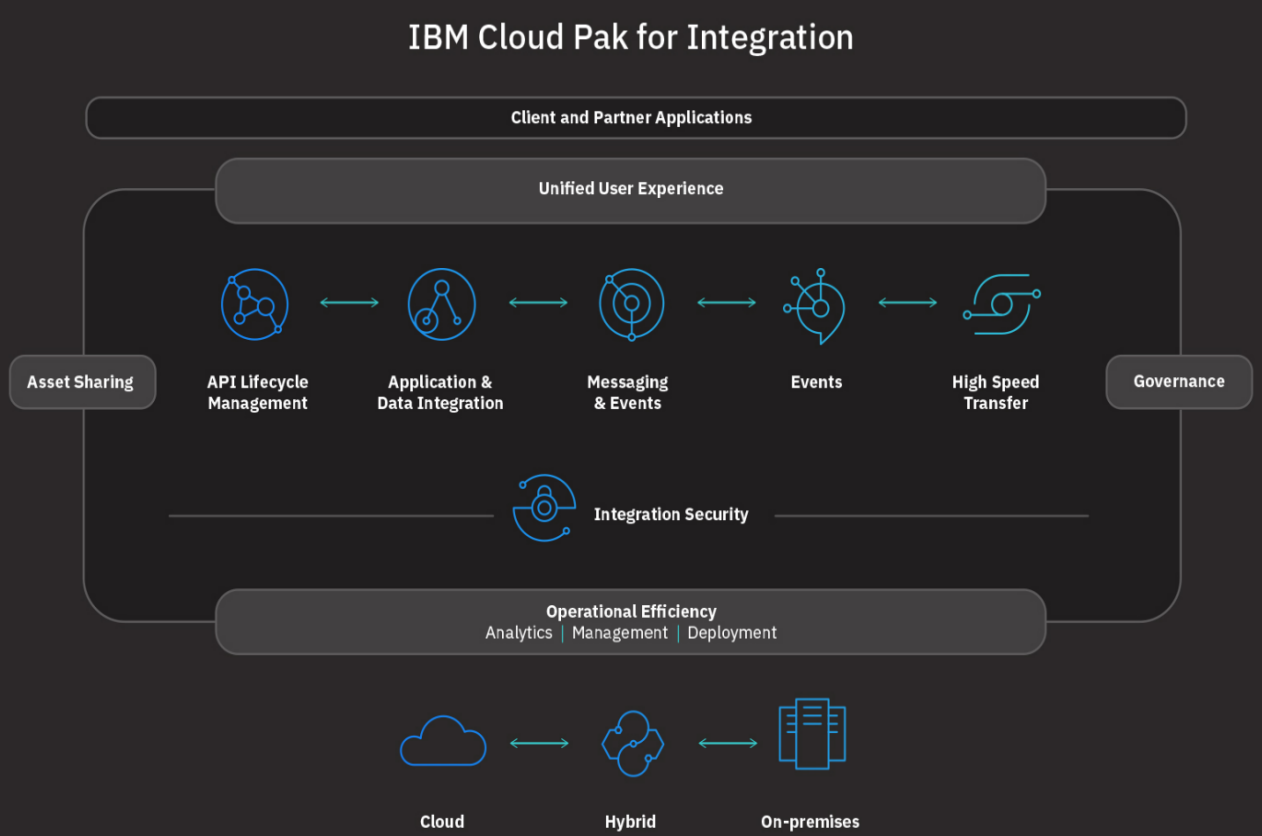
IBM Cloud Pak for Integration



IBM MQ Advanced
and
MQ (base)
are both available as part of the Cloud Pak for Integration.

Purchase options for
IBM MQ

Use your Software License (LI) as a single source of truth for what you are entitled to
https://www-03.ibm.com/software/sla/sladb.nsf/search?OpenForm

What features do I get with MQ, MQ Advanced, MQ for zOS etc?
https://www.ibm.com/support/knowledgecenter/SSFKSJ_9.2.0/com.ibm.mq.pro.doc/q126140_.htm

For more information about IBM licensing click here

Software: MQ or MQ Advanced (+ High Availability replica parts if required.)

