instances of that plan can be created unless the plan quota is increased or some instances of that plan are deleted.

The plan quota is set in the service tile in Ops Manager, shown for an example service plan below.

 **Note:** This is an example image only. The following screen may look slightly different for your service or release version.

 PCF Ops Manager

[◀ Installation Dashboard](#)

## RabbitMQ

Settings Status Credentials Logs

- Assign AZs and Networks
- RabbitMQ
- Networking
- RabbitMQ Policy
- Syslog
- On Demand Instance: Global Settings
- On Demand Instance: Plan 1
- On Demand Instance: Plan 2
- On Demand Instance: Plan 3
- On Demand Instance: Plan 4
- On Demand Instance: Plan 5
- Errands
- Resource Config
- Stemcell

### Plan 3 Configuration

Please read the documentation before changing any of these settings, as improper use can lead to data loss.

**Enable This Plan\***

Plan Disable  
 Plan Enable

**CF Service Access\***

**Plan Name \***

**Plan Description \***

RabbitMQ dedicated cluster

**Plan Features \***

RabbitMQ

**Plan Quota ( min: 0, max: 50 ) \***

Set the total number of dedicated service instances which can be deployed (max = 50)

**Number of Nodes ( min: 1, max: 7 ) \***

**Network Partition Behaviour\***

**AZ Placement \***

us-central1-a  
 us-central1-b  
 us-central1-c

**RabbitMQ VM Type\***

**Persistent Disk Type\***

I acknowledge that I have configured the Persistent Disk Size to be at least 2x the amount of RAM of the selected VM type\*

Acknowledge

## Create and Set Org-level Quotas

An org-level quota applies to all PCF services and sets the maximum number of service instances an organization can create within PCF. For example, if you set your org-level quota to 100, developers can create up to 100 service instances in that org using any combination of PCF services.

When this quota is met, no more service instances of any kind can be created in the org unless the quota is increased or some service instances are deleted.

To create and set an org-level quota, do the following:

1. Run this command to create a quota for service instances at the org level:

```
cf create-quota QUOTA-NAME -m TOTAL-MEMORY -i INSTANCE-MEMORY -r ROUTES -s SERVICE-INSTANCES --allow-paid-service-plans
```

where these variables are:

**QUOTA-NAME** —A name for this quota  
**TOTAL-MEMORY** —Maximum memory used by all service instances combined  
**INSTANCE-MEMORY** —Maximum memory used by any single service instance  
**ROUTES** —Maximum number of routes allowed for all service instances combined  
**SERVICE-INSTANCES** —Maximum number of service instances allowed for the org

For example:

```
cf create-quota myquota -m 1024mb -i 16gb -r 30 -s 50 --allow-paid-service-plans
```

2. Associate the quota you created above with a specific org by running the following command:

```
cf set-quota ORG-NAME QUOTA-NAME
```

For example: `cf set-quota dev_org myquota`

For more information on managing org-level quotas, see [Creating and Modifying Quota Plans](#).

## Create and Set Space-level Quotas

A space-level service quota applies to all PCF services and sets the maximum number of service instances that can be created within a given space in PCF. For example, if you set your space-level quota to 100, developers can create up to 100 service instances in that space using any combination of PCF services.

When this quota is met, no more service instances of any kind can be created in the space unless the quota is updated or some service instances are deleted.

To create and set a space-level quota, do the following:

1. Run the following command to create the quota:

```
cf create-space-quota QUOTA -m TOTAL-MEMORY -i INSTANCE-MEMORY -r ROUTES -s SERVICE-INSTANCES --allow-paid-service-plans
```

where these variables are:

**QUOTA-NAME** —A name for this quota  
**TOTAL-MEMORY** —Maximum memory used by all service instances combined  
**INSTANCE-MEMORY** —Maximum memory used by any single service instance  
**ROUTES** —Maximum number of routes allowed for all service instances combined  
**SERVICE-INSTANCES** —Maximum number of service instances allowed for the org

For example: `cf create-space-quota myspacequota -m 1024mb -i 16gb -r 30 -s 50 --allow-paid-service-plans`

2. Associate the quota you created above with a specific space by running the following command:

```
cf set-space-quota SPACE-NAME QUOTA-NAME
```

For example:

```
cf set-space-quota myspace myspacequota
```

For more information on managing space-level quotas, see [Creating and Modifying Quota Plans](#).

## View Current Org and Space-level Quotas

To view **org** quotas, run the following command.

```
cf org ORG-NAME
```

To view **space** quotas, run the following command:

```
cf space SPACE-NAME
```

For more information on managing org and space-level quotas, see the [Creating and Modifying Quota Plans](#).

## Monitor Quota Use and Service Instance Count

Service-level and plan-level quota use, and total number of service instances, are available through the on-demand broker metrics emitted to Loggregator. These metrics are listed below:

Metric Name	Description
on-demand-broker/SERVICE-NAME/quota_remaining	Quota remaining for all instances across all plans
on-demand-broker/SERVICE-NAME/PLAN-NAME/quota_remaining	Quota remaining for a specific plan
on-demand-broker/SERVICE-NAME/total_instances	Total instances created across all plans
on-demand-broker/SERVICE-NAME/PLAN-NAME/total_instances	Total instances created for a specific plan

**Note:** Quota metrics are not emitted if no quota has been set.

## Calculate Resource Costs for On-Demand Plans

On-demand plans use dedicated VMs, disks, and various other resources from an IaaS, such as AWS. To calculate maximum resource cost for plans individually or combined, you multiply the quota by the cost of VM and Persistent Disk types selected in the plan configuration(s). The specific costs depend on your IaaS.

The image below shows an example of the VM type and persistent disk selected, as well as the quota for this plan.

The form displays the following settings:

- Plan Quota**: (min: 0, max: 50) \*  
Value: 15
- AZ Placement \***
  - europe-west1-b
  - europe-west1-c
  - europe-west1-d
- VM Type\***  
micro.cpu (cpu: 2, ram: 2 GB, disk: 8 GB)
- Persistent Disk Type\***  
20 GB

**Important:** Although operators can limit on-demand instances with plan quotas and a global quota, as described in the above topics, IaaS resource usage still varies based on the number of on-demand instances provisioned.

## Calculate Maximum Resource Cost Per On-Demand Plan

To calculate the maximum cost of VMs and persistent disk for each plan, do the following calculation:

#### plan quota x cost of selected resources

For example, if you selected the options in the above image, you have selected a VM type **micro.cpu** and a persistent disk type **20 GB**, and the plan quota is **15**. The VM and persistent disk types have an associated cost for the IaaS you are using. Therefore, to calculate the maximum cost of resources for this plan, multiply the cost of the resources selected by the plan quota:

$$(15 \times \text{cost of micro.cpu VM type}) + (15 \times \text{cost of 20 GB persistent disk})$$

## Calculate Maximum Resource Cost for All On-Demand Plans

To calculate the maximum cost for all plans combined, add together the maximum costs for each plan. This assumes that the sum of your individual plan quotas is less than the global quota.

Here is an example:

$$(\text{plan1 quota} \times \text{plan1 resource cost}) + (\text{plan2 quota} \times \text{plan2 resource cost}) = \text{max cost for all plans}$$

## Calculate Actual Resource Cost of all On-Demand Plans

To calculate the current actual resource cost across all your on-demand plans:

1. Find the number of instances currently provisioned for each active plan by looking at the `total_instance` metric for that plan.
2. Multiply the `total_instance` count for each plan by that plan's resource costs. Record the costs for each plan.
3. Add up the costs noted in Step 2 to get your total current resource costs.

For example:

$$(\text{plan1 total instances} \times \text{plan1 resource cost}) + (\text{plan2 total instances} \times \text{plan2 resource cost}) = \text{current cost for all plans}$$

## Configuring Automated Backups for Redis for PCF

Page last updated:

### Creating Backups of Redis Instances

You can configure backups to be run for all instances, across dedicated-VM and shared-VM service plans. **Backups are not available for On-Demand instances.**

The key features are:

- Runs on a configurable schedule
- Every instance is backed up, across both service plans
- The Redis broker statefile is backed up
- For each backup artefact, a file is created that contains the MD5 checksum for that artifact. This can be used to validate that the artefact is not corrupted.
- You can configure AWS S3, SCP, Azure or Google Cloud Storage as your destination
- Data from Redis is flushed to disk, before the backup is started by running a `BGSAVE` on each instance
- Backups are labelled with timestamp, instance GUID and plan name

### Configuring Backups

To enable backups, you will first need to choose your backup destination type - AWS S3, SCP, Azure or Google Cloud Storage.

Click on the tile in Ops Manager, followed by the `Backups` link on the left-hand menu.

Redis

Settings Status Credentials Logs

Assign AZs and Networks

Shared-VM Plan

Metrics

Backups

Syslog

Errands

Resource Config

Stemcell

Configure blob store for Redis backups

Backup configuration\*

Disable Backups

AWS S3

SCP

Azure

GCS

Save

### S3 Backup Fields

## Configure blob store for Redis backups

### Backup configuration\*

- Disable Backups
- AWS S3

### Access Key ID \*

Optional field dependent upon your blobstore configuration

### Secret Access Key \*

### Endpoint URL

### Bucket Name \*

### Bucket Path \*

### Cron Schedule \*

### Backup timeout \*

- SCP
- Azure
- GCS

Field	Description	Mandatory/Optional
Access Key ID	The access key for your S3 account	Mandatory
Secret Access Key	The Secret Key associated with your Access Key	Mandatory
Endpoint URL	The endpoint of your S3 account, e.g. <code>http://s3.amazonaws.com</code>	Optional, defaults to <code>http://s3.amazonaws.com</code> if not specified
Bucket Name	Name of the bucket you wish the files to be stored in.	Mandatory
Path	Path inside the bucket to save backups to.	Mandatory
Backup timeout	The amount of time, in seconds, that the backup process waits for the BGSAVE command to complete on your instance, before transferring the RDB file to your configured destination	Mandatory
Cron Schedule	Backups schedule in crontab format. For example, once daily at 2am is <code>* 2 * * *</code> . Also accepts a pre-defined schedule: any of <code>@yearly</code> , <code>@monthly</code> , <code>@weekly</code> , <code>@daily</code> , <code>@hourly</code> , or <code>@every &lt;time&gt;</code> , where <code>&lt;time&gt;</code> is any supported time string (e.g. <code>1h30m</code> ). For more information, see <a href="#">the cron package documentation</a> .	Mandatory

## AWS IAM Policy

An AWS IAM policy describes the permissions related to your bucket. The minimum set of policies required in order to upload the backup files are:

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Effect": "Allow",  
            "Action": [  
                "s3>ListBucket",  
                "s3>ListBucketMultipartUploads",  
                "s3>ListMultipartUploadParts",  
                "s3PutObject"  
            ],  
            "Resource": [  
                "arn:aws:s3:::<bucket-name>",  
                "arn:aws:s3:::<bucket-name>/*"  
            ]  
        }  
    ]  
}
```

Notes:

- Make sure to replace `<bucket-name>` with your correct values.
- `s3:CreateBucket` is only required if the S3 bucket does not exist.
- The additional `s3:CreateBucket` action is also required if the S3 bucket does not exist.

## SCP Backup Fields

## Configure blob store for Redis backups

### Backup configuration\*

- Disable Backups
- AWS S3
- SCP

Username \*

Private Key \*

Hostname \*

Destination Directory \*

SCP Port \*

Cron Schedule \*

Backup timeout \*

Fingerprint

- Azure

- GCS

Field	Description	Mandatory/Optional
Username	The username to use for transferring backups to the scp server	Mandatory
Private Key	The private ssh key of the user configured in <input type="text" value="Username"/>	Mandatory
Hostname	The hostname or IP address of the SCP server	Mandatory
Destination Directory	The path in the scp server, where the backups will be transferred	Mandatory
SCP Port	The scp port of the scp server	Mandatory
Cron Schedule	Backups schedule in crontab format. Refer to table for S3 backups for details	Mandatory
Backup timeout	The amount of time, in seconds, that the backup process waits for the BGSAVE command to complete on your instance, before transferring the RDB file to the scp server	Mandatory

## GCS Backup Fields

Configure blob store for Redis backups

Backup configuration\*

- Disable Backups
- AWS S3
- SCP
- Azure
- GCS

Project ID \*

Bucket name \*

Service account private key \*

JSON contents

Cron Schedule \*

Backup timeout \*

Redis for PCF uses service account credentials to upload backups to Google Cloud Storage. The service account should have `Storage Admin` permissions. Please refer to the [documentation](#) for details on how to set up a GCP service account.

Field	Description	Mandatory/Optional
Project ID	GCP Project ID	Mandatory
Bucket name	Name of the bucket you wish the files to be stored in.	Mandatory
Service account private key	The JSON Secret Key associated with your Service Account. See <a href="#">documentation</a> for details on how to set up service account keys.	Mandatory
Cron Schedule	Backups schedule in crontab format. For example, once daily at 2am is <code>* 2 * * *</code> . Also accepts a pre-defined schedule: any of <code>@yearly</code> , <code>@monthly</code> , <code>@weekly</code> , <code>@daily</code> , <code>@hourly</code> , or <code>@every</code> , where <code>is</code> any supported time string (e.g. <code>1h30m</code> ). For more information, see the cron package documentation.	Mandatory
Backup timeout	The amount of time, in seconds, that the backup process waits for the BGSAVE command to complete on your instance, before transferring the RDB file to your configured destination	Mandatory

## Azure Backup Fields

## Configure blob store for Redis backups

### Backup configuration\*

- Disable Backups
- AWS S3
- SCP
- Azure

### Account \*

### Azure Storage Access Key \*

### Container Name \*

### Destination Directory \*

### Blob Store Base URL

### Cron Schedule \*

### Backup timeout \*

- GCS

Field	Description	Mandatory/Optional
Account	Account name	Mandatory
Azure Storage Access Key	Azure specific credentials required to write to the Azure container	Mandatory
Container name	Name of the Azure container which will store backup files.	Mandatory
Destination Directory	Directory where the backup files will be stored within the Azure container.	Mandatory
Blob Store Base URL	URL pointing to Azure resource	Optional
Cron Schedule	Backups schedule in crontab format. For example, once daily at 2am is * 2 * * *. Also accepts a pre-defined schedule: any of @yearly, @monthly, @weekly, @daily, @hourly, or @every , where is any supported time string (e.g. 1h30m). For more information, see the cron package documentation.	Mandatory
Backup timeout	The amount of time, in seconds, that the backup process waits for the BGSAVE command to complete on your instance, before transferring the RDB file to your configured destination	Mandatory

## Notes

For each backup destination, the field `Backup timeout` causes backups to fail after a configured timeout. Redis' BGSAVE will continue but backups will not be uploaded to destinations if this timeout is hit.

## Manual Backups

You may want to do a manual backup before doing a procedure that might cause data loss. For instructions, see the Knowledge Base article [Manually Backing Up and Restoring Redis for Pivotal Cloud Foundry](#).

## Monitoring Redis for PCF

Page last updated:

The [Loggregator Firehose](#) exposes Redis metrics. You can use third-party monitoring tools to consume Redis metrics to monitor Redis performance and health.

As an example of how to display KPIs and metrics, see the [CF Redis example dashboard](#), which uses [Datadog](#). Pivotal does not endorse or provide support for any third-party solution.

### Metrics Polling Interval

The metrics polling interval defaults to 30 seconds. This can be changed by navigating to the Metrics configuration page and entering a new value in **Metrics polling interval (min: 10)**.

Metrics polling interval (min: 10) \*

Metrics are emitted in the following format:

```
origin:"p-redis" eventType:ValueMetric timestamp:148008432333475533 deployment:"cf-redis" job:"cf-redis-broker" index:"{redacted}" ip:"10.0.1.49" valueMetric:<name:"/p-redis/service-br
```

### Key Performance Indicators

Key Performance Indicators (KPIs) for Redis for PCF are metrics that operators find most useful for monitoring their Redis service to ensure smooth operation. KPIs are high-signal-value metrics that can indicate emerging issues. KPIs can be raw component metrics or *derived* metrics generated by applying formulas to raw metrics.

Pivotal provides the following KPIs as general alerting and response guidance for typical Redis for PCF installations. Pivotal recommends that operators continue to fine-tune the alert measures to their installation by observing historical trends. Pivotal also recommends that operators expand beyond this guidance and create new, installation-specific monitoring metrics, thresholds, and alerts based on learning from their own installations.

For a list of all other Redis metrics, see [Other Redis Metrics](#).

#### Redis for PCF Service KPIs

##### Total Instances For On-Demand Service

total_instances	
Description	Total instances provisioned by application developers across all On-Demand Services and for a specific On-Demand plan  Use: Track instance use by app developers.  Origin: Doppler/Firehose Type: count Frequency: 30s (default), 10s (configurable minimum)
Recommended measurement	Daily
Recommended alert thresholds	Yellow warning: N/A

	<b>Red critical:</b> N/A
<b>Recommended response</b>	N/A

## Quota Remaining For On-Demand Service

quota_remaining	
<b>Description</b>	Number of available instances across all On-Demand Services and for a specific On-Demand plan.  Use: Track remaining resources available for app developers.  Origin: Doppler/Firehose Type: count Frequency: 30s (default), 10s (configurable minimum)
<b>Recommended measurement</b>	Daily
<b>Recommended alert thresholds</b>	Yellow warning: 3 Red critical: 0
<b>Recommended response</b>	Increase quota allowed for the specific plan or across all on-demand services.

## Total Instances For Shared-VM and Dedicated-VM Service

<code>/p-redis/service-broker/dedicated_vm_plan/total_instances</code> <code>/p-redis/service-broker/shared_vm_plan/total_instances</code>	
<b>Description</b>	Total instances provisioned for Shared-VM and Dedicated-VM Services.  Use: Track total Shared-VM and Dedicated-VM instances available for app developers.  Origin: Doppler/Firehose Type: count Frequency: 30s (default), 10s (configurable minimum)
<b>Recommended measurement</b>	Application-specific
<b>Recommended alert thresholds</b>	Yellow warning: N/A Red critical: N/A
<b>Recommended response</b>	N/A

## Quota Remaining For Shared-VM and Dedicated-VM Service

<code>/p-redis/service-broker/dedicated_vm_plan/available_instances</code> <code>/p-redis/service-broker/shared_vm_plan/available_instances</code>	
<b>Description</b>	Number of available instances for the Dedicated-VM serving.  Use: Track remaining resources available for app developers.  Origin: Doppler/Firehose Type: count Frequency: 30s (default), 10s (configurable minimum)
<b>Recommended measurement</b>	Daily
<b>Recommended alert thresholds</b>	Yellow warning: 2 Red critical: 0
<b>Recommended response</b>	Increase VMs available for the Dedicated-VM service.

## Redis KPIs

### Percent of Persistent Disk Used

disk.persistent.percent	
Description	<p>Percentage of persistent disk being used on a VM. The persistent disk is specified as an IaaS-specific disk type with a size. For example, <code>pd-standard</code> on GCP, or <code>st1</code> on AWS, with disk size 5GB. This is a metric relevant to the health of the VM. A percentage of disk usage approaching 100 will cause the VM disk to become unusable as no more files will be allowed to be written.</p> <p><b>Use:</b> Redis is an in-memory data store that uses a persistent disk to backup and restore the dataset in case of upgrades and VM restarts.</p> <p><b>Origin:</b> JMX Bridge or BOSH HM  <b>Type:</b> percent  <b>Frequency:</b> 30s (default), 10s (configurable minimum)</p>
Recommended measurement	Average over last 10 minutes
Recommended alert thresholds	<p><b>Yellow warning:</b> &gt;75  <b>Red critical:</b> &gt;90</p>
Recommended response	Ensure that the disk is at least 3.5x VM memory. If it is, then contact GSS. If it is not, then increase disk space.

### Used Memory Percent

info.memory.used_memory / info.memory.maxmemory	
Description	<p>The ratio of these two metrics returns the percentage of available memory used:</p> <ul style="list-style-type: none"> <li>• <code>info.memory.used_memory</code> is a metric of the total number of bytes allocated by Redis using its allocator (either standard libc, jemalloc, or an alternative allocator such as tcmalloc).</li> <li>• <code>maxmemory</code> is a configuration option for the total memory made available to the Redis instance.</li> </ul> <p><b>Use:</b> This is a performance metric that is most critical for Redis instances with a <code>maxmemory-policy</code> of <code>allkeys-lru</code></p> <p><b>Origin:</b> Doppler/Firehose  <b>Type:</b> percentage  <b>Frequency:</b> 30s (default), 10s (configurable minimum)</p>
Recommended measurement	<p>Application-specific based on velocity of data flow. Some options are:</p> <ol style="list-style-type: none"> <li>1. Individual data points—Use if key eviction is in place, for example, in cache use cases.</li> <li>2. Average over last 10 minutes—Use if this gives you enough detail.</li> <li>3. Maximum of last 10 minutes</li> </ol> <p>If key eviction is not in place, options 1 or 3 give more useful information to ensure that high usage triggers an alert.</p>
Recommended alert thresholds	<p><b>Yellow warning:</b> 80% Not applicable for cache usage. When used as a cache, Redis will typically use up to maxmemory and then evict keys to make space for new entries.</p> <p>A different threshold might be appropriate for specific use cases of no key eviction, to allow for reaction time. Factors to consider:</p> <ol style="list-style-type: none"> <li>1. Traffic load on application—Higher traffic means that Redis memory will fill up faster.</li> <li>2. Average size of data added/ transaction—The more data added to Redis on a single transaction, the faster Redis will fill up its memory.</li> </ol>

	<b>Red critical:</b> 90%. See warning-specific threshold information.
<b>Recommended response</b>	No action assuming the maxmemory policy set meets your applications needs. If the maxmemory policy does not persist data as you wish, either coordinate a backup cadence or update your maxmemory policy if using the on-demand Redis service.

## Connected Clients

info.clients.connected_clients	
<b>Description</b>	<p>Number of clients currently connected to the Redis instance.</p> <p><b>Use:</b> Redis does not close client connections. They remain open until closed explicitly by the client or another script. Once the <code>connected_clients</code> reaches <code>maxclients</code>, Redis stops accepting new connections and begins producing <code>ERR max number of clients reached</code> errors.</p> <p><b>Origin:</b> Doppler/Firehose  <b>Type:</b> number  <b>Frequency:</b> 30s (default), 10s (configurable minimum)</p>
<b>Recommended measurement</b>	Average over last 10 minutes
<b>Recommended alert thresholds</b>	<p><b>Yellow warning:</b> Application-specific. When connected clients reaches max clients, no more clients can connect. This alert should be at the level where it can tell you that your application has scaled to a certain level and may require action.</p> <p><b>Red critical:</b> Application-specific. When connected clients reaches max clients, no more clients can connect. This alert should be at the level where it can tell you that your application has scaled to a certain level and may require action.</p>
<b>Recommended response</b>	Increase max clients for your instance if using the on-demand service, or reduce the number of connected clients.

## Blocked Clients

info.clients.blocked_clients	
<b>Description</b>	<p>The number of clients currently blocked waiting for a blocking request they have made to the Redis server. Redis provides two types of primitive commands to retrieve items from lists: standard and blocking. This metric concerns the blocking commands.</p> <p><b>Standard Commands</b></p> <p>The standard commands (LPOP, RPOP, RPOPLPUSH) immediately return an item from a list. If there are no items available the standard pop commands return nil.</p> <p><b>Blocking Commands</b></p> <p>The blocking commands (BLPOP, BRPOP, BRPOPLPUSH) wait for an empty list to become non-empty. The client connection is blocked until an item is added to the lists it is watching. Only the client that made the blocking request is blocked, and the Redis server continues to serve other clients.</p> <p>The blocking commands each take a <code>timeout</code> argument that is the time in seconds the server waits for a list before returning nil. A blocking command with timeout <code>0</code> waits forever. Multiple clients may be blocked waiting for the same list. For details of the blocking commands, see: <a href="https://redis.io/commands/blpop">https://redis.io/commands/blpop</a>.</p> <p><b>Use:</b> Blocking commands can be useful to avoid clients regularly polling the server for new data. This metric tells you how many clients are currently blocked due to a blocking command.</p> <p><b>Origin:</b> Doppler/Firehose  <b>Type:</b> number  <b>Frequency:</b> 30s (default), 10s (configurable minimum)</p>
<b>Recommended measurement</b>	Application-specific. Change from baseline may be more significant than actual value.
	<b>Yellow warning:</b> The expected range of the <code>blocked_clients</code> metric depends on what Redis is being used for:

<b>Recommended alert thresholds</b>	<ul style="list-style-type: none"> <li>Many uses will have no need for blocking commands and should expect <code>blocked_clients</code> to always be zero.</li> <li>If blocking commands are being used to force a recipient client to wait for a required input, a raised <code>blocked_clients</code> might suggest a problem with the source clients.</li> <li><code>blocked_clients</code> might be expected to be high in situations where Redis is being used for infrequent messaging.</li> </ul> <p>If <code>blocked_clients</code> is expected to be non-zero, warnings could be based on change from baseline. A sudden rise in <code>blocked_clients</code> could be caused by source clients failing to provide data required by blocked clients.</p> <p><b>Red critical:</b> There is no <code>blocked_clients</code> threshold critical to the function of Redis. However a problem that is causing <code>blocked_clients</code> to rise might often cause a rise in <code>connected_clients</code>. <code>connected_clients</code> does have a hard upper limit and should be used to trigger alerts.</p>
<b>Recommended response</b>	<p>Analysis could include:</p> <ul style="list-style-type: none"> <li>Checking the <code>connected_clients</code> metric. <code>blocked_clients</code> would often rise in concert with <code>connected_clients</code>.</li> <li>Establishing whether the rise in <code>blocked_clients</code> is accompanied by an overall increase in applications connecting to Redis, or by an asymmetry in clients providing and receiving data with blocking commands</li> <li>Considering whether a change in <code>blocked_clients</code> is most likely caused by oversupply of blocking requests or undersupply of data</li> <li>Considering whether a change in network latency is delaying the data from source clients</li> </ul> <p>In general, a rise or change in <code>blocked_clients</code> is more likely to suggest a problem in the network or infrastructure, or in the function of client applications, rather than a problem with the Redis service.</p>

## Memory Fragmentation Ratio

info.memory.mem_fragmentation_ratio	
<b>Description</b>	<p>Ratio of the amount of memory allocated to Redis by the OS to the amount of memory that Redis is using</p> <p><b>Use:</b> A memory fragmentation less than one shows that the memory used by Redis is higher than the OS available memory. In other packagings of redis, large values reflect memory fragmentation. For Redis for PCF, the instances only run Redis meaning that no other processes will be affected by a high fragmentation ratio (e.g., 10 or 11).</p> <p><b>Origin:</b> Doppler/Firehose  <b>Type:</b> ratio  <b>Frequency:</b> 30s (default), 10s (configurable minimum)</p>
<b>Recommended measurement</b>	Average over last 10 minutes
<b>Recommended alert thresholds</b>	<p><b>Yellow warning:</b> &lt; 1. Less than 1 indicates that the memory used by Redis is higher than the OS available memory which can lead to performance degradations.</p> <p><b>Red critical:</b> Same as warning threshold.</p>
<b>Recommended response</b>	Restart the Redis server to normalize fragmentation ratio.

## Instantaneous Operations Per Second

info.stats.instantaneous_ops_per_sec	
<b>Description</b>	<p>The number of commands processed per second by the Redis server. The <code>instantaneous_ops_per_sec</code> is calculated as the mean of the recent samples taken by the server. The number of recent samples is hardcoded as 16 in the implementation of Redis.</p> <p><b>Use:</b> The higher the commands processed per second, the better the performance of Redis. This is because Redis is single threaded and the commands are processed in sequence. A higher throughput would thus mean faster response per request which is a direct indicator of higher performance. A drop in the number of commands processed per second as compared to historical norms could be a sign of either low command volume or slow commands blocking the system. Low command volume could be normal, or it could be indicative of problems</p>

	<p>upstream.</p> <p><b>Origin:</b> Doppler/Firehose  <b>Type:</b> count  <b>Frequency:</b> 30s (default), 10s (configurable minimum)</p>
<b>Recommended measurement</b>	Every 30 seconds
<b>Recommended alert thresholds</b>	<p><b>Yellow warning:</b> A drop in the count compared to historical norms could be a sign of either low command volume or slow commands blocking the system. Low command volume could be normal, or it could be indicative of problems upstream. Slow commands could be due to a latency issue, a large number of clients being connected to the same instance, memory being swapped out, etc. Thus, the count is possibly a symptom of compromised Redis performance. However, this is not the case when low command volume is expected.</p> <p><b>Red critical:</b> A very low count or a large drop from previous counts may indicate a downturn in performance that should result in an investigation. That is unless the low traffic is expected behavior.</p>
<b>Recommended response</b>	<p>A drop in the count may be a symptom of compromised Redis performance. The following are possible responses:</p> <ol style="list-style-type: none"> <li><b>Identify slow commands using the slowlog:</b>  Redis logs all the commands that take more than a specified amount of time in slowlog. By default, this time is set to 20ms and the slowlog is allowed a maximum of 120 commands. For the purposes of slowlog, execution time is the time taken by Redis alone and does not account for time spent in I/O. So it would not log slow commands solely due to network latency.   Given that typical commands, including network latency, take about 200ms, a 20ms Redis execution time is 100 times slower. This could be indicative of memory management issues wherein Redis pages have been swapped to disk.   To see all the commands with slow Redis execution times, type <code>slowlog get</code> in the redis-cli.</li> <li><b>Monitor client connections:</b>  Because Redis is single threaded, one process services requests from all clients. As the number of clients grows, the percentage of resource time given to each client decreases and each client spends an increasing time waiting for their share of Redis server time.   Monitoring the number of clients may be important because there may be applications creating connections that you did not expect or your application may not be efficiently closing unused connections.   The connected clients metrics can be used to monitor this. This can also be viewed from the redis-cli using the command <code>info clients</code>.</li> <li><b>Limit client connections:</b>  This currently defaults to 10000, but depending on the application, you may want to limit this further. To do this, run <code>CONFIG SET maxclients NUMBER-OF-CONNECTIONS</code> in the redis-cli. You can configure this for On-Demand service instances in Ops Manager. Connections that exceed the limit are rejected and closed immediately.   It is important to set <code>maxclients</code> to limit the number of unintended client connections. Set <code>maxclients</code> to 110% to 150% of your expected peak number of connections. In addition, because an error message is returned for failed connection attempts, the maxclient limit warns you that a significant number of unexpected connections are occurring. This helps maintain optimal Redis performance.</li> <li><b>Improve memory management:</b>  Poor memory can cause increased latency in Redis. If your Redis instance is using more memory than is available, the operating system will swap parts of the redis process from out of physical memory and onto disk. Swapping will significantly reduce Redis performance since reads from disk are about 5 orders of magnitude slower than reads from physical memory.</li> </ol>

## Keyspace Hits / Keyspace Misses + Keyspace Hits

	<code>info.stats.keyspace_hits / info.stats.keyspace_misses + info.stats.keyspace_hits</code>
	Hit ratio to determine share of keyspace hits that are successful.

Description	<p><b>Use:</b> A memory fragmentation less than one shows that the memory used by Redis is higher than the OS available memory. In other packagings of redis, large values reflect memory fragmentation. For Redis for PCF, the instances only run Redis, therefore, no other processes are affected by a high fragmentation ratio (e.g., 10 or 11).</p> <p><b>Origin:</b> Doppler/Firehose  <b>Type:</b> ratio</p>
Recommended measurement	<p><b>Frequency:</b> 30s (default), 10s (configurable minimum)          Application-specific</p>
Recommended alert thresholds	<p><b>Yellow warning:</b> Application-specific. In general depending how an application is using the cache, an expected hit ratio value can vary between 60% to 99%. Also, the same hit ratio values can mean different things for different applications. Every time an application gets a cache miss, it will probably go to and fetch the data from a slower resource. This cache miss cost can be different per application. The application developers might be able to provide a threshold that is meaningful for the app and its performance</p> <p><b>Red critical:</b> Application-specific. See the warning threshold above.</p>
Recommended response	Application-specific. See the warning threshold above. Work with application developers to understand the performance and cache configuration required for their applications.

## BOSH Health Monitor Metrics

The BOSH layer that underlies PCF generates `healthmonitor` metrics for all VMs in the deployment. However, these metrics are not included in the Loggregator Firehose by default. To get these metrics, do either of the following:

- To send BOSH HM metrics through the Firehose, install the open-source [HM Forwarder](#).
- To retrieve BOSH health metrics outside of the Firehose, install the [JMX Bridge](#) for PCF tile.

## Other Redis Metrics

Redis also exposes the following metrics. for more information, see the [Redis documentation](#).

- `arch_bits`
- `uptime_in_seconds`
- `uptime_in_days`
- `hz`
- `lru_clock`
- `client_longest_output_list`
- `client_biggest_input_buf`
- `used_memory_rss`
- `used_memory_peak`
- `used_memory_lua`
- `loading`
- `rdb_bgsave_in_progress`
- `rdb_last_save_time`
- `rdb_last_bgsave_time_sec`
- `rdb_current_bgsave_time_sec`
- `aof_rewrite_in_progress`
- `aof_rewrite_scheduled`
- `aof_last_rewrite_time_sec`
- `aof_current_rewrite_time_sec`
- `total_connections_received`
- `total_commands_processed`

- instantaneous\_ops\_per\_sec
- total\_net\_input\_bytes
- total\_net\_output\_bytes
- instantaneous\_input\_kbps
- instantaneous\_output\_kbps
- rejected\_connections
- sync\_full
- sync\_partial\_ok
- sync\_partial\_err
- expired\_keys
- evicted\_keys
- keyspace\_hits
- keyspace\_misses
- pubsub\_channels
- pubsub\_patterns
- latest\_fork\_usec
- migrate\_cached\_sockets
- repl\_backlog\_active
- repl\_backlog\_size
- repl\_backlog\_first\_byte\_offset
- repl\_backlog\_histlen
- used\_cpu\_sys
- used\_cpu\_user
- used\_cpu\_sys\_children
- used\_cpu\_user\_children
- rdb\_last\_bgsave\_status
- aof\_last\_bgrewrite\_status
- aof\_last\_write\_status

## Redis for PCF Smoke Tests

Page last updated:

Redis for Pivotal Cloud Foundry (PCF) runs a set of smoke tests during installation to confirm system health. The tests run in the org `system` and in the space `redis-smoke-tests`. The tests run as an application instance with a restrictive Application Security Group (ASG).

### Smoke Test Steps

The smoke tests perform the following for each available service plan:

1. Targets the org `system` and space `redis-smoke-tests` (creating them if they do not exist)
2. Creates a restrictive security group, `redis-smoke-tests-sg`, and binds it to the space
3. Deploys an instance of the [CF Redis Example App](#) to this space
4. Creates a Redis instance and binds it to the CF Redis Example App
5. Checks that the CF Redis Example App can write to and read from the Redis instance

### Security Groups

Smoke tests create a new [application security group](#) for the CF Redis Example App (`redis-smoke-tests-sg`) and delete it once the tests finish. This security group has the following rules:

```
[  
 {  
   "protocol": "tcp",  
   "destination": "<dedicated node IP addresses>",  
   "ports": "6379" // Redis dedicated node port  
 },  
 {  
   "protocol": "tcp",  
   "destination": "<broker IP address>",  
   "ports": "32768-61000" // Ephemeral port range (assigned to shared-vm instances)  
 }  
]
```

This allows outbound traffic from the test app to the Redis shared VM and dedicated VM nodes.

### Smoke Tests Resilience

Smoke tests could fail due to reasons outside of the Redis deployment; for example network latency causing timeouts or the CloudFoundry instance dropping requests.

The smoke tests implement a retry policy for commands issued to CF, for two reasons: - to avoid smoke test failures due to temporary issues such as the ones mentioned above - to ensure that the service instances and bindings created for testing are cleaned up.

Smoke tests will retry failed commands against CF. They use a linear back-off with a baseline of 0.2 seconds, for a maximum of 30 attempts per command. Therefore, assuming that the first attempt is at 0s and fails instantly, subsequent retries will be at 0.2s, 0.6s, 1.2s and so on until either the command succeeds or the maximum number of attempts is reached.

The linear back-off was selected as a good middle ground between: - situations where the system is generally unstable-such as load-balancing issues- where max number of retries are preferred, and - situations where the system is suffering from a failure that lasts a few seconds-such as restart of a CloudFoundry VM-where it's preferable to wait before reattempting the command.

### Considerations

Because of the retry policy described in [Smoke tests resilience](#), smoke tests will generally take longer than previous versions of Redis for PCF to complete

within environments with intermittent failures. If run regularly, e.g. as part of CI, they might last longer than the frequency of the automatic runs, queueing up executions. We recommend adjusting the frequency of the automatic smoke test runs based on the amount of time they take to complete.

The above retry policy does not guard against a more permanent Cloud Foundry downtime or network connectivity issues. In this case, commands will fail after the maximum number of attempts and might leave claimed instances behind. We recommend disabling automatic smoke test runs and manually releasing any claimed instances in case of upgrades or scheduled downtimes.

## Troubleshooting

If errors occur while the smoke tests run, they will be summarised at the end of the errand log output. Detailed logs can be found where the failure occurs. Some common failures are listed below.

Error	Failed to target Cloud Foundry
Cause	Your PCF is unresponsive
Solution	Examine the detailed error message in the logs and check the <a href="#">PCF Troubleshooting Guide</a> for advice

Error	Failed to bind Redis service instance to test app
Cause	Your deployment's broker has not been registered with PCF
Solution	Examine the broker-registrar installation step output and troubleshoot any problems.

When encountering an error when running smoke tests, it can be helpful to search the log for other instances of the error summary printed at the end of the tests, e.g. Failed to target Cloud Foundry. Lookout for TIP: ... in the logs next to any error output for further troubleshooting hints.

## Troubleshooting Redis for PCF

Page last updated:

In this topic:

- [Useful Debugging Information](#)
- [About the Redis CLI](#)
- [How to Retrieve a Service Instance GUID](#)
- [Troubleshooting Errors](#)
  - [Failed Install](#)
  - [Cannot Create or Delete Service Instances](#)
  - [Broker Request Timeouts](#)
  - [Cannot Bind to or Unbind from Service Instances](#)
  - [Cannot Connect to a Service Instance](#)
  - [Upgrade All Instances Fails](#)
  - [Missing Logs and Metrics](#)
- [Troubleshooting Components](#)
  - [BOSH Problems](#)
  - [Configuration](#)
  - [Authentication](#)
  - [Networking](#)
  - [Quotas](#)
- [Techniques for Troubleshooting](#)
  - [Parse a Cloud Foundry \(CF\) Error Message](#)
  - [Access Broker and Instance Logs and VMs](#)
  - [Run Service Broker Errands to Manage Brokers and Instances](#)
  - [Select the BOSH Deployment for a Service Instance](#)
  - [Get Admin Credentials for a Service Instance](#)
  - [Reinstall a Tile](#)
  - [View Resource Saturation and Scaling](#)
  - [Identify Service Instance Owner](#)
  - [Monitor Quota Saturation and Service Instance Count](#)
- [Knowledge Base Articles](#)
- [Other Issues](#)

This topic lists troubleshooting information relevant to Redis for PCF.

## Useful Debugging Information

If you encounter an issue, here is a list of useful information to gather, especially before you perform any destructive operations such as

`cf purge-service-offerings` or `bosh2 -d SERVICE-INSTANCE-DEPLOYMENT delete deployment`.

Before debugging, ensure you know the following about your PCF deployment:

- The version of Redis for PCF
- If upgrading, the previous of Redis for PCF
- Ops Manager version, and, if upgrading, the previous version of Ops Manager
- IaaS description

## From OpsManager:

- The installation logs

- A copy of all files in `/var/tempest/workspaces/default/deployments`

## For All VMs, Unless Specified Otherwise:

- Copy of `/var/vcap/sys/log` (particularly the broker)
- If unable to get logs from disk, logs from a forwarded endpoint
- `monit summary`
- Full `ps aux`: Has monit done its job?
- `ps aux | grep redis-serve[r]`: Are Redis instances running?
- `df -h`: disk usage
- `free -m`: memory usage
- `cf m`
- `tree /var/vcap/store/cf-redis-broker/redis-data` (broker only)
- Copy of `/var/vcap/store/cf-redis-broker/statefile.json` (broker only)

## About the Redis CLI

The redis-cli is a command line tool used to access a Redis server. You can use the redis-cli for create, read, update, and delete (CRUD) actions, and to set configuration values. For more information about the redis-cli, see [redis-cli, the Redis command line interface](#) in the Redis documentation.

To access the redis-cli, do the following:

1. Follow the instructions in [Access the Redis Service](#) to retrieve the password and port number for the service instance.
2. SSH into the service instance.
3. Connect to the Redis server and enter the redis-cli interactive mode by running:

```
/var/vcap/packages/redis/bin/redis-cli -p PORT -a PASSWORD
```

Where:

- `PORT` is the port number retrieved in step one.
- `PASSWORD` is the password retrieved in step one.

For more information about the redis-cli interactive mode, see [Interactive Mode](#) in the Redis documentation.

## How to Retrieve a Service Instance GUID

You need the GUID of your service instance to run some BOSH commands. To retrieve the GUID, run the command

```
cf service SERVICE-INSTANCE-NAME --guid
```

If you do not know the name of the service instance, run `cf services` to see a listing of all service instances in the space. The service instances are listed in the name column.

## Troubleshooting Errors

Start here if you are responding to a specific error or error messages.

## Failed Install

1. Certificate issues: The on-demand broker (ODB) requires valid certificates. Ensure that your certificates are valid and [generate new ones](#) if necessary.
2. Deploy fails: Deploys can fail for a variety of reasons. View the logs using Ops Manager to determine why the deploy is failing.
3. [Networking problems](#):
  - Cloud Foundry cannot reach the Redis for PCF service broker
  - Cloud Foundry cannot reach the service instances
  - The service network cannot access the BOSH director
4. [Register broker errand](#) fails.
5. The smoke test errand fails.
6. Resource sizing issues: These occur when the resource sizes selected for a given plan are less than the Redis for PCF service requires to function. Check your resource configuration in Ops Manager and ensure that the configuration matches that recommended by the service.
7. Other service-specific issues.

## Cannot Create or Delete Service Instances

If developers report errors such as the following:

Instance provisioning failed: There was a problem completing your request. Please contact your operations team providing the following information: service: redis-acceptance, service-instance-g

1. If the BOSH error shows a problem with the deployment manifest:
  - a. Download the manifest for the on-demand service instance by running:

```
bosh download manifest service-instance_SERVICE-INSTANCE-GUID MY-SERVICE.yml.
```
  - b. Check the manifest for configuration errors.
2. To continue troubleshooting, [Log in to BOSH](#) and target the Redis for PCF service instance using the instructions on [parsing a Cloud Foundry error message](#).
3. Retrieve the BOSH task ID from the error message and run one of the following commands depending on your Ops Manager version:

Ops Manager Version	BOSH Command
1.10 and earlier	<code>bosh task TASK-ID</code>
1.11	<code>bosh2 task TASK-ID</code>
1.12 and later	<code>bosh task TASK-ID</code>

4. If you need more information, [access the broker logs](#) and use the `broker-request-id` from the error message above to search the logs for more information. Check for:
  - [Authentication errors](#)
  - [Network errors](#)
  - [Quota errors](#)

## Broker Request Timeouts

If developers report errors such as:

Server error, status code: 504, error code: 10001, message: The request to the service broker timed out: https://BROKER-URL/v2/service\_instances/e34046d3-2379-40d0-a318-d54fc7a5b13f/ser

1. Confirm that Cloud Foundry (CF) is [connected to the service broker](#).
2. Check the BOSH queue size:
  - a. Log into BOSH as an admin.
  - b. Run one of these commands depending on your Ops Manager version:
    - 1.10 and earlier: `bosh tasks`
    - 1.11: `bosh2 tasks`
    - 1.12 and later: `bosh tasks`
3. If there are a large number of queued tasks, the system may be under too much load. BOSH is configured with two workers and one status worker, which may not be sufficient resources for the level of load. Advise app developers to try again once the system is under less load.

## Cannot Bind to or Unbind from Service Instances

### Instance Does Not Exist

If developers report errors such as:

Server error, status code: 502, error code: 10001, message: Service broker error: instance does not exist

Follow these steps:

1. Type `cf service MY-INSTANCE --guid`. This confirms that the Redis for PCF service instance exists in BOSH and CF, and returns a GUID.
2. Using the GUID obtained above, run one of the following BOSH CLI commands depending on your Ops Manager version:

Ops Manager Version	BOSH Command
1.10 and earlier	<code>bosh vms service-instance_GUID</code>
1.11	<code>bosh2 -d service-instance_GUID vms</code>
1.12 and later	<code>bosh -d service-instance_GUID vms</code>

If the BOSH deployment is not found, it has been deleted from BOSH. Contact Pivotal support for further assistance.

### Other Errors

If developers report errors such as:

Server error, status code: 502, error code: 10001, message: Service broker error: There was a problem completing your request. Please contact your operations team providing the following information

To find out the exact issue with the binding process:

1. [Access the service broker logs](#).
2. Search the logs for the `broker-request-id` string listed in the error message above.
3. Contact Pivotal support for further assistance if you are unable to resolve the problem.
4. Check for:
  - o [Authentication errors](#)
  - o [Network errors](#)

## Cannot Connect to a Service Instance

If developers report that their app cannot use service instances that they have successfully created and bound:

Ask the user to send application logs that show the connection error. If the error is originating from the service, then follow Redis for PCF-specific instructions. If the issue appears to be network-related, then:

1. Check that [application security groups](#) are configured correctly. Access should be configured for the service network that the tile is deployed to.
2. Ensure that the network the PCF Elastic Runtime tile is deployed to has network access to the service network. You can find the network definition for this service network in the Ops Manager Director tile.
3. In Ops Manager go into the service tile and see the service network that is configured in the networks tab.
4. In Ops Manager go into the ERT tile and see the network it is assigned to. Make sure that these networks can access each other.

## Upgrade All Instances Fails

If the [upgrade-all-service-instances](#) errand fails, look at the errand output in the Ops Manager log.

If an instance fails to upgrade, debug and fix it before running the errand again to prevent any failure issues from spreading to other on-demand instances.

Once the Ops Manager log no longer lists the deployment as [failing](#), [re-run the errand](#) to upgrade the rest of the instances.

## Missing Logs and Metrics

If no logs are being emitted by the on-demand broker, check that your syslog forwarding address is correct in Ops Manager.

1. Ensure you have configured syslog for the tile.
2. Ensure that you have network connectivity between the networks that the tile is using and the syslog destination. If the destination is external, you need to use the [public ip](#) VM extension feature available in your Ops Manager tile configuration settings.
3. Verify that the Firehose is emitting metrics:
  - a. Install the [cf nozzle plugin](#)
  - b. Run `cf nozzle -f ValueMetric | grep --line-buffered "on-demand-broker/MY-SERVICE"` to find logs from your service in the [cf nozzle](#) output.

If no metrics appear within five minutes, verify that the broker network has access to the Loggregator system on all required ports.

[Contact Pivotal support](#) if you are unable to resolve the issue.

## Troubleshooting Components

Guidance on checking for and fixing issues in on-demand service components.

### BOSH Problems

## Missing BOSH Director UUID

 **Note:** This error does not occur if you are using BOSH CLI v2

If using the BOSH CLI v1, re-add the `director_uuid` to the manifest:

1. Run `bosh status --uuid` and record the `director_uuid` value from the output.
2. Edit the manifest and add the `director_uuid: DIRECTOR-UUID` from the last step at the top of the manifest.

For more, see [Deployment Identification ↗](#) in the BOSH docs.

## Large BOSH Queue

On-demand service brokers add tasks to the BOSH request queue, which can back up and cause delay under heavy loads. An app developer who requests a new Redis for PCF instance sees `create in progress` in the Cloud Foundry Command Line Interface (cf CLI) until BOSH processes the queued request.

Ops Manager currently deploys two BOSH workers to process its queue. Future versions of Ops Manager will let users configure the number of BOSH workers.

## Configuration

### Service instances in failing state

You may have configured a VM / Disk type in tile plan page in Ops Manager that is insufficiently large for the Redis for PCF service instance to start. See tile-specific guidance on resource requirements.

## Authentication

### UAA Changes

If you have rotated any UAA user credentials then you may see authentication issues in the service broker logs.

To resolve this, redeploy the Redis for PCF tile in Ops Manager. This provides the broker with the latest configuration.

 **Note:** You must ensure that any changes to UAA credentials are reflected in the Ops Manager `credentials` tab of the Elastic Runtime tile.

## Networking

Common issues include:

1. Network latency when connecting to the Redis for PCF service instance to create or delete a binding.
  - Solution: Try again or improve network performance
2. Network firewall rules are blocking connections from the Redis for PCF service broker to the service instance.
  - Solution: Open the Redis for PCF tile in Ops Manager and check the two networks configured in the **Networks** pane. Ensure that these networks allow access to each other.
3. Network firewall rules are blocking connections from the service network to the BOSH director network.
  - Solution: Ensure that service instances can access the Director so that the BOSH agents can report in.
4. Apps cannot access the service network.
  - Solution: Configure Cloud Foundry application security groups to allow runtime access to the service network.
5. Problems accessing BOSH's UAA or the BOSH director.
  - Solution: Follow network troubleshooting and check that the BOSH director is online.

## Validate Service Broker Connectivity to Service Instances

1. To validate you can `bosh2 ssh` onto the Redis for PCF service broker:
  - With **BOSH CLI v2**: Target the deployment, and reach the service instance.
  - With **BOSH CLI v1**: Download the broker manifest and target the deployment, then try to reach the service instance.
2. If no BOSH `task-id` appears in the error message, look in the broker log using the `broker-request-id` from the task.

## Validate App Access to Service Instance

Use `cf ssh` to access to the app container, then try connecting to the Redis for PCF service instance using the binding included in the `VCAP_SERVICES` environment variable.

## Quotas

### Plan Quota issues

If developers report errors such as:

```
Message: Service broker error: The quota for this service plan has been exceeded.  
Please contact your Operator for help.
```

1. Check your current plan quota.
2. Increase the plan quota.
3. Log into Ops Manager.
4. Reconfigure the quota on the plan page.
5. Deploy the tile.
6. Find who is using the plan quota and take the appropriate action.

## Global Quota Issues

If developers report errors such as:

```
Message: Service broker error: The quota for this service has been exceeded.  
Please contact your Operator for help.
```

1. Check your current global quota.
2. Increase the global quota.
3. Log into Ops Manager.
4. Reconfigure the quota on the on-demand settings page.
5. Deploy the tile.
6. Find out who is using the quota and take the appropriate action.

## Failing jobs and unhealthy instances

To determine whether there is an issue with the Redis for PCF service deployment, inspect the VMs. To do so, run one of the following commands:

Ops Manager Version	BOSH Command
1.10 or earlier	<code>bosh vms --vitals service-instance_GUID</code>
1.11	<code>bosh2 -d service-instance_GUID vms --vitals</code>
1.12 and later	<code>bosh -d service-instance_GUID vms --vitals</code>

For additional information, run one of the following commands:

Ops Manager Version	BOSH Command
1.10 and earlier	<code>bosh instances --ps --vitals</code>
1.11	<code>bosh2 instances --ps --vitals</code>
1.12 and later	<code>bosh instances --ps --vitals</code>

If the VM is failing, follow the service-specific information. Any unadvised corrective actions (such as running BOSH `restart` on a VM) can cause issues in the service instance.

## Techniques for Troubleshooting

This section contains instructions on interacting with the on-demand service broker and on-demand service instance BOSH deployments, and on performing general maintenance and housekeeping tasks.

### Parse a Cloud Foundry (CF) Error Message

Failed operations (create, update, bind, unbind, delete) result in an error message. You can retrieve the error message later by running the cf CLI command `cf service INSTANCE-NAME`.

```
$ cf service myservice

Service instance: myservice
Service: super-db
Bound apps:
Tags:
Plan: dedicated-vm
Description: Dedicated Instance
Documentation url:
Dashboard:

Last Operation
Status: create failed
Message: Instance provisioning failed: There was a problem completing your request.
Please contact your operations team providing the following information:
  service: redis-acceptance,
  service-instance-guid: ae9e232c-0bd5-4684-af27-1b08b0c70089,
  broker-request-id: 63da3a35-24aa-4183-aec6-db8294506bac,
  task-id: 442,
  operation: create
Started: 2017-03-13T10:16:55Z
Updated: 2017-03-13T10:17:58Z
```

Use the information in the `Message` field to debug further. Provide this information to Pivotal Support when filing a ticket.

The `task-id` field maps to the BOSH task ID. For more information on a failed BOSH task, use the `bosh task TASK-ID`.

The `broker-request-guid` maps to the portion of the On-Demand Broker log containing the failed step. Access the broker log through your syslog aggregator, or access BOSH logs for the broker by typing `bosh logs broker 0`. If you have more than one broker instance, repeat this process for each instance.

## Access Broker and Instance Logs and VMs

Before following the procedures below, log into the [cf CLI](#) and the [BOSH CLI](#).

### Access Broker Logs and VM(s)

You can [access logs using Ops Manager](#) by clicking on the **Logs** tab in the tile and downloading the broker logs.

To access logs using the BOSH CLI, do the following:

1. Identify the on-demand broker (ODB) deployment by running one of the following commands, depending on your Ops Manager version:

Ops Manager Version	BOSH Command
1.10 and earlier	<code>bosh deployments</code>
1.11	<code>bosh2 deployments</code>
1.12 and later	<code>bosh deployments</code>

2. For BOSH CLI v1 only:

- a. Run `bosh download manifest ODB-DEPLOYMENT-NAME odb.yml` to download the ODB manifest.
- b. Select the ODB deployment using `bosh deployment odb.yml`.

3. View VMs in the deployment using one of the following commands:

Ops Manager Version	BOSH Command
1.10 and earlier	<code>bosh instances</code>
1.11	<code>bosh2 -d DEPLOYMENT-NAME instances</code>
1.12 and later	<code>bosh -d DEPLOYMENT-NAME instances</code>

4. SSH onto the VM by running one of the following commands:

Ops Manager Version	BOSH Command

Ops Manager Version	BOSH Command
1.11	bosh2 -d service-instance_GUID ssh
1.12 and later	bosh -d service-instance_GUID ssh

5. Download the broker logs by running one of the following commands:

Ops Manager Version	BOSH Command
1.10 and earlier	bosh logs service-instance_GUID
1.11	bosh2 -d service-instance_GUID logs
1.12 and later	bosh -d service-instance_GUID logs

The archive generated by BOSH or Ops Manager includes the following logs:

Log Name	Description
broker.log	Requests to the on-demand broker and the actions the broker performs while orchestrating the request (e.g. generating a manifest and calling BOSH). Start here when troubleshooting.
broker_ctl.log	Control script logs for starting and stopping the on-demand broker.
post-start.stderr.log	Errors that occur during post-start verification.
post-start.stdout.log	Post-start verification.
drain.stderr.log	Errors that occur while running the drain script.

## Access Service Instance Logs and VMs

1. To target an individual service instance deployment, retrieve the GUID of your service instance with the cf CLI command `cf service MY-SERVICE --guid`.

2. For BOSH CLI v1 only:

- a. Run `bosh status --uuid` to retrieve the BOSH Director GUID.

 Note: "GUID" and "UUID" mean the same thing.

- b. To download your BOSH manifest for the service, run `bosh download manifest service-instance_BOSH-DIRECTOR-GUID MANIFEST.yml` using the GUID you just obtained and a filename you want to save the manifest as.

- c. Edit the following line in the service instance manifest that you just saved, to include the current BOSH Director GUID:

```
director_uuid: BOSH-DIRECTOR-GUID
```

- d. Run `bosh deployment MANIFEST.yml` to select the deployment using the Director UUID.

3. View VMs in the deployment using one of the following commands:

Ops Manager Version	BOSH Command
1.10 and earlier	bosh instances
1.11	bosh2 -d DEPLOYMENT-NAME instances
1.12 and later	bosh -d DEPLOYMENT-NAME instances

4. SSH onto a VM by running one of the following commands:

Ops Manager Version	BOSH Command
1.10 and earlier	bosh ssh service-instance_GUID
1.11	bosh2 -d service-instance_GUID ssh
1.12 and later	bosh -d service-instance_GUID ssh

5. Download the instance logs by running one of the following commands:

Ops Manager Version	BOSH Command
1.10 and earlier	bosh logs service-instance_GUID
1.11	bosh2 -d service-instance_GUID logs
1.12 and later	bosh -d service-instance_GUID logs

## Run Service Broker Errands to Manage Brokers and Instances

From the BOSH CLI, you can run service broker errands that manage the service brokers and perform mass operations on the service instances that the brokers created. These service broker errands include:

- `register-broker` registers a broker with the Cloud Controller and lists it in the Marketplace
- `deregister-broker` deregisters a broker with the Cloud Controller and removes it from the Marketplace
- `upgrade-all-service-instances` upgrades existing instances of a service to its latest installed version
- `delete-all-service-instances` deletes all instances of service
- `orphan-deployments` detects “orphan” instances that are running on BOSH but not registered with the Cloud Controller

To run errands:

1. **For BOSH CLI v1 only:** Select the broker deployment by running this command:

```
bosh deployment BOSH_MANIFEST.yml
```

2. Run one of the following commands depending on your Ops Manager version:

Ops Manager Version	BOSH Command
1.10 and earlier	bosh run errand ERRAND_NAME
1.11	bosh2 -d DEPLOYMENT_NAME run-errand ERRAND_NAME
1.12 and later	bosh -d DEPLOYMENT_NAME run-errand ERRAND_NAME

Examples:

```
bosh run errand deregister-broker
```

```
bosh2 -d DEPLOYMENT-NAME run-errand deregister-broker
```

## Register Broker

The `register-broker` errand registers the broker with Cloud Foundry and enables access to plans in the service catalog. Run this errand whenever the broker is re-deployed with new catalog metadata to update the Cloud Foundry catalog.

Plans with disabled service access are not visible to non-admin Cloud Foundry users (including Org Managers and Space Managers). Admin Cloud Foundry users can see all plans including those with disabled service access.

The errand does the following:

- Registers the service broker with Cloud Controller.
- Enables service access for any plans that have the radio button set to `enabled` in the tile plan page.
- Disables service access for any plans that have the radio button set to `disabled` in the tile plan page.
- Does nothing for any plans that have the radio button set to `manual`.

To run the errand, do the following:

1. **For BOSH CLI v1 only:** Select the broker deployment by running this command:

```
bosh deployment BOSH_MANIFEST.yml
```

2. Run one of the following commands depending on your Ops Manager version:

Ops Manager Version	BOSH Command

Ops Manager Version	BOSH Command
1.10 and earlier	bosh run errand register-broker
1.11	bosh2 -d DEPLOYMENT-NAME run-errand register-broker
1.12 and later	bosh -d DEPLOYMENT-NAME run-errand register-broker

## Deregister Broker

This errand deregisters a broker from Cloud Foundry.

The errand does the following:

- Deletes the service broker from Cloud Controller
- Fails if there are any service instances, with or without bindings

Use the [Delete All Service Instances errand](#) to delete any existing service instances.

To run the errand, do the following:

- For BOSH CLI v1 only: Select the broker deployment by running the command:  

```
bosh deployment BROKER_MANIFEST.yml
```

- Run one of the following commands depending on your Ops Manager version:

Ops Manager Version	BOSH Command
1.10 and earlier	bosh run errand deregister-broker
1.11	bosh2 -d DEPLOYMENT-NAME run-errand deregister-broker
1.12 and later	bosh -d DEPLOYMENT-NAME run-errand deregister-broker

## Upgrade All Service Instances

If you have made changes to the plan definition or uploaded a new tile into Ops Manager, you may want to upgrade all the Redis for PCF service instances to the latest software/plan definition.

The `upgrade-all-service-instances` errand does the following:

- Collects all of the service instances the on-demand broker has registered.
- For each instance the errand serially:
  - Issues an upgrade command to the on-demand broker.
  - Re-generates the service instance manifest based on its latest configuration from the tile.
  - Deploys the new manifest for the service instance.
  - Waits for this operation to complete, then proceeds to the next instance.
- Adds to a retry list any instances that have ongoing BOSH tasks at the time of upgrade.
- Retries any instances in the retry list until all are upgraded.

If any instance fails to upgrade, the errand fails immediately. This prevents systemic problems from spreading to the rest of your service instances. Run the errand by following either of the procedures below.

To run the errand, you can either select the errand through the Ops Manager UI and have it run when you click `Apply Changes`, or do the following:

- For BOSH CLI v1 only: Select the broker deployment by running this command:  

```
bosh deployment BOSH_MANIFEST.yml
```

- Run one of the following commands depending on your Ops Manager version:

Ops Manager Version	BOSH Command
1.10 and earlier	bosh run errand upgrade-all-service-instances
1.11	bosh2 -d DEPLOYMENT-NAME run-errand upgrade-all-service-instances

b12 and later	<b>Ops Manager Version</b>	<b>BOSH Command</b>
		bosh -d DEPLOYMENT-NAME run-errand upgrade-all-service-instances

## Delete All Service Instances

This errand deletes all service instances of your broker's service offering in every org and space of Cloud Foundry. It uses the Cloud Controller API to do this, and therefore only deletes instances the Cloud Controller knows about. It will not delete orphan BOSH deployments.

Orphan BOSH deployments don't correspond to a known service instance. While rare, orphan deployments can occur. Use the `orphan-deployments` errand to identify them.

The errand does the following:

- Unbinds all applications from the service instances.
- Deletes all service instances sequentially.
- Checks if any instances have been created while the errand was running.
- If newly-created instances are detected, the errand fails.

**A** **WARNING:** Use extreme caution when running this errand. You should only use it when you want to totally destroy all of the on-demand service instances in an environment.

To run the errand, do the following:

1. **For BOSH CLI v1 only:** Select the broker deployment by running the command:  
`bosh deployment BROKER_MANIFEST.yml`.

2. Run one of the following commands depending on your Ops Manager version:

Ops Manager Version	BOSH Command
1.10 and earlier	<code>bosh run errand delete-all-service-instances</code>
1.11	<code>bosh2 -d service-instance_GUID delete-deployment</code>
1.12 and later	<code>bosh -d service-instance_GUID delete-deployment</code>

## Detect Orphaned Instances Service Instances

A service instance is defined as 'orphaned' when the BOSH deployment for the instance is still running, but the service is no longer registered in Cloud Foundry.

The `orphan-deployments` errand collates a list of service deployments that have no matching service instances in Cloud Foundry and return the list to the operator. It is then up to the operator to remove the orphaned BOSH deployments.

To run the errand, do the following:

1. **For BOSH CLI v1 only:** Select the broker deployment by running the command:  
`bosh deployment BROKER_MANIFEST.yml`

2. Run the errand using one of the following commands depending on your Ops Manager version:

Ops Manager Version	BOSH Command
1.10 and earlier	<code>bosh run errand orphan-deployments</code>
1.11	<code>bosh2 -d DEPLOYMENT-NAME run-errand orphan-deployments</code>
1.12 and later	<code>bosh -d DEPLOYMENT-NAME run-errand orphan-deployments</code>

If orphan deployments exist, the errand script will:

- Exit with exit code 10
- Output a list of deployment names under a `[stdout]` header

- Provide a detailed error message under a [stderr] header

For example:

```
[stdout]
[{"deployment_name":"service-instance_80e3c5a7-80be-49f0-8512-44840f3c4d1b"}]

[stderr]
Orphan BOSH deployments detected with no corresponding service instance in Cloud Foundry. Before deleting any deployment it is recommended to verify the service instance no longer exists in the system.

Errand 'orphan-deployments' completed with error (exit code 10)
```

These details will also be available through the BOSH /tasks/ API endpoint for use in scripting:

```
$ curl 'https://bosh-user:bosh-password@bosh-url:25555/tasks/task-id/output?type=result' | jq .
{
  "exit_code": 10,
  "stdout": "[{"deployment_name":"service-instance_80e3c5a7-80be-49f0-8512-44840f3c4d1b"}]\n",
  "stderr": "Orphan BOSH deployments detected with no corresponding service instance in Cloud Foundry. Before deleting any deployment it is recommended to verify the service instance no longer exists in the system.",
  "logs": {
    "blobstore_id": "d830c4bf-8086-4bc2-8c1d-54d3a3c6d88d"
  }
}
```

If no orphan deployments exist, the errand script will:

- Exit with exit code 0
- Stdout will be an empty list of deployments
- Stderr will be [None]

```
[stdout]
[]

[stderr]
None

Errand 'orphan-deployments' completed successfully (exit code 0)
```

If the errand encounters an error during running it will:

- Exit with exit 1
- Stdout will be empty
- Any error messages will be under stderr

To clean up orphaned instances, run the following command on each instance:

**⚠ WARNING:** Running this command may leave IaaS resources in an unusable state.

Ops Manager Version	BOSH Command
1.10 and earlier	bosh delete deployment service-instance_SERVICE-INSTANCE-GUID
1.11	bosh2 delete-deployment service-instance_SERVICE-INSTANCE-GUID
1.12 and later	bosh delete-deployment service-instance_SERVICE-INSTANCE-GUID

## Select the BOSH Deployment for a Service Instance

This is an additional troubleshooting option for **BOSH CLI v1 only**. It does not apply to the BOSH CLI v2.

- Retrieve the GUID of your service instance with the command `cf service YOUR-SERVICE-INSTANCE --guid`.

2. To download your BOSH manifest for the service, run `bosh download manifest service-instance_SERVICE-INSTANCE-GUID myservice.yml` using the GUID you just obtained and a file name you want to use when saving the manifest.
3. Run `bosh deployment MY-SERVICE.yml` to select the deployment.

## Get Admin Credentials for a Service Instance

To retrieve the admin and read-only admin credentials for a service instance, perform the following steps:

1. [Identify the service deployment by GUID.](#)
  2. [Log into BOSH ↗.](#)
  3. [Download the manifest for the service instance](#) and add the GUID if using the BOSH CLI v1.
-  Skip this step if you are using the BOSH CLI v2. You cannot download the manifest with the BOSH CLI v2. Open it in a text editor instead.
4. Look in the manifest for the `admin` and `roadmin` credentials.

## Reinstall a Tile

To reinstall a tile in the same environment where it was previously uninstalled:

1. Ensure that the previous tile was correctly uninstalled as follows:
  - a. Log in as an admin with `cf login`.
  - b. Use `cf m` to confirm that the Marketplace does not list Redis for PCF.
  - c. Depending on which version of the BOSH CLI you are using, follow one of the steps below to log in to BOSH as an admin:
    - i. **For BOSH CLI v2:** Use `bosh2 log-in`.
    - ii. **For BOSH CLI v1:** Use `bosh login`.
- d. Depending on which version of the BOSH CLI you are using, follow one of the steps below to display your BOSH deployments to confirm that the output does not show a Redis for PCF deployment:
  - i. **For BOSH CLI v2:** Use `bosh2 deployments`.
  - ii. **For BOSH CLI v1:** Use `bosh deployments`.
- e. Run the [“delete-all-service-instances” errand](#) to delete every instance of the service.
- f. Run the [“deregister-broker” errand](#) to delete the service broker.
- g. Depending on which version of the BOSH CLI you are using, follow one of the steps below:
  - i. **For BOSH CLI v2:** Use `bosh2 delete-deployment BROKER-DEPLOYMENT-NAME` to delete the service broker BOSH deployment.
  - ii. **For BOSH CLI v1:** Use `bosh delete deployment BROKER-DEPLOYMENT-NAME` to delete the service broker BOSH deployment.
- h. Reinstall the tile.

## View Resource Saturation and Scaling

### BOSH CLI v2: Viewing statistics

To view usage statistics for any service do the following:

1. **For BOSH CLI v1 only:** Select the broker deployment by running this command:  
`bosh deployment BOSH_MANIFEST.yml`

2. Run the following commands depending on your Ops Manager version:

Ops Manager Version	BOSH Commands
v1.10 and earlier	Run the BOSH CLI v1 command <code>bosh vms --vitals</code> . To view process-level information, run <code>bosh instances --ps</code> .
v1.11	Run the BOSH CLI v2 command <code>bosh2 -d DEPLOYMENT-NAME vms --vitals</code> . To view process-level information, run <code>bosh2 -d DEPLOYMENT-NAME instances --ps</code>
v1.12 and later	Run the BOSH CLI v2 command <code>bosh -d DEPLOYMENT-NAME vms --vitals</code> . To view process-level information, run <code>bosh2 -d DEPLOYMENT-NAME instances --ps</code>

## Identify Service Instance Owner

If you want to identify which apps are using a specific service instance from the BOSH deployment name, you can run the following steps:

1. Take the deployment name and strip the `service-instance_` leaving you with the GUID.
2. Log in to CF as an admin.
3. Obtain a list of all service bindings by running the following: `cf curl /v2/service_instances/GUID/service_bindings`
4. The output from the above curl gives you a list of `resources`, with each item referencing a service binding, which contains the `APP-URL`. To find the name, org, and space for the app, run the following:
  - a. `cf curl APP-URL` and record the app name under `entity.name`
  - b. `cf curl SPACE-URL` to obtain the space, using the `entity.space_url` from the above curl. Record the space name under `entity.name`
  - c. `cf curl ORGANIZATION-URL` to obtain the org, using the `entity.organization_url` from the above curl. Record the organization name under `entity.name`

**Note:** When running `cf curl` ensure that you query all pages, because the responses are limited to a certain number of bindings per page. The default is 50. To find the next page curl the value under `next_url`

## Monitor Quota Saturation and Service Instance Count

Quota saturation and total number of service instances are available through ODB metrics emitted to Loggregator. The metric names are shown below:

Metric Name	Description
<code>on-demand-broker/SERVICE-NAME-MARKETPLACE/quota_remaining</code>	global quota remaining for all instances across all plans
<code>on-demand-broker/SERVICE-NAME-MARKETPLACE/PLAN-NAME/quota_remaining</code>	quota remaining for a particular plan
<code>on-demand-broker/SERVICE-NAME-MARKETPLACE/total_instances</code>	total instances created across all plans
<code>on-demand-broker/SERVICE-NAME-MARKETPLACE/PLAN-NAME/total_instances</code>	total instances created for a given plan

**Note:** Quota metrics are not emitted if no quota has been set.

## Knowledge Base Articles

The following are [Pivotal Knowledge Base](#) articles about Redis for PCF:

- [Create an Empty Service Network to use the Redis Tile without enabling the On-Demand Service](#)
- [Can't redeploy PCF Redis if shared-vm persistent disk full](#)
- [Issue with upgrading tile](#)

- [Issue with deploy failing ↗](#)
- [Redis Instance Alive after Successful De-provisioning ↗](#)
- [PCF Redis dedicated instance fails to persist to disk ↗](#)
- [Redis error when saving changes after a back to AWS S3: Error: Access Denied for bucket' ↗](#)
- [Internet access disabled for tile and instances ↗](#)

## Other Issues

Error	<code>Failed to target Cloud Foundry</code>
Cause	Your Pivotal Cloud Foundry is unresponsive
Solution	Examine the detailed error message in the logs and check the <a href="#">PCF Troubleshooting Guide ↗</a> for advice

Error	<code>Failed to bind Redis service instance to test app</code>
Cause	Your deployment's broker has not been registered with Pivotal Cloud Foundry
Solution	Examine the broker-registrar installation step output and troubleshoot any problems.

## Introduction for App Developers

Page last updated:

This section provides an introduction to Redis for Pivotal Cloud Foundry (PCF) services for developers and links to more information.

For instructions on creating, binding to, and deleting an instance of the On-Demand, Dedicated-VM, or Shared-VM plan, see [Using Redis for PCF](#).

## Redis for PCF Services

Redis for PCF v1.8+ offers On-Demand, Dedicated-VM, and Shared-VM services.

- **On-Demand Service**—Provides a dedicated VM running a Redis instance. The operator can configure up to three plans with different configurations, memory sizes, and quotas. App developers can provision an instance for any of the On-Demand plans offered and configure certain Redis settings.
- **Dedicated-VM Service**—Provides a dedicated VM running a Redis instance. The Dedicated-VM Service is pre-provisioned by the operator with a fixed number of VMs and memory size. App developers can then use one of those pre-provisioned VMs.
- **Shared-VM Service**—Provides support for a number of Redis instances running in a single VM. It is designed for testing and development. The Shared-VM instances are pre-provisioned by the operator with a fixed number of instances and memory size. App developers can then use one of these pre-provisioned instances.

For more information on the plans, see the service offerings for the [on-demand plan](#) and the [dedicated and shared plans](#).

## Getting Started

### Using Redis for PCF with Spring

[Spring Cloud Connectors](#) can connect to Redis for PCF. [Spring Cloud Cloud Foundry connectors](#) automatically connect to Redis for PCF.

To view an example Spring app demonstrating Redis as a cache with failover, see the [Example Spring App](#) in GitHub.

### PCF Dev

PCF Dev is a small footprint version of PCF that's small enough to run on a local developer machine. For more information, see <https://pivotal.io/pcf-dev>.

### Redis Example App

Sample ruby code that uses PCF can be found here <https://github.com/pivotal-cf/cf-redis-example-app>.

### Redis

To learn more about Redis itself, see [redis.io](#).

## Quickstart Guide for App Developers

This topic provides some sample apps in various languages to demonstrate how to get Redis for Pivotal Cloud Foundry (PCF) up and running quickly. It also highlights the critical components of the apps that allow them to connect to a Redis instance. Credentials to connect to a Redis for PCF instance are passed to the apps as environment variables under `VCAP_SERVICES`.

Additionally, this topic includes advice for setting up Spring Sessions with Redis for PCF.

## Feedback

If you have feedback about this page, or you want more information (other quickstart guides, sample use cases), please send a message to [Pivotal Cloud Foundry Feedback](#).

## Quickstart Apps

All apps using Redis for PCF must parse and read the Redis for PCF instance credentials from the environment. The credentials are available to the app once a Redis for PCF instance is bound to it and are viewable by typing `$cf env {app_name}`.

Prerequisites for these examples include access to a Marketplace with `p-redis` or `p.redis`.

For reference, `p.redis` refers to the Redis service that provides On-Demand instances and `p-redis` refers to the Redis service that provides Dedicated-VM and Shared-VM instances. Any Redis for PCF service and plan works with the following examples. Available plans and instance types can be viewed with in the Marketplace.

### Quickstart Java App

This is a basic Java app with the capability to get and set keys in Redis and view configuration information. Prerequisites include [Maven](#).

Here we use a cache-small plan of the `p.redis` service, but any `p-redis` or `p.redis` instance works.

