

# IBM Planning Analytics Local: A Technical Deep Dive



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2018



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# The Complex IT Landscape



# IT Teams Deal with Diverse Technology and Complex Hybrid Environments



# Docker Helps Developers and Sysadmins

Docker enables developers and IT admins to build, ship and run any application, anywhere



## BUILD

### DEVELOPER WORKFLOWS

Docker allows you to compose your application from microservices, without worrying about inconsistencies between development and production environments, and without locking into any platform or language.



## SHIP

### REGISTRY SERVICES

Docker lets you design the entire cycle of application development, testing and distribution, and manage it with a consistent user interface.



## RUN

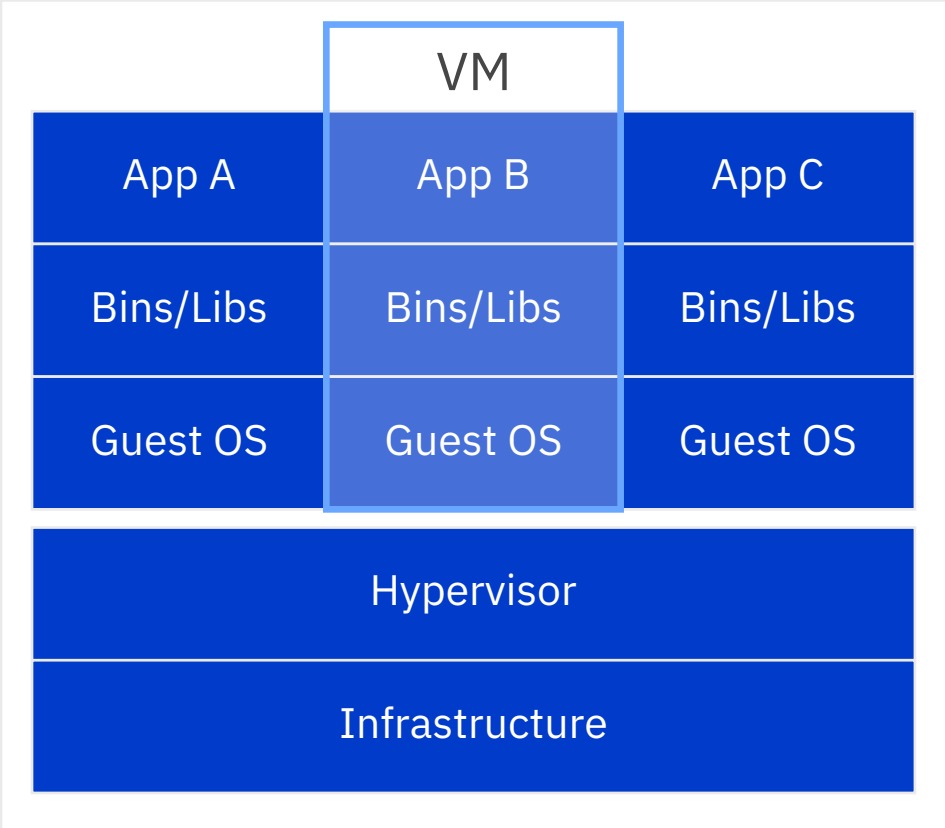
### MANAGEMENT

Docker offers you the ability to deploy scalable services, securely and reliably, on a wide variety of platforms.