Hardware appliance: MQ Appliance

Mainframe: MQ for z/OS, MQ Advanced for z/OS VUE

Cloud:

- IBM-managed '**MQ on IBM Cloud**' service (available on IBM Cloud and AWS)
- **BYOSL** – Bring your software license to Docker, K8, IBM Cloud, AWS, Microsoft Azure etc (for eligible public clouds and core ratings, click here) use MQ or MQ Advanced software parts + High Availability Replica parts if needed.
- **BYOL** – customers with existing software investment can gain a discount on IBM MQ on IBM Cloud.

Hybrid License: One license to cover MQ Advanced on premise and the managed 'MQ on Cloud' service.

Metrics:

- **PVU –** a unit of measure used to differentiate licensing of software on distributed processor technologies. Work out PVU ratings for different processor technologies here or use the calculator.
- **VPC / month –** a physical processor core, provided that the server is not partitioned for virtual machines, or a virtual core assigned to a virtual machine
- **VPC / hour –** MQ on Cloud managed service
- **Install** – used for MQ Appliance
- **MSU –** (MQ for z/OS) – measurement of the amount of processing work a computer can perform in one hour

Need IBM on-site for assistance that goes beyond standard break/fix support?

IBM's **On-Site Hardware Assistance** offering for Data Power and **MQ Appliances** can help!

TOP

On-site Hardware Assistance can be used for any or all of these options:

- **On-Site Problem Diagnostics** provides on-site assistance to extend Support capabilities - especially helpful for remote locations where staffing is limited
- **Stand-By Service** during planned events – IBM technicians can be on-site to stand-by to assist more rapidly in case problems arise during planned events such as firmware updates or data center cycling
- **Hardware Health Check** on-site presence to complement remote health checks
- **Hardware Install** installs your Appliance hardware for you
- **Customer Replacement Unit (CRU) installs** replaces parts for you that are normally client responsibility

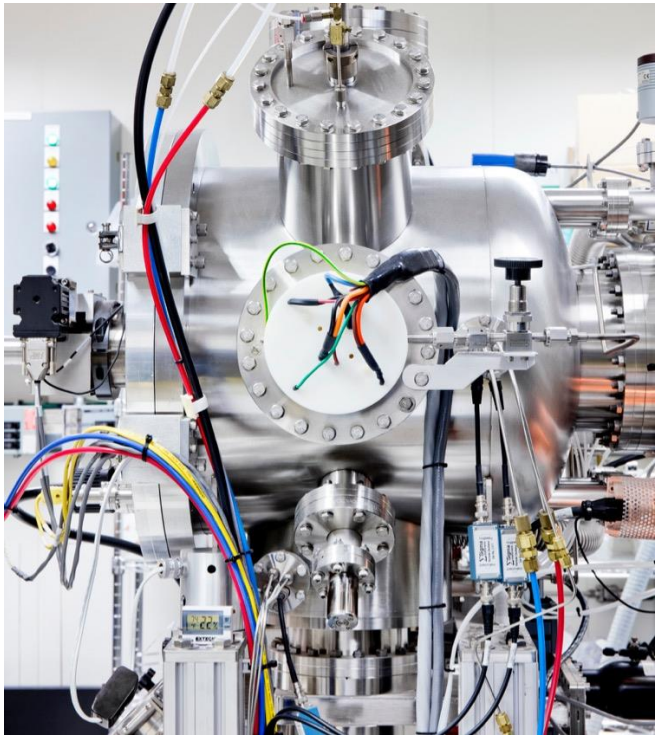
Offering Details:

- Sold as 3-Day or 5-Day packs
- Service choice from above made when service is requested
- Days are valid for up to one year after purchase
- Service Days may be used in half-day increments
- Requires active support agreement (warranty or maintenance subscription, active at the time of sale & at the time of service delivery)

High Availability (HA)

TOP

- **Availability**
  - A system is said to be available if it is able to perform its required function, such as successfully process requests from users.
  - Usually measured as a percentage of time that a system is functional in a month or a year.
  - An essential element of Service Level Agreements (SLAs) between service providers and service consumers.
- **High Availability**
  - A requirement, or a capability, of a system to be operational for a greater proportion of time than is common for other, less important, systems.
- **HA solutions employ:**
  - Redundancy to eliminate single points of failure using high speed failover.
  - Dynamic routing to redistribute work in response to failures.