```
$ git clone git@github.com:colrich/RedisForPCF-Java-Example.git java_redis_app
$ cd java_redis_app
$ mvn package
$ cf create-service p.redis cache-small redis_instance
$ cf push redis_example_app -p target/RedisExample-0.0.1-SNAPSHOT.jar
$ cf bind-service redis_example_app redis_instance
$ cf restage redis_example_app
```

You can then visit the app in your browser window. The app has three entry points:

- “/” — Gets info about a bound Redis instance
- “/set” — Sets a given key to a given value. E.g., `{APP_URL}/set?kn=somekeyname&kv=valuetoSet`
- “/get” — Gets the value stored at a given key. E.g., `{APP_URL}/get?kn=somekeyname`

In the [application code](#), the snippet where `VCAP_SERVICES` is read and parsed is here:

```

@RequestMapping("/")
public RedisInstanceInfo getInfo() {
    LOG.log(Level.WARNING, "Getting Redis Instance Info in Spring controller...");
    // first we need to get the value of VCAP_SERVICES, the environment variable
    // where connection info is stored
    String vcap = System.getenv("VCAP_SERVICES");
    LOG.log(Level.WARNING, "VCAP_SERVICES content: " + vcap);

    // now we parse the json in VCAP_SERVICES
    LOG.log(Level.WARNING, "Using GSON to parse the json...");
    JsonElement root = new JsonParser().parse(vcap);
    JsonObject redis = null;
    if (root != null) {
        if (root.getAsJsonObject().has("p.redis")) {
            redis = root.getAsJsonObject().get("p.redis").getAsJsonArray().get(0).getAsJsonObject();
            LOG.log(Level.WARNING, "instance name: " + redis.get("name").getAsString());
        }
        else if (root.getAsJsonObject().has("p-redis")) {
            redis = root.getAsJsonObject().get("p-redis").getAsJsonArray().get(0).getAsJsonObject();
            LOG.log(Level.WARNING, "instance name: " + redis.get("name").getAsString());
        }
        else {
            LOG.log(Level.SEVERE, "ERROR: no redis instance found in VCAP_SERVICES");
        }
    }

    // then we pull out the credentials block and produce the output
    if (redis != null) {
        JsonObject creds = redis.get("credentials").getAsJsonObject();
        RedisInstanceInfo info = new RedisInstanceInfo();
        info.setHost(creds.get("host").getAsString());
        info.setPort(creds.get("port").getAsInt());
        info.setPassword(creds.get("password").getAsString());

        // the object will be json serialized automatically by Spring web - we just need to return it
        return info;
    }
    else return new RedisInstanceInfo();
}

```

## Quickstart Node App

This is a basic node app with the capability to get and set keys in Redis and view configuration information. Prerequisites are the [cf cli](#) and access to a Marketplace with p-redis or p.redis.

Here we use a cache-small plan for the p.redis service, but any p-redis or p.redis instance works.

```

$ git clone git@github.com:colrich/RedisForPCF-Node-Example.git node_redis_app
$ cd node_redis_app
$ cf create-service p.redis cache-small redis_instance
$ cf push redis_example_app
$ cf bind-service redis_example_app redis_instance
$ cf restart redis_example_app

```

You can then visit the app in your browser window. The app has three entry points:

- “/” — Gets info about bound redis instance
- “/set” — Sets a given key to a given value. E.g., {APP\_URL}/set?kn=somekeyname&kv=valuetoset
- “/get” — Gets the value stored at a given key. E.g., {APP\_URL}/get?kn=somekeyname

In the [application code](#), the snippet where VCAP\_SERVICES is read and parsed is here:

```

// parses the VCAP_SERVICES env var and looks for redis service instances
function getVcapServices() {
  var vcstr = process.env.VCAP_SERVICES;
  if (vcstr != null && vcstr.length > 0 && vcstr != '{}') {
    console.log("found VCAP_SERVICES: " + vcstr)

    var vcap = JSON.parse(vcstr);
    if (vcap != null) {
      if (vcap.hasOwnProperty("p.redis")) {
        console.log("found redis instance: " + vcap["p.redis"][0].name);
        return vcap["p.redis"][0]
      }
      else if (vcap.hasOwnProperty("p-redis")) {
        console.log("found redis instance: " + vcap["p-redis"][0].name);
        return vcap["p-redis"][0]
      }
      else {
        console.log("ERROR: no redis service bound!")
      }
    }
    else {
      console.log("ERROR: no redis service bound!")
    }
  }
  else {
    console.log("ERROR: VCAP_SERVICES does not contain a redis block")
  }
  return null
}

// pulls the necessary connection info out of the parsed VCAP_SERVICES block for
// the redis connection
function getRedisInfo(vcap) {
  var info = {}
  info["host"] = vcap["credentials"]["host"]
  info["port"] = vcap["credentials"]["port"]
  info["password"] = vcap["credentials"]["password"]
  return info
}

// set the port to listen on; for apps in PCF it's important to listen on $PORT (usually 8000)
app.set('port', (process.env.PORT || 8080))

// this method looks in VCAP_SERVICES for a redis service instance and outputs the
// host / port / password info to the response
app.get('/', function(request, response) {
  console.log("Getting Redis connection info from the environment...")

  var vcap = getVcapServices()
  if (vcap != null) {
    var info = getRedisInfo(vcap)
    console.log("connection info: " + info.host + " / " + info.port + " / " + info.password)
    response.send("connection info: " + info.host + " / " + info.port + " / " + info.password)
  }
  else {
    console.log("ERROR: VCAP_SERVICES does not contain a redis block or no redis bound")
    response.send("ERROR: VCAP_SERVICES does not contain a redis block or no redis bound")
  }
})

```

## Quickstart Ruby App

This is a basic ruby app with the capability to get and set keys in Redis and view configuration information. Here we use an instance of the dedicated\_vm service, but any p-redis or p.redis instance works.

```

$ git clone git@github.com:pivotal-cf/cf-redis-example-app.git ruby_redis_app
$ cd ruby_redis_app
$ cf create-service p-redis dedicated-vm redis_instance
$ cf push redis_example_app --no-start
$ cf bind-service redis_example_app redis_instance
$ cf start redis_example_app"

```

You can then get, set, and delete keys:

```
$ export APP=redis-example-app.my-cloud-foundry.com
$ curl -X PUT $APP/foo -d 'data=bar'
success
$ curl -X GET $APP/foo
bar
$ curl -X DELETE $APP/foo
success
```

In the [application code ↗](#), the method where VCAP\_SERVICES is read is here:

```
def redis_credentials
  service_name = ENV['service_name'] || "redis"

  if ENV['VCAP_SERVICES']
    all_pivotal_redis_credentials = CF::App::Credentials.find_all_by_all_service_tags(['redis', 'pivotal'])
    if all_pivotal_redis_credentials && all_pivotal_redis_credentials.first
      all_pivotal_redis_credentials && all_pivotal_redis_credentials.first
    else
      redis_service_credentials = CF::App::Credentials.find_by_service_name(service_name)
      redis_service_credentials
    end
  end
end
```

The method where VCAP\_SERVICES is parsed is here:

```
def redis_client
  @client ||= Redis.new(
    host: redis_credentials.fetch('host'),
    port: redis_credentials.fetch('port'),
    password: redis_credentials.fetch('password'),
    timeout: 30
  )
end
```

## Spring Session with Redis for PCF

One common use case of Redis for PCF is management of a user's session information with [Spring Session](#). Spring Session provides an API and implementations with which to manage sessions.

This topic describes how to use Redis for PCF as the backend with Spring Session to manage user session information.

This documentation is adopted from the [Spring Session docs ↗](#) and extends to include instructions for use with Redis for PCF. The document is also adopted from this [Spring Session - Spring Boot guide ↗](#).

### Setting Up Spring Session

#### Updating Dependencies

To use Spring Session, update your dependencies to include spring-session-data-redis. The below example is for Maven.

```
pom.xml
```

```
<dependencies>
    <!-- ... -->
    <dependency>
        <groupId>org.springframework.session</groupId>
        <artifactId>spring-session-data-redis</artifactId>
        <version>1.3.1.RELEASE</version>
        <type>pom</type>
    </dependency>
    <dependency>
        <groupId>biz.paluch.redis</groupId>
        <artifactId>lettuce</artifactId>
        <version>3.5.0.Final</version>
    </dependency>
    <dependency>
        <groupId>org.springframework</groupId>
        <artifactId>spring-web</artifactId>
        <version>4.3.4.RELEASE</version>
    </dependency>
</dependencies>
```

## Spring Java Configuration

After adding the required dependencies, we can create our Spring configuration.

The Spring configuration is responsible for creating a Servlet Filter that replaces the `HttpSession` implementation with an implementation backed by Spring Session. Add the following Spring Configuration:

```
@EnableRedisHttpSession (1)
public class Config {

    @Bean
    public LettuceConnectionFactory connectionFactory() {
        return new LettuceConnectionFactory(); (2)
    }
}
```

1	The <code>@EnableRedisHttpSession</code> annotation creates a Spring Bean with the name of <code>springSessionRepositoryFilter</code> that implements <code>Filter</code> . The filter is what is in charge of replacing the <code>HttpSession</code> implementation to be backed by Spring Session. In this instance Spring Session is backed by Redis.
2	We create a <code>RedisConnectionFactory</code> that connects Spring Session to the Redis Server. We configure the connection to connect to localhost on the default port (6379) For more information on configuring Spring Data Redis, refer to the <a href="#">reference documentation</a> .

## Java Servlet Container Initialization

Our Spring Configuration created a Spring Bean named `springSessionRepositoryFilter` that implements `Filter`. The `springSessionRepositoryFilter` bean is responsible for replacing the `HttpSession` with a custom implementation that is backed by Spring Session.

In order for our `Filter` to do its magic:

- Spring needs to load our `Config` class.
- We need to ensure that our Servlet Container (i.e. Tomcat) uses our `springSessionRepositoryFilter` for every request.

Fortunately, Spring Session provides a utility class named `AbstractHttpSessionApplicationInitializer`, which helps us confirm that these two requirements are met.

The example below shows how to extend `AbstractHttpSessionApplicationInitializer`:

src/main/java/sample/Initializer.java

```
public class Initializer extends AbstractHttpSessionApplicationInitializer { (1)

    public Initializer() {
        super(Config.class); (2)
    }
}
```

The name of our class (`Initializer`) does not matter. What is important is that we extend `AbstractHttpSessionApplicationInitializer`. Doing this achieves the

following:

- It ensures that the Spring Bean by the name `springSessionRepositoryFilter` is registered with our Servlet Container for every request.
- It provides a mechanism to easily ensure that Spring loads our `Config`.

## Configuring Redis for PCF as a Backend

At this stage, Spring Session is now configured to use a Redis instance. To use a Redis for PCF instance, create a `session-replication` tag for it.