DOCKER ENGINE

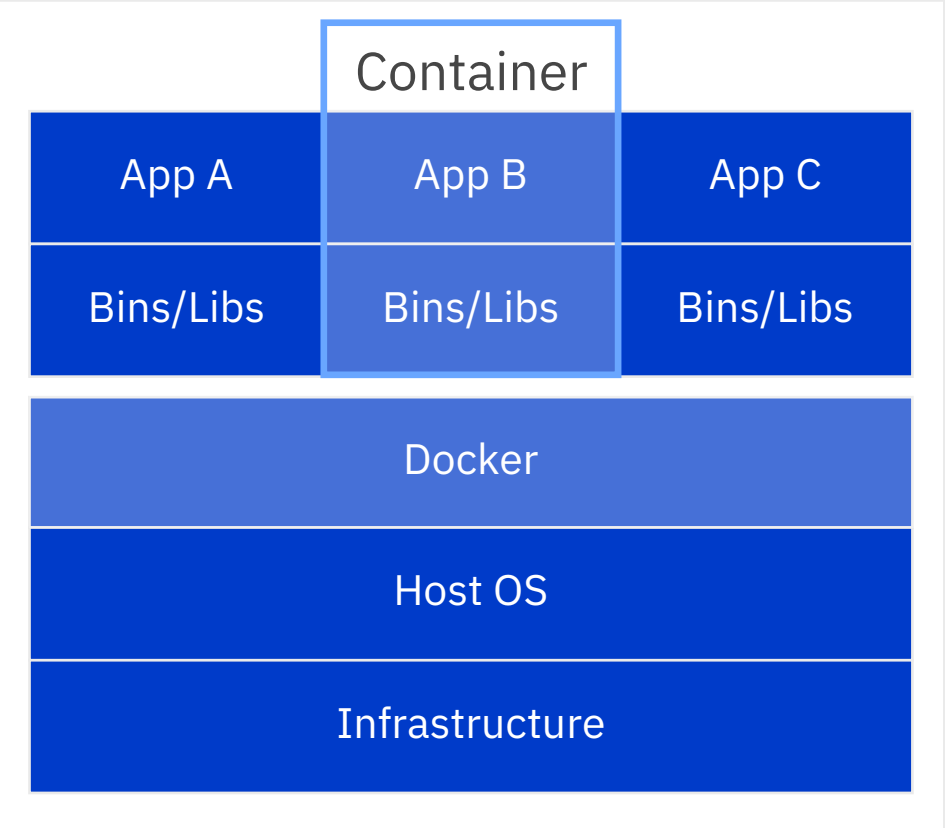
INFRASTRUCTURE

# Comparing Docker Containers and VMs



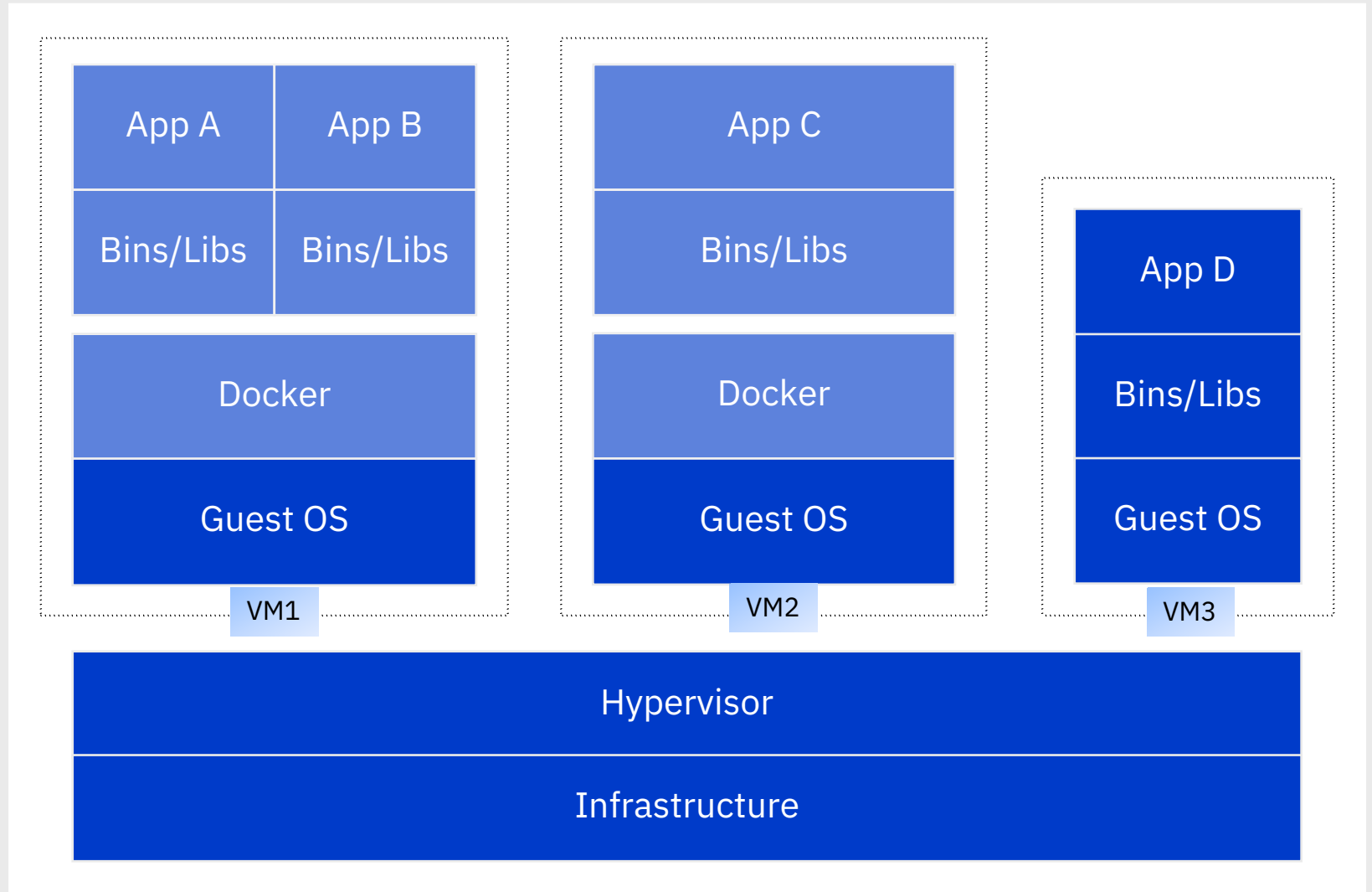
**VMs**  
are an infrastructure  
level abstraction to  
turn one machine  
into many servers

**Containers**  
are an application  
level abstraction,  
managed by a Docker  
Engine running on a  
Host OS



# Containers and VMs Together

provide flexibility for IT to optimally deploy and manage various workloads

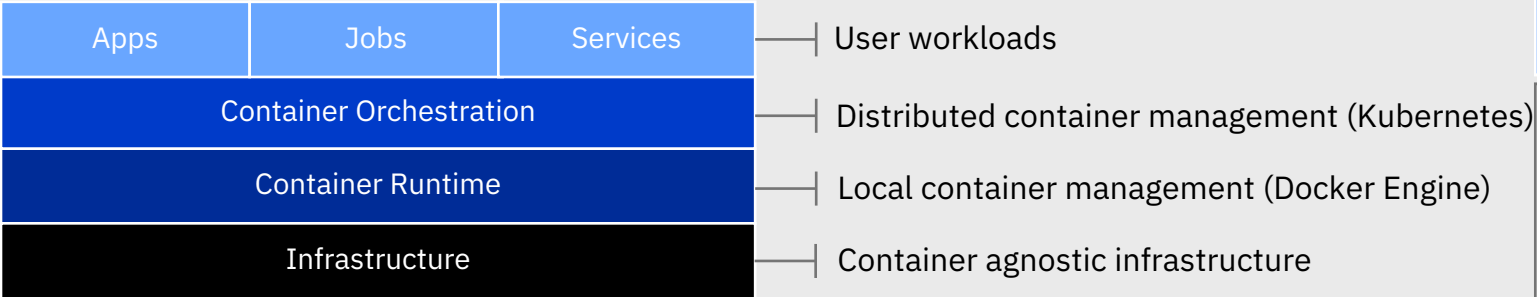




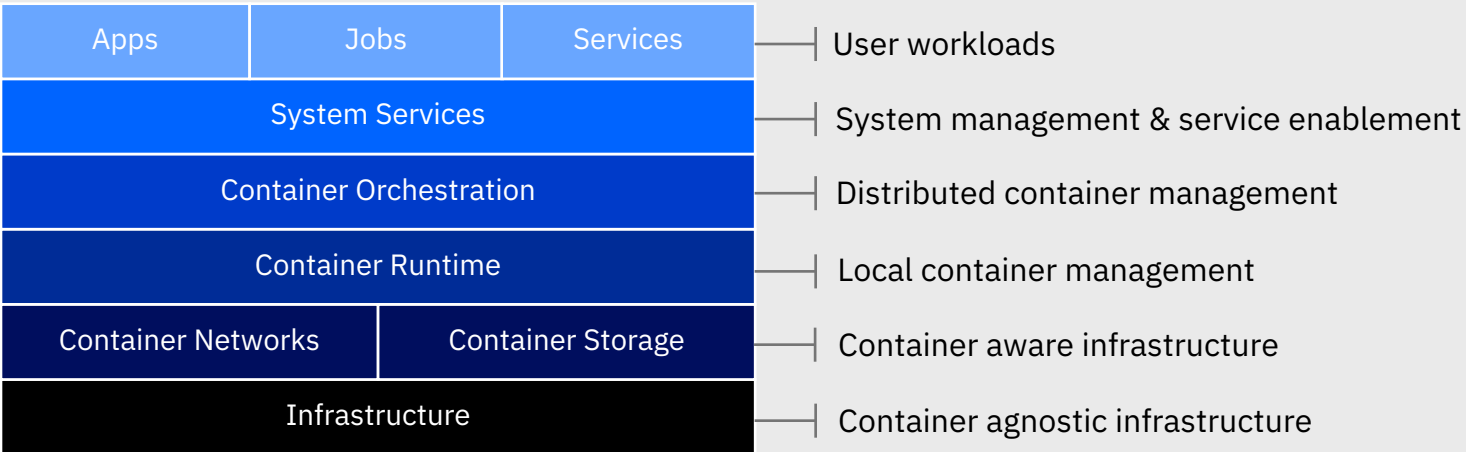
# The Introduction of Containers into the Data Center Brings a New Challenge for Sysadmins