IBM MQ HA capabilities

TOP

IBM MQ has a number of capabilities that can be used to build highly available solutions. The capabilities, discussed in the next few charts, help address different aspects of a messaging solution, including the availability of queue managers and how they communicate with each other and applications. Customers are required to ensure they have sufficient entitlement to cover their HA environments as specified in the Program License through the use of 'HA Replica' parts.

What are High Availability Replica chargeable components?

High Availability Replica (formerly Idle Standby) parts cater for high availability environments, where multiple systems are configured to provide redundancy. In this case, not all systems will be utilized to full capacity and a lower charge might be applicable to reflect that.

For most scenarios of failover systems where IBM MQ is installed:

- If failover is automatic, and there is no other active use of IBM MQ, then license the failover system as IBM MQ High Availability Replica or IBM MQ Advanced High Availability Replica.
- If failover is manual (for example, for Disaster Recovery), and there is no other active use of IBM MQ, then no IBM MQ or IBM MQ High Availability Replica licenses (or their IBM MQ Advanced equivalents) are required. See Backup Licensing documents.
- The IBM MQ Replicated Data Queue Manager High Availability and Disaster Recovery Features require entitlement as described in the license terms. A copy of the terms are on the next slide.

You must use the **setmqinst** command to specify that an installation is a High Availability Replica. This action applies tags to the installation such that it can be identified by ILMT (see **setmqinst**).

This is a copy of the IBM MQ 9.2 License terms:

A. Licensee's use of the Program is limited to use of the following features as stated below or as stated in the Other High Availability Solutions section.

1. Multi-Instance Queue Manager Feature

Licensee is permitted to use the multi-instance queue manager feature of the Program for Stand-by Purposes only. Stand-by Purposes are defined as having the Program started, but ensuring that the Program remains idle unless the active and separately entitled IBM MQ copy of the program fails over to the high availability replica Program. If this occurs, the high availability replica Program may be used to carry out productive work during the period of failover. The Program is considered "idle" if, until a failover takes place, it is not used to carry out productive work of any kind and is used exclusively for administrative actions.

2. Replicated Data Queue Manager High Availability Feature

Licensee's use of this replicated data queue manager feature of the Program requires configuration on three servers and requires that all queue managers on the three servers be Replicated Data Queue Managers. Two of the servers may be configured and entitled as IBM MQ Advanced High Availability Replica, but the copy of IBM MQ on the third configured server must be licensed separately by obtaining entitlements to IBM MQ Advanced. When using this high availability feature in conjunction with replication to a disaster recovery site, the three high availability servers at the disaster recovery site must also be entitled as described above.

3. Replicated Data Queue Manager Disaster Recovery Feature

Licensee's use of this replicated data queue manager feature of the Program requires configuration on two servers and requires that all queue managers on the two servers be Replicated Data Queue Managers. One of the servers may be configured and entitled as an IBM MQ Advanced High Availability Replica, but the copy of IBM MQ on the second configured server must be licensed separately by obtaining entitlements to IBM MQ Advanced. This disaster recovery configuration of two servers is a separate configuration to using three servers as a high availability configuration, even when that is used with replication to a disaster recovery site.

4. Other High Availability Solutions

If Licensee chooses to use other high availability solutions along with the Program, Licensee is permitted to use the Program as a high availability replica so long as it resides for backup purposes on a standby server and the Program is not started. The Program may be started automatically by the high availability components in the event of the active server failing, in which event the Program may be used to carry out productive work during the period of failover.