```
$ cf update-service INSTANCE_NAME -t session-replication
```

## Other Considerations

The `RedisHttpSessionConfiguration` tries to use the Redis CONFIG command. The CONFIG command is not available due to security recommendations.

This feature can be disabled by exposing `ConfigureRedisAction.NO_OP` as a bean:

```
@Bean  
public static ConfigureRedisAction configureRedisAction() {  
    return ConfigureRedisAction.NO_OP;  
}
```

However, disabling the configuration means that Redis cannot send namespace notifications. This functionality is critical for apps that require `SessionDestroyedEvent` to be fired to clean up resources, such as for WebSocket apps to ensure open WebSockets are closed when the `HttpSession` expires.

If you want a workaround for this use case, send email to [redis-feedback](#).

## Using Redis for PCF

Page last updated:

Redis for Pivotal Cloud Foundry (PCF) can be used both via [Pivotal Apps Manager](#) and the Cloud Foundry Command Line Interface (cf CLI). Both methods are outlined below.

You can find an example app has to help you get started with Redis for PCF. Download the example app by clicking[this link](#).

For recommendations regarding Redis for PCF service plans and memory allocation, see the service offerings for the [on-demand plan](#) and the [dedicated and shared plans](#).

## Prerequisites

To use Redis for PCF with your PCF apps, you need:

- A PCF installation with [Redis for PCF](#) installed and listed in the [Marketplace](#). The three Redis services are listed differently in the Marketplace, ensure the service you want to use is enabled.
- A [Space Developer](#) or Admin account on the PCF installation
- To use the cf CLI, you must [log into](#) the org and space containing your app and have a local machine with the following installed:
  - A browser
  - A shell
  - The [Cloud Foundry Command-Line Interface](#) (cf CLI)

## Use Redis for PCF in a PCF app

Every app and service in PCF is scoped to a [space](#). To use a service, an app must exist in the same space as an instance of the service.

To use Redis for PCF in a PCF app:

1. Use the [cf CLI](#) or [Apps Manager](#) to log in to the org and space that contains the app.
2. Make sure an instance of the Redis for PCF service exists in the same space as the app.
  - If the space does not already have a Redis for PCF instance, [create](#) one.
  - If the space already has a Redis for PCF instance, you can [bind](#) your app to the existing instance or create a new instance to bind to your app.
3. [Bind](#) the app to the Redis for PCF service instance, to enable the app to use Redis.

## Confirm Redis for PCF Service Availability

For an app to use a service, the following two things must be true:

- The service must be available in the Marketplace for its space.
- An instance of the service must exist in its space.

You can confirm both of these using the cf CLI as follows:

1. To find out if a Redis for PCF service is available in the Marketplace:
  - a. Enter `cf marketplace`.
  - b. If the output lists `p.redis` in the `service` column, on-demand Redis for PCF is available. If the output lists `p-redis` in the `service` column, dedicated-VM and shared-VM Redis for PCF is available. If it is not available, ask your operator to install it.

```
$ cf marketplace
Getting services from marketplace in org my-org / space my-space as user@example.com...
OK
service    plans      description
p-redis    shared-vm, dedicated-vm  Redis service to provide pre-provisioned instances configured as a datastore, running on a shared or dedicated VM.
p-redis    cache-small, cached-med  Redis service to provide on-demand dedicated instances configured as a cache.
[...]
```

2. To confirm that a Redis for PCF instance is running in the space:

- Enter `cf services`.
- Any `p.redis` listings in the `service` column are service instances of on-demand Redis for PCF in the space. Any `p-redis` in the `service` column are service instances of dedicated-VM and shared-VM Redis for PCF.

```
$ cf services
Getting services in org my-org / space my-space as user@example.com...
OK
name      service   plan   bound apps   last operation
my-instance p-redis  cache-small        create succeeded
```

You can [bind](#) your app to an existing instance or [create](#) a new instance to bind to your app.

## Create a Redis for PCF Service Instance

### Create a Service Instance with the cf CLI

#### Dedicated-VM and Shared-VM Service

Dedicated-VM and Shared-VM service instances have been pre-provisioned by the operator. This means, if an instance is available, the app developer can provision it immediately. These plans are both listed under the `p-redis` service in the Marketplace.

To create an instance of the Redis for PCF Dedicated-VM or Shared-VM service, run this command:

```
cf create-service p-redis SERVICE_TYPE
SERVICE_NAME
```

where:

- `SERVICE_TYPE` is `dedicated-vm` or `shared-vm`.
- `SERVICE_NAME` is a name for your service instance.

```
$ cf create-service p-redis dedicated-vm dedicated-instance
Creating service dedicated-instance in org my-org / space my-space as user@example.com...
OK
```

#### On-Demand Service

Unlike pre-provisioned services, on-demand instances are created asynchronously, not immediately. On-demand plans are listed under the `p.redis` service in the Marketplace.

To create an instance of the Redis for PCF On-Demand service, run this command:

```
cf create-service p.redis CACHE_PLAN
SERVICE_NAME
```

where:

- `CACHE_PLAN` is `cache-small`, `cache-medium`, or `cache-large`.
- `SERVICE_NAME` is a name for your service.

```
$ cf create-service p.redis cache-small od-instance
Creating service my-on-demand-instance in org my-org / space my-space as user@example.com...
OK
```

As the On-Demand instance can take longer to create, the `watch` command is helpful as a way to track when your service instance is ready to bind and use.

```
$ watch cf services
Getting services in org my-org / space my-space as user@example.com...
OK
name      service    plan    bound apps   last operation
od-instance p.redis   cache-small          create succeeded
```

If you get an error, see [Troubleshooting Instances](#). For information on the on-demand cache plans, see [On-Demand Service Plans](#).

## Create a Service Instance with Apps Manager

From within Pivotal Apps Manager, select **Marketplace** from the left navigation menu under Spaces.

The screenshot shows the Pivotal Apps Manager interface. The left sidebar has a dark theme with white text. It includes sections for 'ORG' (with 'my-org' selected), 'SPACES' (with 'my-space'), 'Accounting Report', 'Marketplace' (which is currently selected and highlighted in blue), 'Docs', and 'Tools'. The main content area has a light gray background. At the top, it says 'Marketplace' and provides a note: 'Get started with our free marketplace services. Upgrade select plans to gain access to premium service plans.' Below this is a search bar with the placeholder 'Search the Marketplace'. A section titled 'Services ▾' lists four items: 'App Autoscaler' (with a small icon of a house with a cloud), 'On-Demand Redis' (with a small icon of a server), 'Redis' (with a small icon of a server), and 'User Provided Service' (with a small icon of a square). Each item has a brief description and a right-pointing arrow indicating more details. At the bottom of the main content area, there's a footer bar with the text '©2017 Pivotal Software, Inc. All Rights Reserved.'

## Dedicated-VM and Shared-VM Service

1. Select **Redis** from the displayed tiles in the Marketplace.

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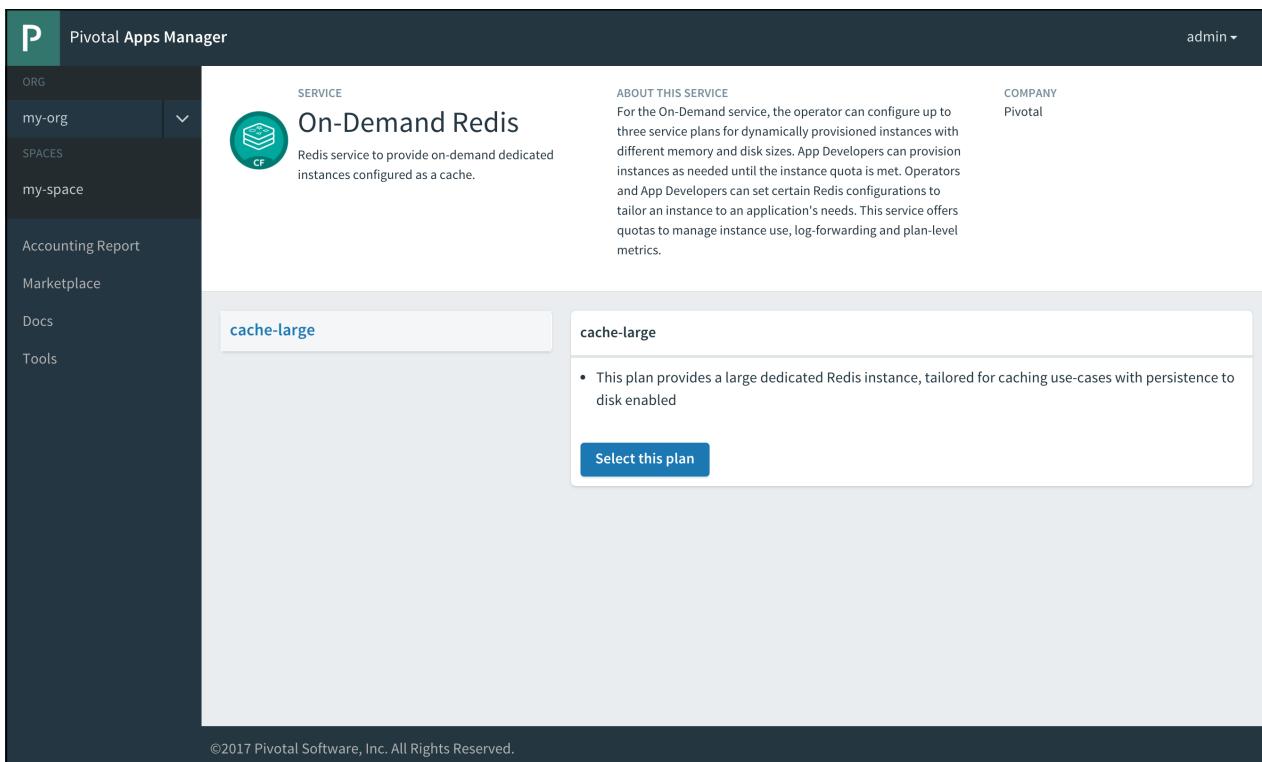
- Click on the appropriate **Select this plan** button to select the required **Redis Service Plan**.

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- In the **Instance Name** field, enter a name that will identify this specific Redis service instance.
- From the **Add to Space** drop-down list, select the space where you or other users will deploy the apps that will bind to the service.
- Click the **Add** button.

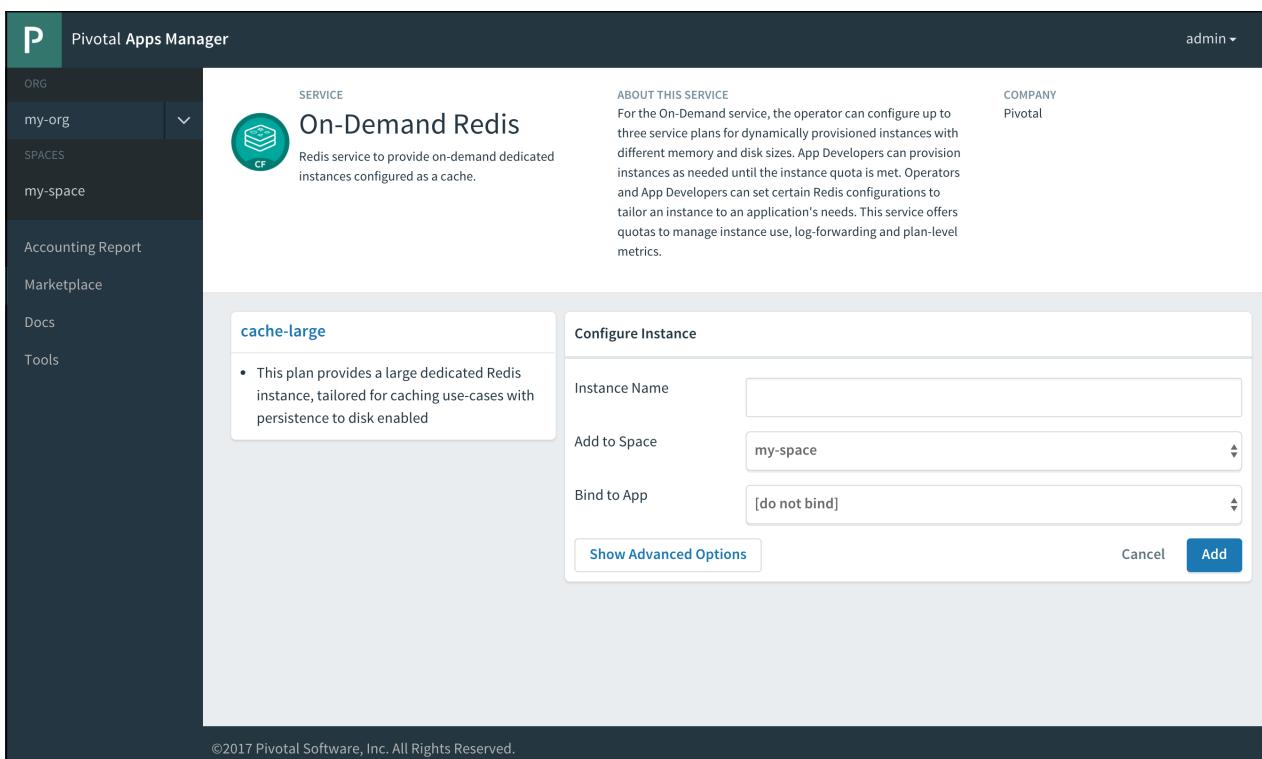
## On-Demand Service

1. Select **On-Demand Redis** from the displayed tiles in the Marketplace.



The screenshot shows the Pivotal Apps Manager interface. On the left, there's a sidebar with a dark background containing the Pivotal logo, a navigation bar with 'my-org' selected, and links for Accounting Report, Marketplace, Docs, and Tools. The main content area has a light gray background. At the top, it says 'SERVICE' and 'On-Demand Redis'. Below that is a green circular icon with a white Redis logo and the text 'Redis service to provide on-demand dedicated instances configured as a cache.' To the right, under 'ABOUT THIS SERVICE', is a detailed description of the On-Demand Redis service. At the bottom right of the main area, there's a button labeled 'Select this plan'. The footer contains the copyright notice '©2017 Pivotal Software, Inc. All Rights Reserved.'

2. Click on the appropriate **Select this plan** button to select the required **Redis Service Plan**.



This screenshot shows the configuration dialog for the 'cache-large' plan of the On-Demand Redis service. The left sidebar is identical to the previous screenshot. The main area now features a 'Configure Instance' section. It includes fields for 'Instance Name' (with a placeholder box), 'Add to Space' (set to 'my-space'), and 'Bind to App' (set to '[do not bind]'). At the bottom of this section are 'Show Advanced Options', 'Cancel', and 'Add' buttons. The footer again displays the copyright notice.

3. In the **Instance Name** field, enter a name that will identify this specific Redis service instance.
4. From the **Add to Space** drop-down list, select the space where you or other users will deploy the apps that will bind to the service.
5. Click the **Add** button.

## Bind a Service Instance to Your App

For an app to use a service, you must bind it to a service instance. Do this after you push or re-push the app using `cf push`.

### Bind a Service Instance with the cf CLI

To bind an app to a Redis for PCF instance use `$ cf bind-service`.

1. Run `cf services` to view running service instances.