## Managing Containers and Modernizing Data Centers

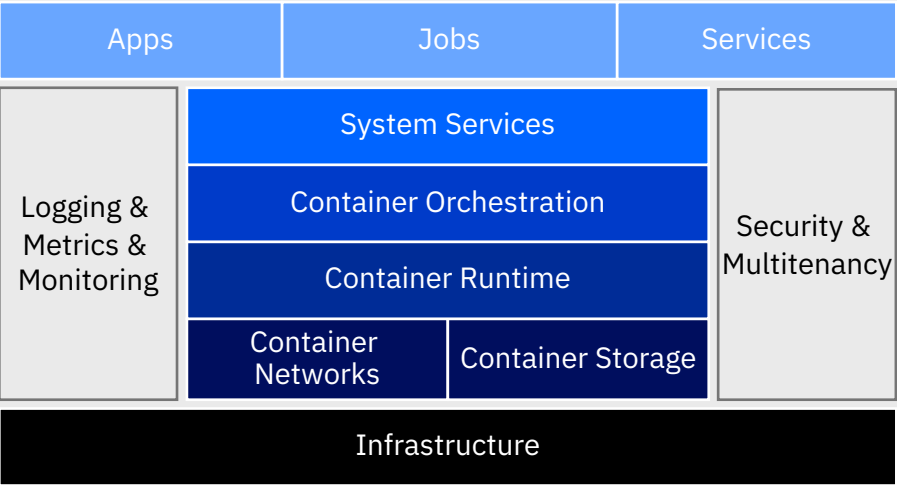
### Container Orchestration



### Container Platform



### Private Cloud

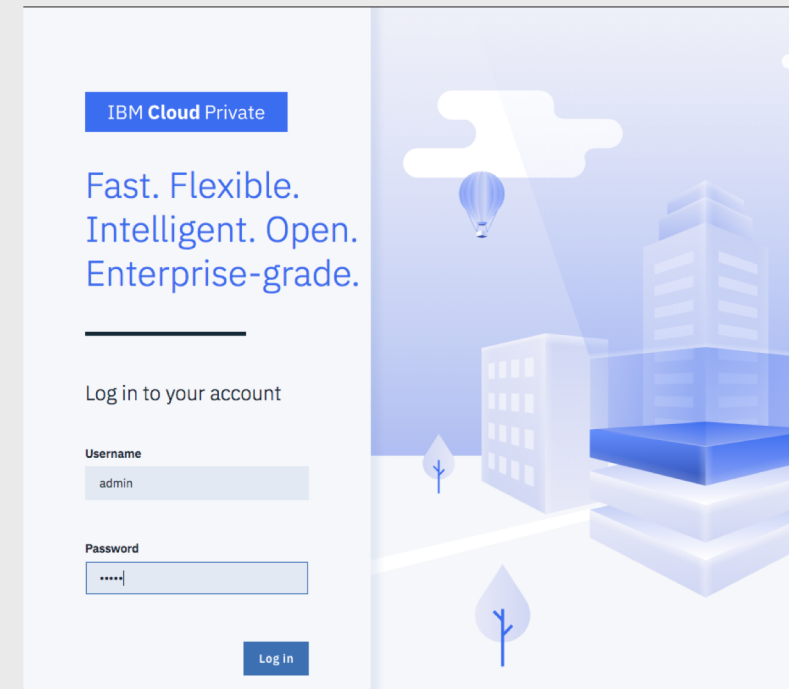


IBM Cloud Private

Fast. Flexible. Intelligent.  
Open. Enterprise-grade.

# What is Kubernetes?

- Enterprise level container orchestration engine
- Provision, manage, scale applications across a cluster
- Declarative model: you provide the “desired state” of a cluster and Kubernetes will make it happen
- What’s in the name? Kubernetes (k8s/Kube): “Helmsman” in ancient Greek
- ICP ( a Platform, a Catalog, and a core set of management services is built on Kubernetes - Kube++)



# IBM Planning Analytics Local

# IBM Planning Analytics Installation Considerations

- 1 Download Software from IBM Passport Advantage or Fix Central
- 2 Install TM1 Server and Clients (Data Tier, Web Tier, Rich Tier)
- 3 Install IBM Planning Analytics Workspace - PAW (prerequisite Docker)
- 4 Install IBM Planning Analytics for Excel – PAX (Client side install)

[YouTube Video - PA Installation on a Single Windows 2016 Server VM for a POC/Demo](#)

[IBM Knowledge Center - Detailed PA Install Documentation](#)

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Fixes for product IBM Planning Analytics Local require entitlement.

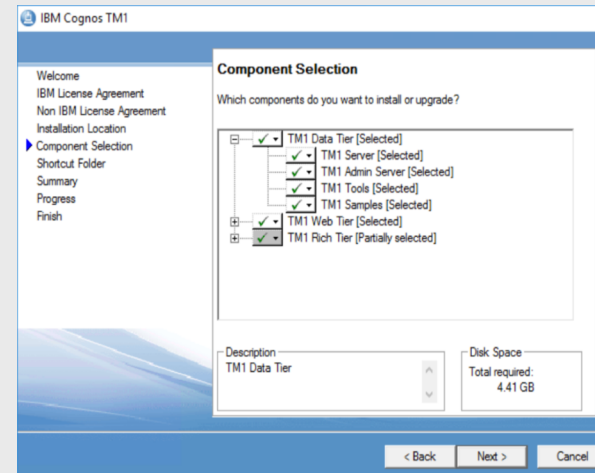
Continue Clear selections

Show fix details | Hide fix details

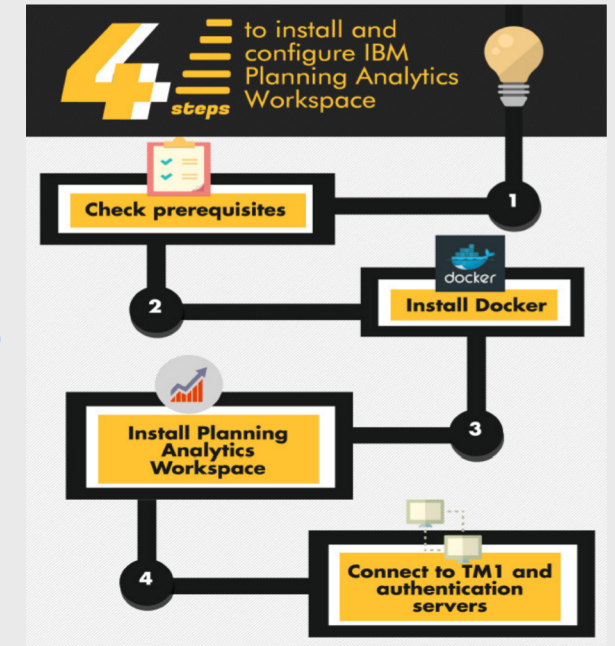
Show 10 results Search:

	Description	Release date
<input checked="" type="checkbox"/>	1 release level: → BA-PAWL-2.0.35 IBM Planning Analytics Workspace 2.0.35 <a href="#">More Information</a>	2018/08/10
<input checked="" type="checkbox"/>	2 release level: → BA-PAXL-2.0.35 IBM Planning Analytics for Microsoft Excel 2.0.35 <a href="#">More Information</a>	2018/07/27
<input type="checkbox"/>	3 release level: → BA-PAWL-2.0.34 IBM Planning Analytics Workspace 2.0.34 <a href="#">More Information</a>	2018/07/12
<input checked="" type="checkbox"/>	4 release level: → BA-PAL-2.0.5 IBM Planning Analytics Local 2.0.5 <a href="#">More Information</a>	2018/06/27
<input type="checkbox"/>	5 release level: → BA-PAXL-2.0.34 IBM Planning Analytics for Microsoft Excel 2.0.34	2018/06/22

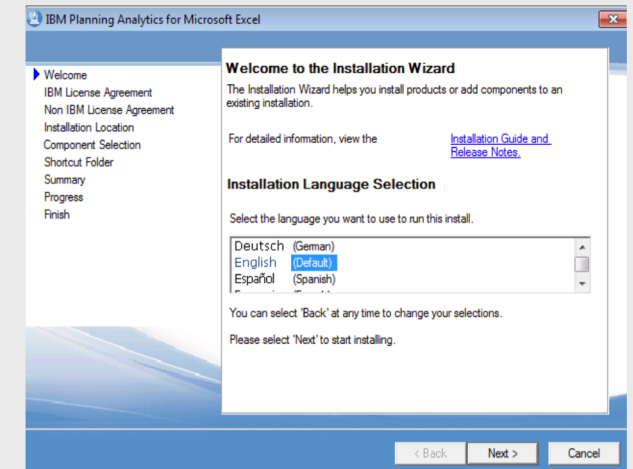
2



3



4





# IBM Planning Analytics Local

Component Architecture, **Typical** Sizing, and [OS conformance](#)

## Web Tier

TM1 Web, TM1 Application Web, Operations Console

- 8 Cores/32GB for TM1 Web Java engine and PMHUB running in Websphere
- OS: RHEL Server 6,7—Ubuntu and Windows Server

## Rich Tier

Architect, Performance Modeler, Perspectives, Cognos Insight, PAx

- 2 Cores/4GB Desktop/Laptop Windows 7, 8, 10 with latest IE11/Chrome/Firefox browsers
- MS Excel 2013 and 2016

## Workspace

Dockerized Micro Services and Databases (PAx requires PAW)

- 4 Cores/16GB (100 named users) or 8 Cores/32GB (up to 1000 named users)
- Docker on Windows Server 2016 or RHEL Server 7 x86-64 with Docker EE

## Data Tier

TM1 Admin Server, TM1 Server

CPU/RAM requirements depend on model size and application complexity at runtime.