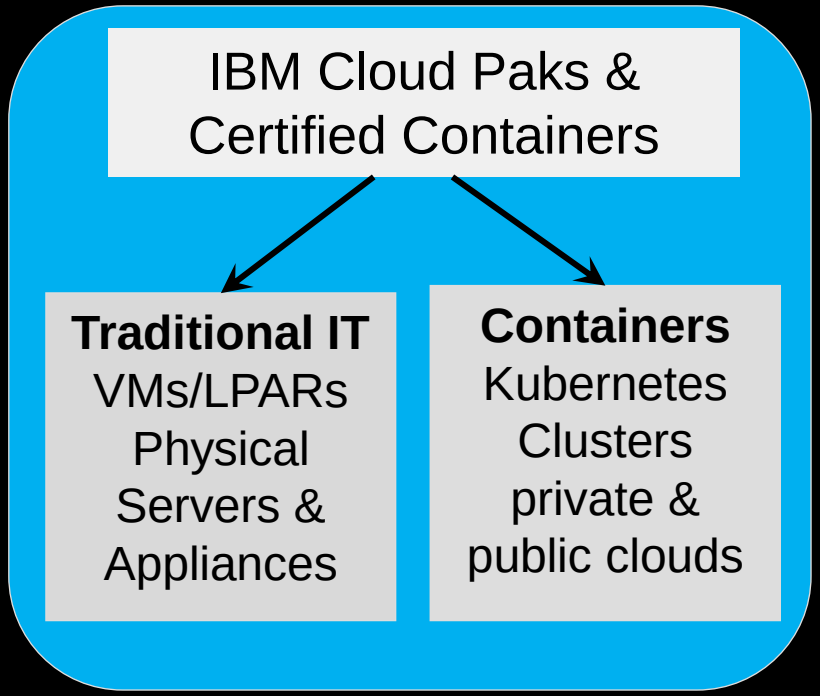
An Introduction to Container Licensing on IBM Cloud Paks and IBM Certified Containers

IBM Cloud

Agenda

- High level notions on Kubernetes and Cloud Paks
- Overview of the new Container Licensing
- IBM license management Tools

What are IBM Cloud Paks and IBM Certified Containers



IBM Cloud Paks

- ✓ Solution that includes multiple products plus supporting programs
- ✓ Includes entitlement to Red Hat OpenShift Container Platform (Kubernetes orchestration)

IBM Certified Containers

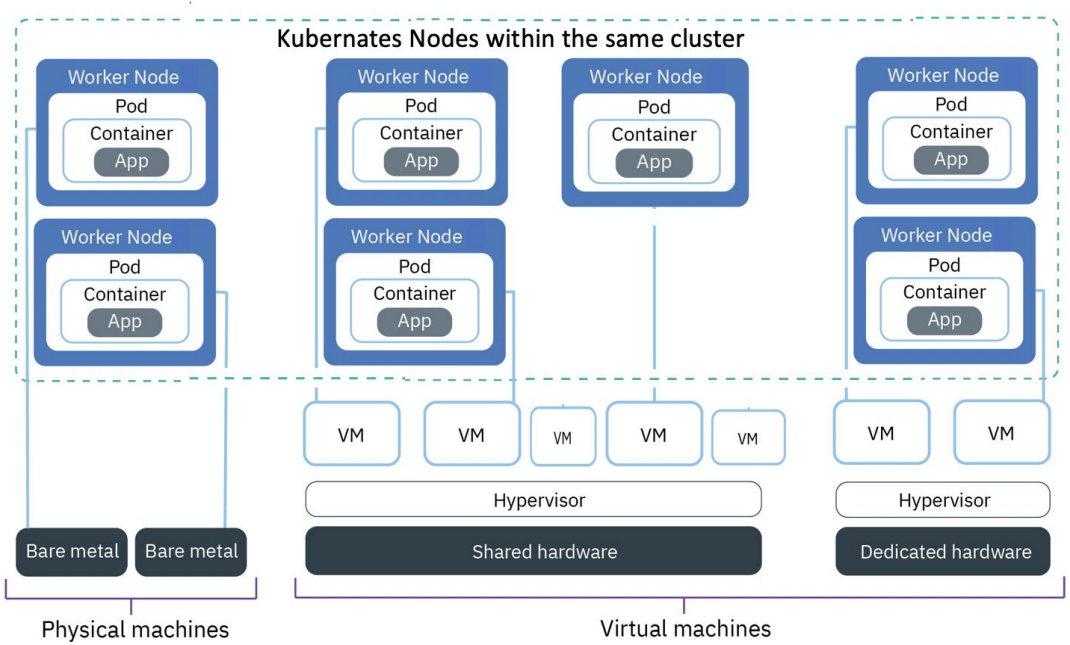
- ✓ Standalone deployments of containerized software that meet standard criteria for packaging with platform integrations.