```
$ cf services

Getting services in org system / space apps-manager as admin...
OK

name      service    plan   bound apps  last operation
my-instance p-redis  shared-vm        create succeeded
```

2. Enter `cf bind-service APP SERVICE_INSTANCE` where:

- o `APP` is the app you want to use the Redis service instance.
- o `SERVICE_INSTANCE` is the name you supplied when you ran `cf create-service`.

```
$ cf bind-service my-app my-instance

Binding service my-instance to my-app in org my-org / space test as user@example.com...
OK
TIP: Use 'cf push' to ensure your env variable changes take effect
```

### Bind a Service Instance with Apps Manager

1. Select the app that you want to bind to the service. A page displays showing the already bound services and instances for this app.
2. Click **Bind**. A list of available services displays.
3. Click the **Bind** button for the Redis service you want to bind to this app.
4. Start or restage your app from the command line, for example:

```
$ cf restage my-app
```

## Customize an On-Demand Service Instance

The On-Demand Service allows operators and app developers to customize certain configuration variables.

Operators can customize the memory size, org and space access, Redis Client Timeout (default 3600 seconds), Redis TCP Keepalive (default 60 seconds), Redis Max Clients (default 1000), and can enable Lua Scripting.

App developers can customize the following parameters. See the [Redis documentation](#) for more detail.

Property	Default	Options	Description
<code>maxmemory-policy</code>	<code>allkeys-lru</code>	<code>allkeys-lru</code> , <code>noeviction</code> , <code>volatile-lru</code> , <code>allkeys-random</code> , <code>volatile-ttl</code>	Sets the behavior Redis follows when `maxmemory` is reached
<code>notify-keyspace-events</code>	<code>"</code>	Set a combination of the following characters (e.g., <code>Elg</code> ): K, E, g, \$, l, s, h, z, x, e, A	Sets the keyspace notifications for events that affect the Redis data set
<code>slowlog-log-slower-than</code>	10000	0-20000	Sets the threshold execution time (seconds). Commands that exceed this execution time are added to the slowlog.

slowlog-max-len	128	1-2024	Sets the length (count) of the slowlog queue.
-----------------	-----	--------	---

## Customize an On-Demand Instance with the cf CLI

You can customize an instance in two ways:

- While creating the instance, run:

```
cf create-service SERVICE PLAN NAME -c '{"PROPERTY":"SETTING"}'
```

- After creating the instance, run:

```
cf update-service NAME -c '{"PROPERTY":"SETTING"}'
```

For both scenarios, the `-c` flag requires a valid JSON object containing service-specific configuration parameters, provided either in-line or in a file.

```
$ cf update-service my-instance -c '{"maxmemory-policy":"noeviction"}'
```

You can pass through multiple arbitrary parameters:

```
$ cf update-service my-instance -c '{"maxmemory-policy":"noeviction", "notify-keyspace-events":"El"}'
```

If the update is not successful, an error is displayed with a description of what went wrong. Here is an example where a hyphen is added to the `noeviction` setting.

```
$ cf update-service my-instance -c '{"maxmemory-policy":"no-eviction", "notify-keyspace-events":"El"}'
Updating service instance my-instance as admin...
FAILED
Server error, status code: 502, error code: 10001, message: Service broker error: invalid value "no-eviction" specified for maxmemory-policy
```

## Customize an On-Demand Instance with the Apps Manager

You can customize an instance in two ways:

- While creating the instance, after you select the plan, click **advanced settings**.

The screenshot shows the Pivotal Apps Manager interface. On the left, there's a sidebar with navigation links like 'ORG', 'my-org', 'SPACES', 'my-space', 'Accounting Report', 'Marketplace', 'Docs', and 'Tools'. The main content area is titled 'On-Demand Redis' and describes it as a Redis service for providing on-demand dedicated instances. It mentions that the operator can configure up to three service plans for dynamically provisioned instances with different memory and disk sizes. Developers can provision instances as needed until the instance quota is met. Operators and App Developers can set certain Redis configurations to tailor an instance to an application's needs. The service offers quotas to manage instance use, log-forwarding and plan-level metrics. Below this, there's a 'cache-large' plan box with a note about providing a large dedicated Redis instance for caching use-cases with persistence to disk enabled. To the right, there's a 'Configure Instance' dialog box. It has fields for 'Instance Name' (empty), 'Add to Space' (set to 'my-space'), 'Bind to App' (set to '[do not bind]'), and 'Add Parameters' (containing 'maxmemory-policy' and 'volatile-lru'). At the bottom of the dialog, there are 'Cancel' and 'Add' buttons. The footer of the page includes a copyright notice: '©2017 Pivotal Software, Inc. All Rights Reserved.'

- After creating the instance, navigate to the instance Settings page.

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In either of the above cases, do the following:

1. In the parameters fields enter each property you want to change and its new setting.  
Click the + sign to add more parameter fields.
2. Depending on the page you are on, click either **Add** or **Update**.

If the update is not successful, an error is displayed with a description of what went wrong. Here is an example where we forgot the hyphen in the `volatile-lru` setting.

## Access the Redis Service

All Redis for PCF instances are password-protected and require authentication. This is enforced with the `requirepass` directive in the configuration file.

To retrieve the password, do the following:

1. Create a service-key for your Redis instance using the command `cf create-service-key INSTANCE-NAME SERVICE-KEY-NAME`.
2. Retrieve the password using the command `cf service-key INSTANCE-NAME SERVICE-KEY-NAME`.

Here is an example of this procedure:

```
$ cf create-service-key my-instance my-key
Creating service key my-key for service instance my-instance as admin...
OK
$ cf service-key my-instance my-key
Getting key my-key for service instance my-instance as admin...
{
  "host": "10.0.8.4",
  "password": "",
  "port": 6379
}
```

Redis for PCF data is accessible from apps bound to that instance. Some Redis for PCF users bind the opensource [cf-redis-commander](#) app to view instance data. This app is not maintained by the Redis for PCF team, and Pivotal cannot guarantee its performance or security.

## Use the Redis Service in Your App

To access the Redis service from your app:

1. Run `cf env APP_NAME` with the name of the app bound to the Redis for PCF instance.
2. In the output, note the connection strings listed in the `VCAP_SERVICES` > `credentials` object for the app. Example `VCAP_SERVICES`

```
{
  "p-redis": [
    {
      "credentials": {
        "host": "10.0.0.11",
        "password": "<redacted>",
        "port": 6379
      },
      "label": "p-redis",
      "name": "redis",
      "plan": "dedicated-vm",
      "provider": null,
      "syslog_drain_url": null,
      "tags": [
        "pivotal",
        "redis"
      ],
      "volume_mounts": []
    }
  ]
}
```

 **Note:** You can also search for your service by its `name`, given when creating the service instance, or dynamically via the `tags` or `label` properties.

3. In your app code, call the Redis service using the connection strings.

## Delete a Redis Instance

When you delete a Redis service instance, all apps that are bound to that service are automatically unbound and any data in the service instance is cleared.

### Delete a Redis Instance with the cf CLI

1. Run `cf delete-service SERVICE-INSTANCE-NAME` and enter `y` when prompted to confirm.

For example:

```
$ cf delete-service my-redis-instance  
Really delete the service my-redis-instance?> y  
Deleting service my-redis-instance in org system / space apps-manager as admin...  
OK
```

2. If you had apps that were bound to this service, you might need to restage or re-push your app for the app changes to take effect. For example:

```
$ cf restage my-app
```

## Delete a Redis Instance with Pivotal Apps Manager

1. In the service instance Settings page, click **Delete Service Instance**.

The screenshot shows the Pivotal Apps Manager interface. On the left, there's a sidebar with 'ORG' set to 'my-org' and 'SPACES' set to 'my-space'. The main area displays an 'On-Demand Redis' service instance. The 'INSTANCE NAME' is 'my-instance' and the 'SERVICE PLAN' is 'cache-large'. Below this, there are three tabs: 'Overview', 'Plan', and 'Settings', with 'Settings' being the active tab. Under 'Settings', there's a 'Service Instance Name' field containing 'my-instance' with an 'Update' button. Below it is a 'Configure Instance' section with a note about supported configuration parameters. At the bottom of the page, there's a 'Delete Service Instance' section with a warning message and a red 'Delete Service Instance' button.

2. If you had apps that were bound to this service, you might need to restage or re-push your app for the app changes to take effect. For example:

```
$ cf restage my-app
```

## Troubleshooting Instances

Page last updated:

This topic provides basic instructions for app developers troubleshooting On-Demand Redis for Pivotal Cloud Foundry (PCF).

## Temporary Outages

Redis for PCF service instances can become temporarily inaccessible during upgrades and VM or network failures.

## Errors

You may see an error when using the Cloud Foundry Command-Line Interface (cf CLI) to perform basic operations on a Redis for PCF service instance:

- `cf create`
- `cf update`
- `cf bind`
- `cf unbind`
- `cf delete`

## Parse a Cloud Foundry (CF) Error Message

Failed operations (create, update, bind, unbind, delete) result in an error message. You can retrieve the error message later by running the cf CLI command `cf service INSTANCE-NAME`.

```
$ cf service myservice
Service instance: myservice
Service: super-db
Bound apps:
Tags:
Plan: dedicated-vm
Description: Dedicated Instance
Documentation url:
Dashboard:

Last Operation
Status: create failed
Message: Instance provisioning failed: There was a problem completing your request.
Please contact your operations team providing the following information:
  service: redis-acceptance,
  service-instance-guid: ae9e232c-0bd5-4684-af27-1b08b0c70089,
  broker-request-id: 63da3a35-24aa-4183-aec6-db8294506bac,
  task-id: 442,
  operation: create
Started: 2017-03-13T10:16:55Z
Updated: 2017-03-13T10:17:58Z
```

Use the information in the `Message` field to debug further. Provide this information to Pivotal Support when filing a ticket.

The `task-id` field maps to the BOSH task ID. For more information on a failed BOSH task, use the `bosh task TASK-ID`.

The `broker-request-guid` maps to the portion of the On-Demand Broker log containing the failed step. Access the broker log through your syslog aggregator, or access BOSH logs for the broker by typing `bosh logs broker 0`. If you have more than one broker instance, repeat this process for each instance.

## Retrieve Service Instance Information

1. Log into the space containing the instance or failed instance.

```
$ cf login
```

2. If you do not know the name of the service instance, run `cf services` to see a listing of all service instances in the space. The service instances are listed in the `name` column.

```
$ cf services
Getting services in org my-org / space my-space as user@example.com...
OK
name      service    plan      bound apps   last operation
my-instance p.Redis  db-small          create succeeded
```

3. Run `cf service SERVICE-INSTANCE-NAME` to retrieve more information about a specific instance.
4. Run `cf service SERVICE-INSTANCE-NAME --guid` to retrieve the GUID of the instance, which is useful for debugging.

## Knowledge Base (Community)

Find the answer to your question and browse product discussions and solutions by searching the [Pivotal Knowledge Base](#).

## File a Support Ticket

You can file a support ticket [here](#). Be sure to provide the error message from `cf service YOUR-SERVICE-INSTANCE`.

To help expedite troubleshooting, if possible also provide your service broker logs, service instance logs, and BOSH task output. Your cloud operator should be able to obtain these from your error message.

## Sample Redis Configuration

Page last updated:

The following is a `redis.conf` file from a Dedicated-VM plan instance:

```
daemonize yes
pidfile /var/vcap/sys/run/redis.pid
port 6379
tcp-backlog 511
timeout 0
tcp-keepalive 0
loglevel notice
logfile /var/vcap/sys/log/redis/redis.log
syslog-enabled yes
syslog-ident redis-server
syslog-facility local0
databases 16
save 900 1
save 300 10
save 60 10000
stop-writes-on-bgsave-error yes
rdbcompression yes
rdbchecksum yes
dbfilename dump.rdb
dir /var/vcap/store/redis
slave-serve-stale-data yes
slave-read-only yes
repl-diskless-sync no
repl-diskless-sync-delay 5
repl-ping-slave-period 10
repl-timeout 60
repl-disable-tcp-nodelay no
slave-priority 100
maxmemory-policy noevection
appendonly yes
appendfilename appendonly.aof
appendfsync everysec
no-appendfsync-on-rewrite no
auto-aof-rewrite-percentage 100
auto-aof-rewrite-min-size 64mb
aof-load-truncated yes
lua-time-limit 5000
slowlog-log-slower-than 10000
slowlog-max-len 128
latency-monitor-threshold 0
notify-keyspace-events ""
hash-max-ziplist-entries 512
hash-max-ziplist-value 64
list-max-ziplist-entries 512
list-max-ziplist-value 64
set-max-intset-entries 512
zset-max-ziplist-entries 128
zset-max-ziplist-value 64
hll-sparse-max-bytes 3000
activerehashing yes
client-output-buffer-limit normal 0 0
client-output-buffer-limit slave 256mb 64mb 60
client-output-buffer-limit pubsub 32mb 8mb 60
hz 10
aof-rewrite-incremental-fsync yes
rename-command CONFIG "A-B-Ab1AZec_-AaC1A2bAbB22a_a1Baa"
rename-command SAVE "SAVE"
rename-command BGSAVE "BGSAVE"
rename-command DEBUG ""
rename-command SHUTDOWN ""
rename-command SLAVEOF ""
rename-command SYNC ""
requirepass 1a1a2bb0-0ccc-222a-444b-1e1e1e1e2222
maxmemory 1775550873
```