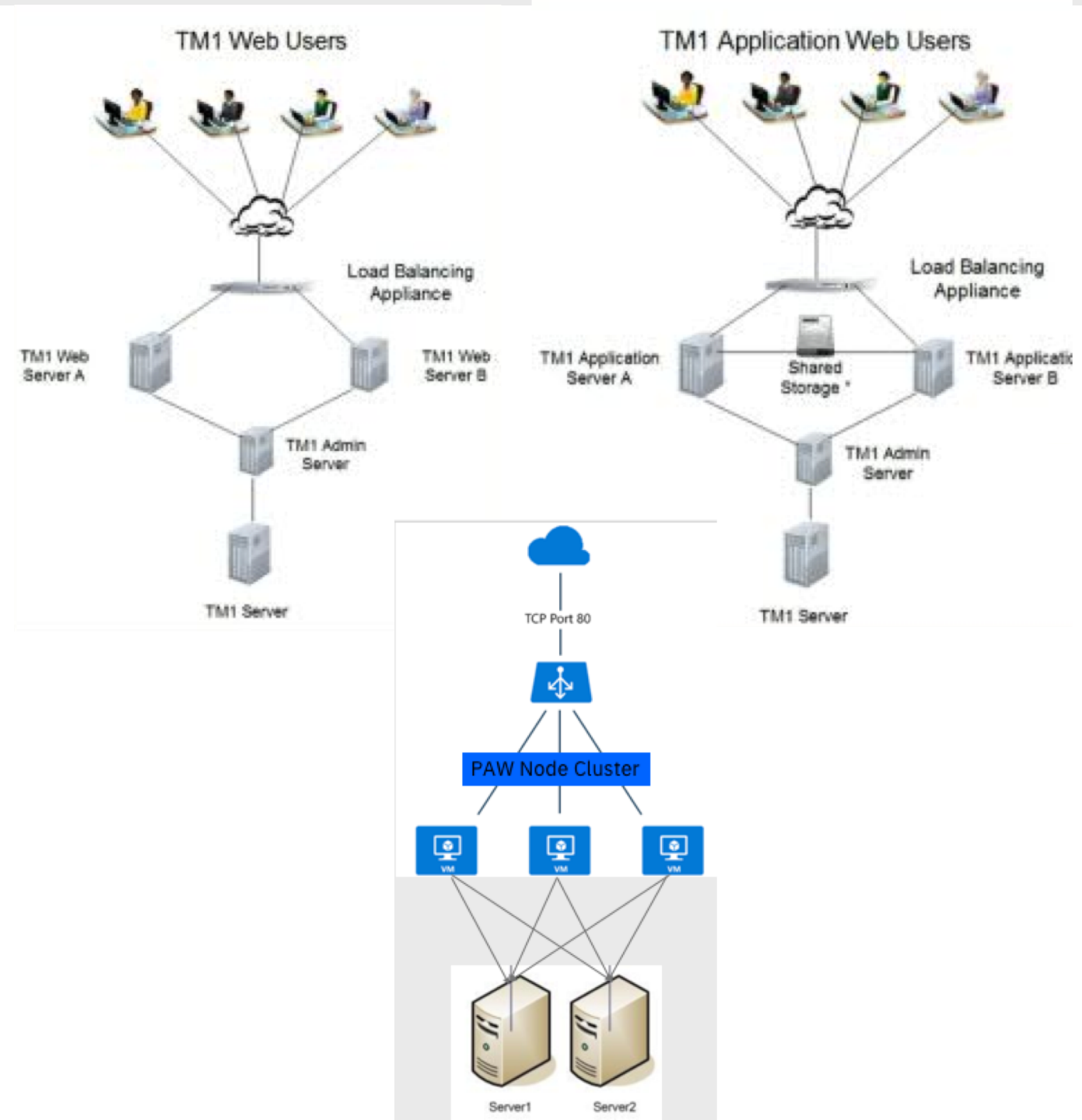
Linux: RHEL Server 6,7 on x86-64 or IBM z Systems Hardware  
Linux: Ubuntu 16.04 LTS on x86-64 Hardware  
Windows Server 2008, 2012, 2016

# Planning Analytics Operation

## High Availability Runbook

- TM1 Web and TM1 Application Web can be configured for High Availability and Load Balancing in an Active/Active configuration
- TM1 Server and TM1 Admin Server can be configured for fast restore in Active/Passive configuration
- Workspace plans to provide HA by leveraging modern container orchestration technologies: Swarm Beta in June 2018. Swarm eGA in 1Q@2019. Kubernetes/ICP in 1H@2019

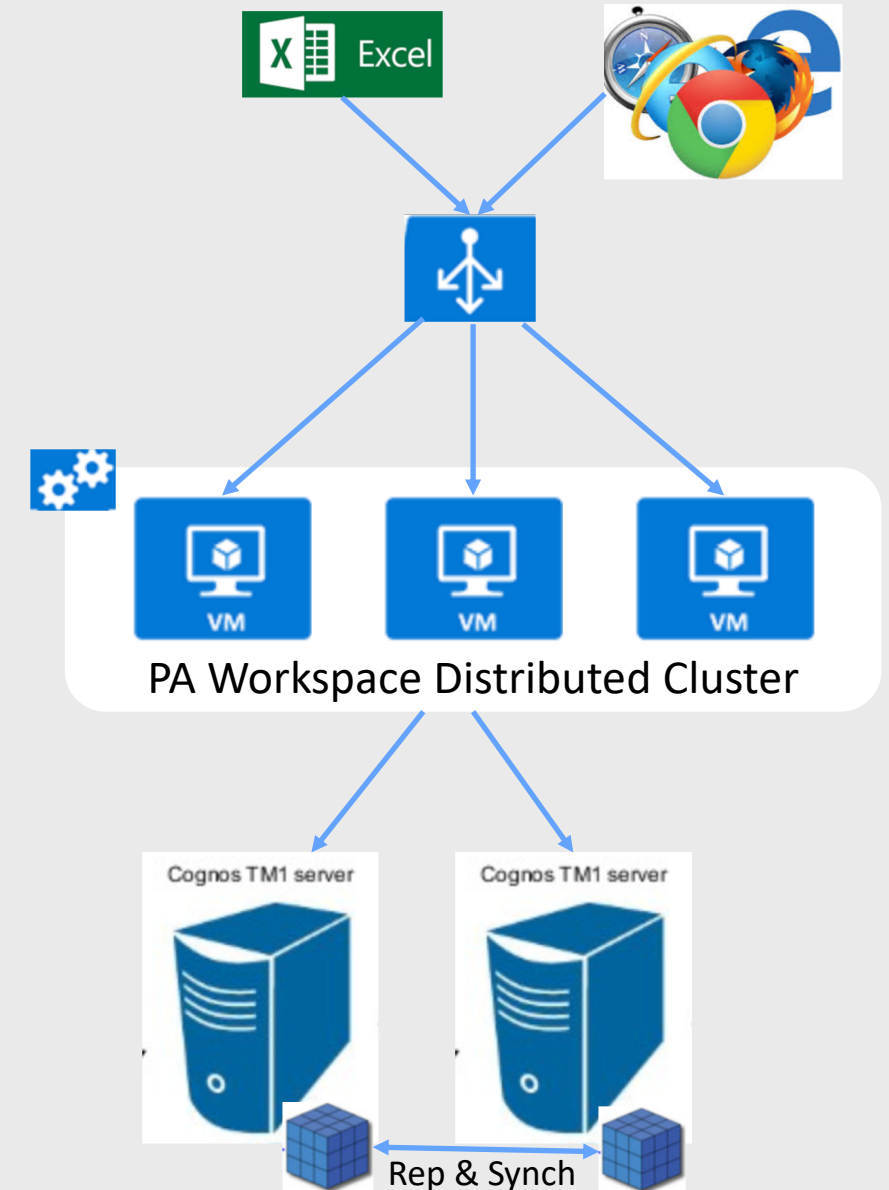
[TM1 Web and TM1 Applications Loading Balancing and High Availability Run Book](#)