Deployment options

- ✓ IBM Cloud Paks & Certified Containers can be deployed in traditional environments and/or within Docker/Kubernetes environments.

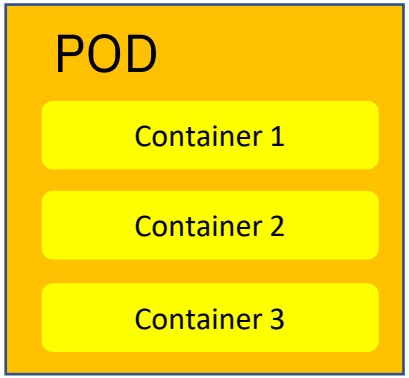
A few Kubernetes notions

- Cluster: the set of Master, Hub-Gateways and Worker Nodes
  - Applications and IBM SW are running only on Worker Nodes
- Worker Node: a Physical Bare Metal Server, a VM or LPAR
- POD: the basic entity that Kubernetes manages and schedule to run within the Cluster
  - An Application can be one or multiple PODs
  - A POD can include one or multiple Containers



NOTE: In IBM we usually refer to Product Containers, but they are actually Product PODs

Key Notions about POD and Container Capacity



POD - basic unit that is managed by Kubernetes. Containers are executed within the boundaries of a POD. A POD can include one or more Containers.

CPU Request: mandatory value of minimum CPU required by the Container to run. The **POD CPU Request** is the sum of all Containers CPU Requests within the POD.

CPU Limit: optional value of maximum CPU allocation that container will be limited to. The **POD CPU Limit** is the sum of all Containers CPU Limits within the POD.

	CPU request	CPU Limit
Container 1	0.3	0.7
Container 2	0.2	0.5
Container 3	0.1	0.3
POD	0.6	1.5

Kubernetes schedules Pods on Worker Nodes accordingly to the aggregated CPU requests of the containers in a Pod (POD cpu.request), and the available CPU capacity on the worker nodes in the cluster.

CPU limit is not granted and it is only the max cap a POD can have within the Worker Node

Why the IBM Container licensing?

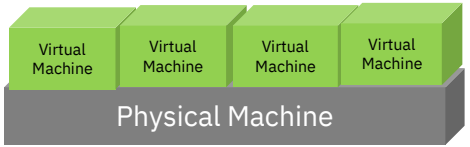
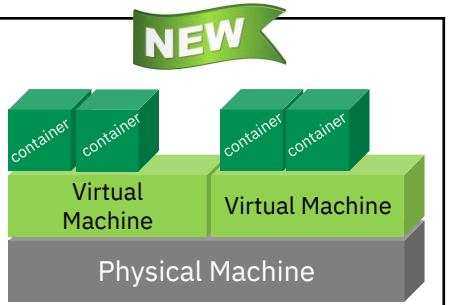
IBM is:

- ✓ **Better alignment with Kubernetes capabilities:**: Allowing customers to license software for container groupings (Pods) rather than a virtual or physical server. **Containers are now an eligible sub-capacity technology.**
- ✓ **A new License Service tool/solution** that will allow for automatic tracking and reporting of license usage for containerized environments.