# IBM Planning Analytics Workspace Local Distributed: Advantages

A Secure, Scalable, Highly Available PA Workspace platform with:

- Non-disruptive operations
- Automated Rollouts and Rollbacks
- Elastic horizontal scaling
- Self-healing
- Service discovery & load balancing
- Secret and configuration mgt
- Intelligent request routing



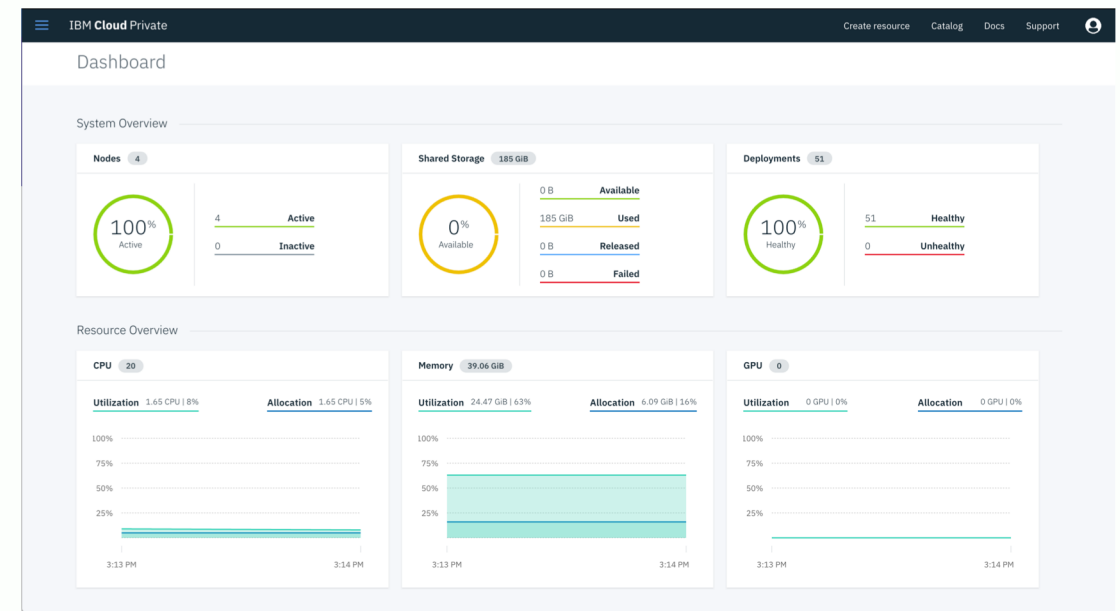
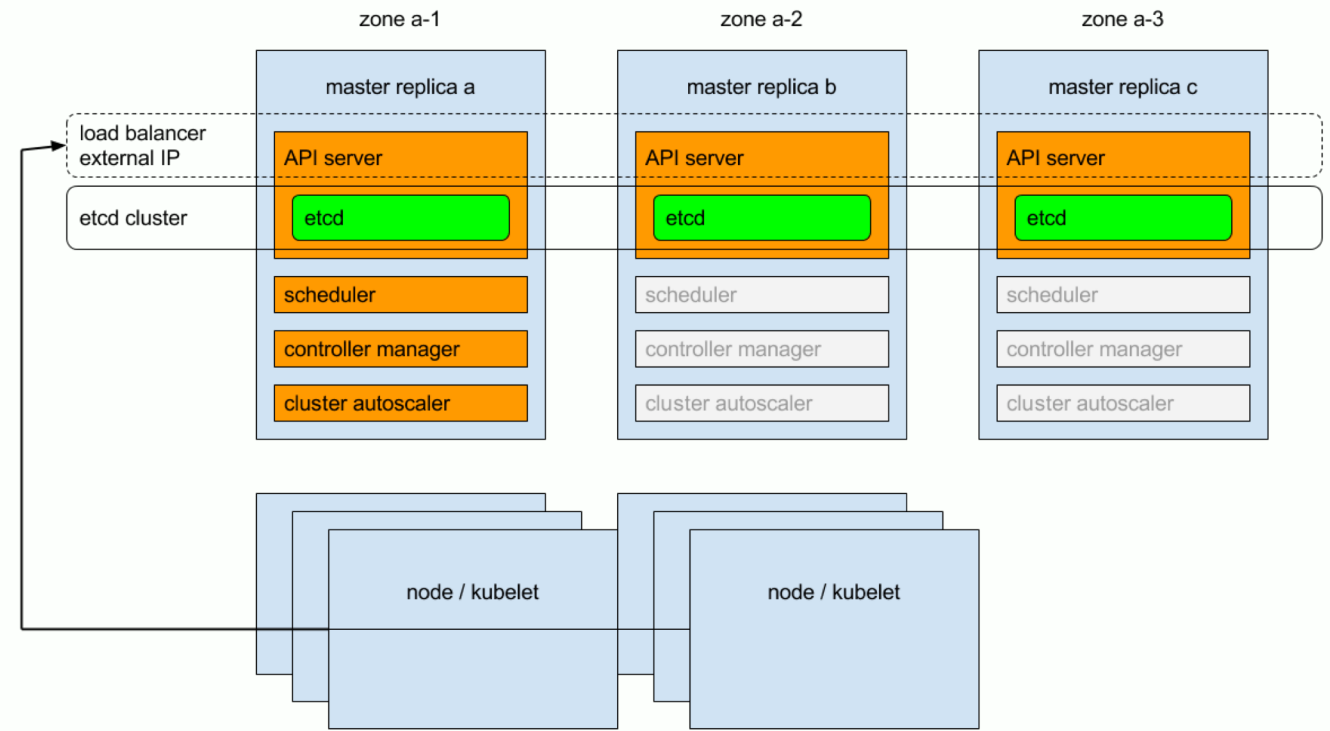
# IBM Planning Analytics Workspace Local



# IBM Planning Analytics Workspace Local Distributed IN THE LABS

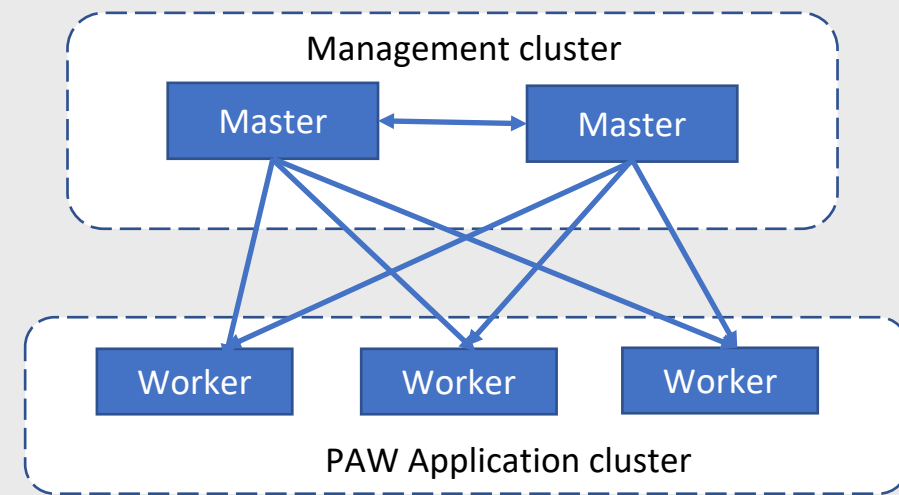
## IBM Cloud Private

- IBM Cloud Private allows for the management of on premises containerized applications.
- At least 1 master node is required to provide proxy and management support for containers
- At least 3 worker nodes are required for PAW fail-over
- PAW Services and Databases are distributed amongst worker nodes



# Standing up a 3 Node PAW cluster

Install IBM Cloud Private master and worker nodes



IBM Knowledge Center

Marketplace

Previous

Next

Home > IBM Cloud Private 2.1.0 > ... > Installing IBM® Cloud Private Cloud Native >

Installing an IBM® Cloud Private Cloud Native HA environment

Table of contents

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Search in all products

Search in this product...

Set up high availability (HA) IBM® Cloud Private master, worker, and proxy nodes in your cluster.

- Before you install IBM® Cloud Private, prepare your cluster. See [Configuring your cluster](#).
- You can install only IBM® Cloud Private in high availability mode.

You can configure high availability for IBM® Cloud Private master and proxy nodes. You can configure high availability for only the master nodes, only the proxy nodes, or for both types of node. To reduce the infrastructure requirements of your cluster, you can assign both master and proxy roles to the high availability nodes.

**Note:** To reduce performance risk, configure either 3 or 5 master or proxy nodes.

For more information about node types, see IBM® Cloud Private [Architecture](#).

If you plan to use the private image registry, you must set up shared storage across your master nodes. The following directories must be mounted on this shared storage:

- `/var/lib/registry` - this directory is used to store images in the private image repository. This shared images directory is needed so that these images are kept synchronized across all master nodes.

More topics

[Installing a standard IBM® Cloud Private Cloud Native environment](#)

[Installing bundled products](#)

Print this topic

Help

Select a product

Open a ticket and download fixes at the IBM Support Portal

Feedback

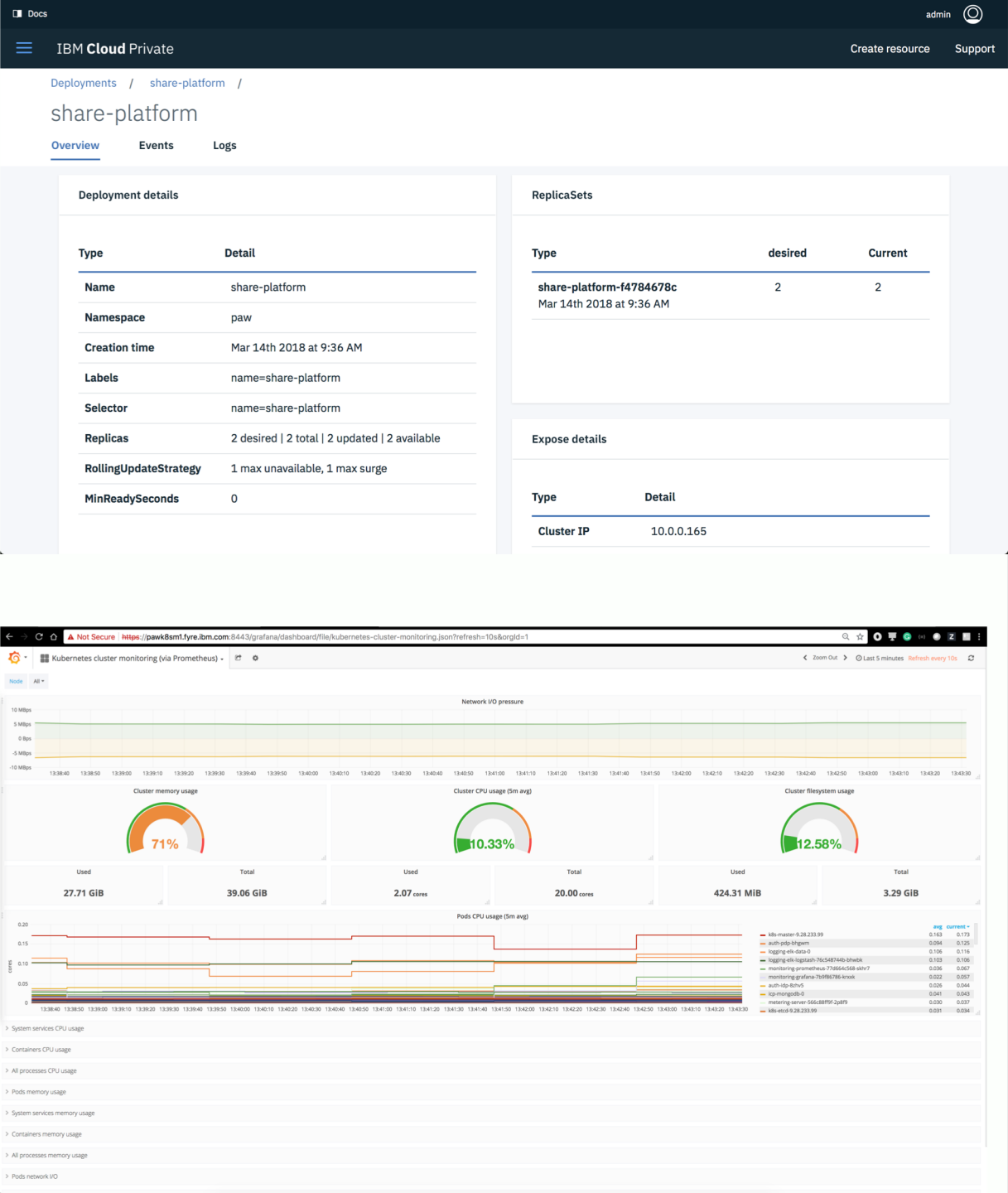
ical tutorial in developerWorks

# PAW Local Distributed Install, Configuration, and Monitoring

Unzip and run ./config.sh, then ./deploy.sh

- All secrets and configs created
- All databases automatically set up clustering and security

IBM Cloud Private provides monitoring capabilities



# Small Cluster Sizing and Typical PAW Service Distribution

A Cluster of 3 worker nodes, 4 cores/16 GB each, is easy to manage, will tolerate the failure of one node, and will support ~ 1000 named PAW users

OOTB clustered Redis, Mongo, CouchDB and MySQL services

Zero ops and configuration required to spin up replicated databases

Option to point to external customer-supplied endpoint to use a pre-existing database

IBM Cloud Private

Create resourceCatalogDocsSupport

Nodes

Search items

20 items per page | 1-4 of 4 items1 of 1 pages

NAME	ROLE	ARCHITECTURE	STATUS	SCHEDULABLE	CREATED
<a href="#">9.28.233.102</a>	worker	amd64	Active	Schedulable	4 days ago
<a href="#">9.28.233.101</a>	worker	amd64	Active	Schedulable	4 days ago
<a href="#">9.28.233.100</a>	worker	amd64	Active	Schedulable	4 days ago
<a href="#">9.28.233.99</a>	proxy, management, master	amd64	Active	Schedulable	4 days ago