Container Licensing allows clients to:

- Capitalize on the value of containers and Kubernetes
- License only the capacity available to their container deployments
- Make use of the advantages of Kubernetes without incurring a licensing penalties
- Enables portability of a standard Kubernetes licensing methodology in private and public Cloud
- Simplify compliance & audit with IBM License Service tracking and reporting

IBM Capacity Licensing models

License Model	 **Full Capacity**	 **Sub-Capacity**	 **Container**
Price Metric	*PVU, RVU MAPC, VPC* PVU rate value changes by processor type	*PVU, RVU MAPC, VPC* PVU rate value changes by processor type	*PVU, VPC* Flat 70 PVU rate value per processor core
What do you count?	All Physical Cores	All Virtual Cores Count physical cores when virtual cores > physical cores	All cores available to a container
Fractional Core Support	Not supported	Supported for IBM Power only Rounded up at VM level	Supported Rounded up at the Cluster Level
Customer Measured at	Global High Water Mark	Global High Water Mark	Global High Water Mark
Tooling	ILMT	ILMT	License Service

PVU	Processor Value Unit
RVU MAPC	Resource Value Unit for Managed Activated Processor Cores
VPC	Virtual Processor Core

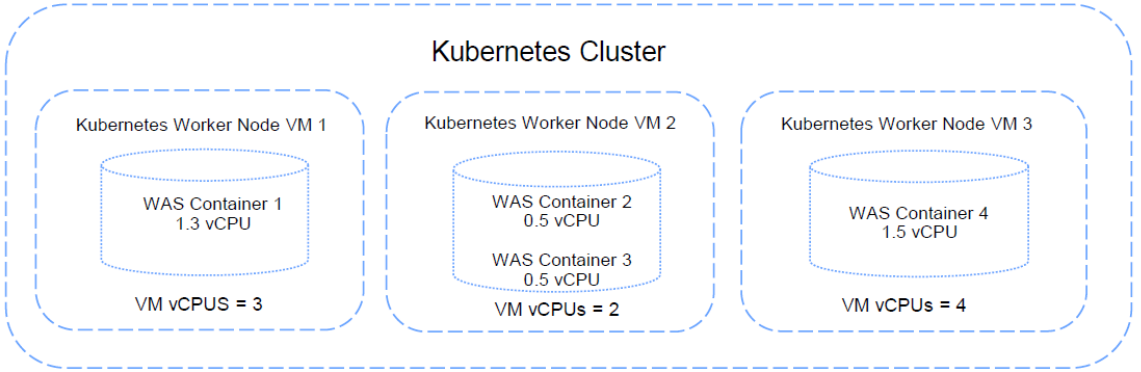
Comparing Sub-Capacity and Container Licensing

Summary	Traditional IT Environments Physical Server/VM/LPAR (Sub-Capacity)	Kubernetes Environments (Container Licensing for Cloud Paks and Containers)
Capacity License requirement	License to the capacity of the VM/LPAR or full capacity of non-virtualized Physical Server	License the max capacity limit for the Pod
Capping	License the lesser of the cores VMs/LPARs or Physical Server	License the lesser of sum of Pods in Worker Node or Worker Node
Fractional Cores	Not Supported	Fractional capacity is counted. Total capacity is rounded at Cluster level
PVUs per Core	Varies depending on chipset	Fixed at 70 PVUs
License Tool	ILMT	License Service
Manual Counting Allowed?	Yes, on exception basis	No

Key notions for Container Licensing

- ✓ Use of **vCPU capacity limit** for each container
- ✓ The vCPU capacity of a Pod is the sum of all containers within that Pod.
- ✓ Cap capacity at Worker Node when:
  - ✓ a) total capacity of product Pods exceeds Worker Nod
  - ✓ b) CPU limits are not set
- ✓ Counting fractional capacity
  - ✓ Rounding total Product Capacity at cluster level to the closest integer
- ✓ Flat 70 PVU rate for PVU licensed products