Nodes / 9.28.233.100 / 9.28.233.100Overview

Node details

Type	Detail
Hostname	9.28.233.100
Unschedulable	Schedulable
Status	Active
Address	9.28.233.100
Labels	beta.kubernetes.io/arch=amd64,beta.kubernetes.io/os=linux,gpu/nvidia=NA,kubernetes.io/hostname=9.28.233.100,pa-node1=true
CPU	4
Memory	7.5 GiB
alpha.kubernetes.io/nvidia-gpu	0
CPU Request	0m (0%)
CPU Limits	0m (0%)
Memory Request	0Mi (0%)
Memory Limits	0Mi (0%)
GPU Limits	0 (0%)
Created	4 days ago

Pods

Search items

20 items per page | 1-20 of 23 items1 of 2 pages

NAME	NAMESPACE	STATUS	HOST IP	POD IP	READY	START TIME	ACTION
<a href="#">sentinel-data1-5d7b559fcd-wr46g</a>	pa-workspace	Running	9.28.233.100	10.1.157.198	1/1	4 days ago	
<a href="#">neo-idbiz-6d94c7bct-d6bms</a>	pa-workspace	Running	9.28.233.100	10.1.157.217	1/1	4 days ago	
<a href="#">yellicorn-5bcccccd79-wdfls</a>	pa-workspace	Running	9.28.233.100	10.1.157.207	1/1	4 days ago	
<a href="#">mysql-data1-584dbd894d-ig2pd</a>	pa-workspace	Running	9.28.233.100	10.1.157.196	1/1	4 days ago	
<a href="#">mysql-server-598f8b448-ss2s</a>	pa-workspace	Running	9.28.233.100	10.1.157.215	1/1	4 days ago	
<a href="#">erism-aop-7476b86bbc-zf744</a>	pa-workspace	Running	9.28.233.100	10.1.157.222	1/1	4 days ago	
<a href="#">gateway-d8d79bc97-4ndd</a>	pa-workspace	Running	9.28.233.100	10.1.157.211	1/1	4 days ago	
<a href="#">share-nrosv-c49b747d6-nd2c7</a>	pa-workspace	Running	9.28.233.100	10.1.157.223	1/1	4 days ago	
<a href="#">erism-platform-65f7f7a56c-rm52</a>	pa-workspace	Pending	9.28.233.100	-	0/1	4 days ago	
<a href="#">erism-platform-65f7f7a56c-9b3b</a>	pa-workspace	Running	9.28.233.100	10.1.157.226	1/1	4 days ago	
<a href="#">glass-66b6db8f-cxll2</a>	pa-workspace	Running	9.28.233.100	10.1.157.213	1/1	4 days ago	
<a href="#">mongo-data1-56fb566695-cmxyz</a>	pa-workspace	Running	9.28.233.100	10.1.157.197	1/1	4 days ago	
<a href="#">couchdb-data1-fd5576b6t-c9zdf</a>	pa-workspace	Running	9.28.233.100	10.1.157.206	1/1	4 days ago	
<a href="#">social-56b79494f8-bc2fb</a>	pa-workspace	Running	9.28.233.100	10.1.157.224	1/1	4 days ago	
<a href="#">redis-data1-5c6d7c4467-c0lrg</a>	pa-workspace	Running	9.28.233.100	10.1.157.202	1/1	4 days ago	
<a href="#">user-admin-8489c7f4d-sy9b6</a>	pa-workspace	Running	9.28.233.100	10.1.157.227	1/1	4 days ago	
<a href="#">neo-cognition-75b96b64fc-8tong</a>	pa-workspace	Running	9.28.233.100	10.1.157.221	1/1	4 days ago	
<a href="#">erism-nrosv-65f8bdc6f6-17xvi</a>	pa-workspace	Running	9.28.233.100	10.1.157.204	1/1	4 days ago	
<a href="#">monitoring-crometheus-nodes-proc...</a>	kube-system	Running	9.28.233.100	9.28.233.100	1/1	4 days ago	
<a href="#">calico-node-tmnc7</a>	kube-system	Running	9.28.233.100	9.28.233.100	2/2	4 days ago	



# Desired State Management

Stateless services can be scaled up or down as required for fail-over/performance

Mongo, Redis, CouchDB, MySQL configured to replicate (master/slave/slave or master/master)

IBM Cloud Private

Create resourceCatalogDocsSupport

ReplicaSets

All namespaces

NAME	NAMESPACE	DESIRED	CURRENT	CREATED	ACTION
<a href="#">sentinel-data3-5584fc5cb</a>	pa-workspace	1	1	4 days ago	<div></div>
<a href="#">mongo-data2-644cdf7b7</a>	pa-workspace	1	1	4 days ago	<div></div>
<a href="#">mongo-data3-85bcccd99</a>	pa-workspace	1	1	4 days ago	<div></div>
<a href="#">mysql-data2-76664d4bc4</a>	pa-workspace	1	1	4 days ago	<div></div>
<a href="#">redis-data2-6bb66c9d69</a>	pa-workspace	1	1	4 days ago	<div></div>
<a href="#">redis-data3-5dfb597f6d</a>	pa-workspace	1	1	4 days ago	<div></div>
<a href="#">sentinel-data2-9b57497bb</a>	pa-workspace	1	1	4 days ago	<div></div>
<a href="#">couchdb-data2-54449d7c67</a>	pa-workspace	1	1	4 days ago	<div></div>
<a href="#">mongo-data1-5fdb566695</a>	pa-workspace	1	1	4 days ago	<div></div>
<a href="#">mysql-data1-584db4894d</a>	pa-workspace	1	1	4 days ago	<div></div>
<a href="#">redis-data1-5c6d7c4467</a>	pa-workspace	1	1	4 days ago	<div></div>
<a href="#">sentinel-data1-5d7b559f6d</a>	pa-workspace	1	1	4 days ago	<div></div>
<a href="#">couchdb-data1-ffd5596bf</a>	pa-workspace	1	1	4 days ago	<div></div>
<a href="#">social-56b79494f8</a>	pa-workspace	2	2	4 days ago	<div></div>
<a href="#">user-admin-8489cf7d4</a>	pa-workspace	2	2	4 days ago	<div></div>
<a href="#">wa-proxy-69df9b57fb</a>	pa-workspace	2	2	4 days ago	<div></div>
<a href="#">welcome-5bcccdcd79</a>	pa-workspace	2	2	4 d	<div><div>Scale</div><div>Edit</div><div>Remove</div></div>
<a href="#">prism-platform-65f7b7656c</a>	pa-workspace	2	2	4 d	<div></div>
<a href="#">prism-proxy-65fbbfbcf6</a>	pa-workspace	2	2	4 d	<div></div>
<a href="#">share-app-5bff9c5698</a>	pa-workspace	2	2	4 days ago	<div></div>

>

×

REPLICASET

Scale ReplicaSet

How many instances do you want to scale to?  
Instances:

6

Cancel

Scale ReplicaSet

# PAW Backing Up

- `$ ./backup.sh`
- Supply the backup directory or one is generated with the current time
- Hot Backup of MySQL, MongoDB, Redis, CouchDB, all without outage

```
Press Ctrl+C to stop the tool
^CStopping IBM Planning Analytics Workspace Administration Tool...
root@NodeA1:~/paw/tools#
root@NodeA1:~/paw/tools# ./backup.sh
Backing up to directory: /root/paw/tools/backup/backup_2018_09_17_11_30_07
Starting backup...
Backing up CouchDB
=====
Performing backup on http://localhost:5984/socialdb using configuration:
{
  "bufferSize": 500,
  "log": "/tmp/tmp-213E6bsrfrGM0Mc.tmp",
  "mode": "full",
  "parallelism": 5
}
=====
2018-09-17T11:30:09.031Z couchbackup:backup Fetching all database changes...
2018-09-17T11:30:09.180Z couchbackup:backup Total batches received: 1
2018-09-17T11:30:09.225Z couchbackup:backup Written batch ID: 0 Total document revisions wr
2018-09-17T11:30:09.232Z couchbackup:backup Finished - Total document revisions written: 8
Backing up Mongo
MongoDB backup complete: success
Backing up MySQL
MySQL backup complete: success
Backing up Redis
Backup complete: /root/paw/tools/backup/backup_2018_09_17_11_30_07
root@NodeA1:~/paw/tools#
```

# Restoring PAW

## -\$tools/restore.sh

- Must supply the backup directory
- Used to recover from catastrophic failure (permanent loss of quorum in the cluster)

```
root$ ./restore.sh ../backup/backup_2018_03_14_10_47_03
Restoring from directory: ../backup/backup_2018_03_14_10_47_03
Starting restore...
Restoring scripts
Restoring secrets
Restoring couchdb
Restoring mongo
Restoring mysql
Restoring redis
Done
root$
```

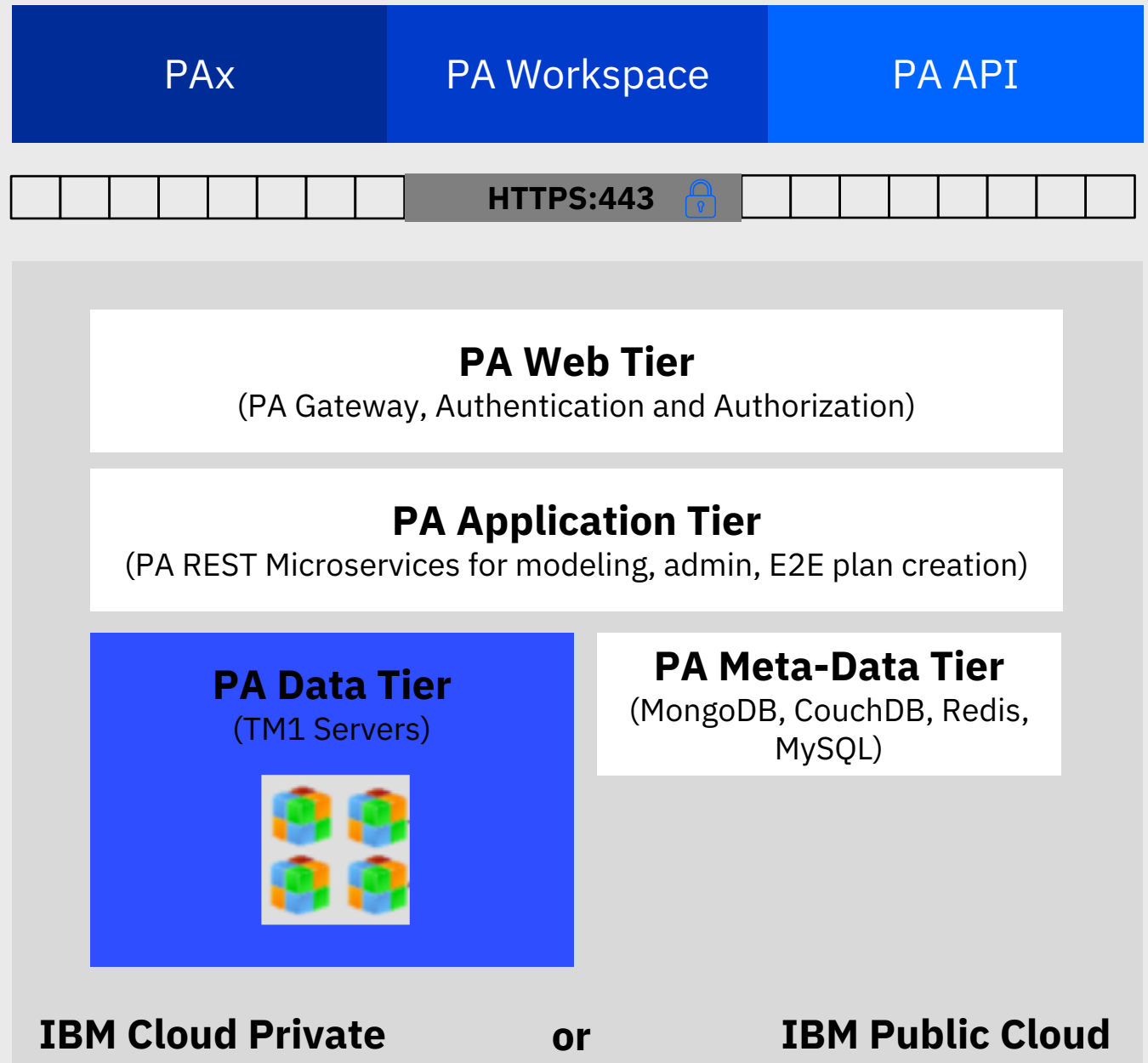
# Next Generation Planning Analytics Architecture

# IBM Planning Analytics Architecture Roadmap

Secure, Scalable, Highly Available PA System with:

- Non-disruptive operations
- Automated Rollouts and Rollbacks
- Elastic horizontal scaling
- Self-healing
- Service discovery & load balancing
- Secret and configuration mgt
- Intelligent scheduling

**PA with ICP is game changing! bringing cloud operation efficiency and reliability to your data center.**



# Need more Info?

[Planning Analytics 2.0 documentation](#)

[Planning Analytics Community](#)

[Planning Analytics YouTube Channel](#)

[IBM Cloud Private Documentation in Knowledge Center](#)

## Q&A

Docs Videos **New**

Planning Analytics on the Cloud >

Planning Analytics Local Installation and Configuration >

Planning Analytics Workspace >

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Recommended

Recently viewed

Accessible Docs

## IBM Planning Analytics Workspace Docs

How can Watson help you?

People like me asked: [cube](#) [samples](#) [search](#) [sheet](#)

### Recommended content for new features

#### Feature updates

- 2.0.30 - Feature updates, January 19, 2018
- 2.0.29 - Feature updates, December 15, 2017
- 2.0.28 - Feature updates, November 17, 2017

#### Videos

- Tutorial 5: Creating a chart to show expenses (Planning Analytics Workspace)
- Importing data into a cube
- Creating a view with the Intent Bar

#### Blogs

- Importing data into a cube in Planning Analytics Workspace – IBM Analytics Communities
- What's new In Planning Analytics – July 7th, 2016 – IBM Analytics Communities
- Feb 2017 Updates to Planning Analytics – IBM Analytics Communities

#### Topics

- 2.0.30 - Feature updates, January 19, 2018
- What's new in Planning Analytics Workspace
- 2.0.29 - Feature updates, December 15, 2017

### Quick resources

- Getting started
- Workspace tutorial
- Youtube channel
- Community

# Take a minute to share your thoughts.....

The IBM Customer Success team is seeking your feedback to validate the support and product life-cycle strategies for our solution. Please take a few moments to complete a short survey regarding your support community experiences and Cognos Analytics modernization plans.

***Thank you in advance for participating***

Cognos Analytics Version Customer Success Survey

<https://www.surveymonkey.com/r/AnalyticsUnivCA>





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# Thank you

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