VPC counting rule – Example

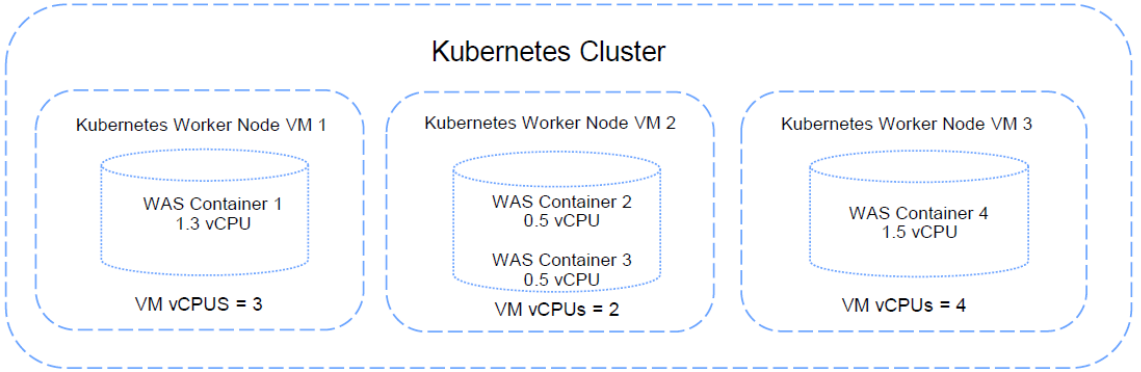


Rounding performed at the Cluster level

Worker Nodes	Containers / PODs	Point in time capacity per Worker Node	Point in time capacity for WAS Application in the Cluster
Worker Node 1	WAS Container 1	1.3	Sum of point in time capacity per Worker Node 1.3 + 1 + 1.5 = 4 VPCs (3.8 rounded to 4)
Worker Node 2	WAS Container 2 WAS Container 3	0.5 + 0.5 = 1	
Worker Node 3	WAS Container 4	1.5	

With traditional Sub-Cap licensing it would have been 9 VPCs

VPC counting rule – Example



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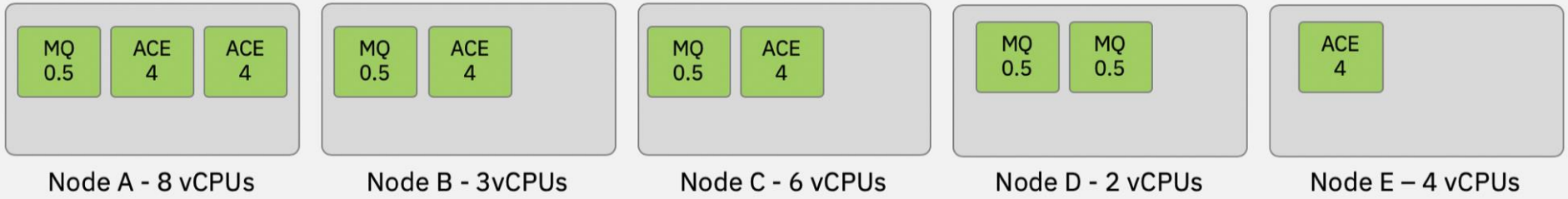
Worker Node 3	WAS Container 4	1.5	

Sample point in time capacity counting at fractional cores capacity for concurrent instances of same Product Containers

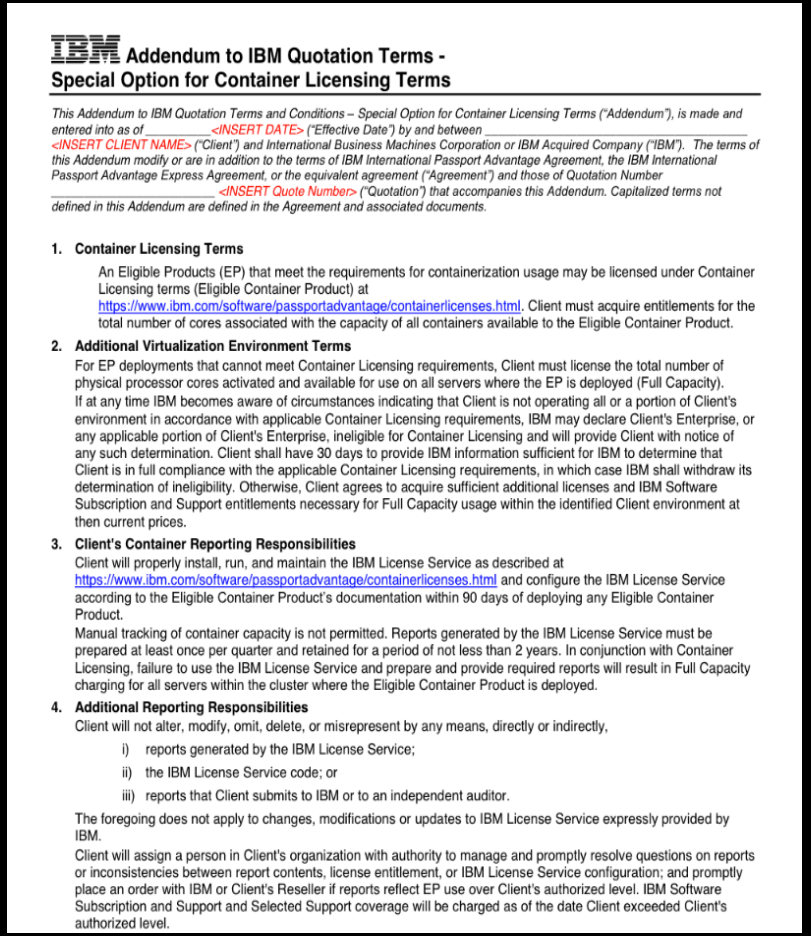


Worker Node ->)	A	B	C	D	E	TOTAL
MQAdv by Node	0.5	0.5	0.5	1 (0.5+0.5)		2.5
MQAdv total for Cluster						3 (2.5 rounded to 3)
CP4Int licenses for MQAdv						2 (2:1 ratio, 3/2 rounded up)
ACE by Node	8 (4+4)	3 (4 but capped to Node)	4		4	19
ACE total for Cluster						19
CP4Int licenses for ACE						57 (1:3 ratio, 19*3)
TOTAL CP4Int licenses						59 (2+57)

IBM Container Licensing

Customer Requirements

- Use any Virtual Processor Core (VPC) & Processor Value Units (PVU) based containerized product supported by IBM License Service
- Use Kubernetes orchestration
- Agree to the Passport Advantage (PA) transaction addendum (terms to be included in next PA update) for **every** transaction
- Use the IBM License Service
- More information + Addendum translations @ https://www.ibm.com/software/passportadvantage/containerlicenses.html



IBM **Addendum to IBM Quotation Terms - Special Option for Container Licensing Terms**

This Addendum to IBM Quotation Terms and Conditions – Special Option for Container Licensing Terms ("Addendum"), is made and entered into as of _____ <INSERT DATE> ("Effective Date") by and between _____ <INSERT CLIENT NAME> ("Client") and International Business Machines Corporation or IBM Acquired Company ("IBM"). The terms of this Addendum modify or are in addition to the terms of IBM International Passport Advantage Agreement, the IBM International Passport Advantage Express Agreement, or the equivalent agreement ("Agreement") and those of Quotation Number _____ <INSERT Quote Number> ("Quotation") that accompanies this Addendum. Capitalized terms not defined in this Addendum are defined in the Agreement and associated documents.

1. **Container Licensing Terms**

   An Eligible Products (EP) that meet the requirements for containerization usage may be licensed under Container Licensing terms (Eligible Container Product) at https://www.ibm.com/software/passportadvantage/containerlicenses.html. Client must acquire entitlements for the total number of cores associated with the capacity of all containers available to the Eligible Container Product.

2. **Additional Virtualization Environment Terms**

   For EP deployments that cannot meet Container Licensing requirements, Client must license the total number of physical processor cores activated and available for use on all servers where the EP is deployed (Full Capacity).
   If at any time IBM becomes aware of circumstances indicating that Client is not operating all or a portion of Client's environment in accordance with applicable Container Licensing requirements, IBM may declare Client's Enterprise, or any applicable portion of Client's Enterprise, ineligible for Container Licensing and will provide Client with notice of any such determination. Client shall have 30 days to provide IBM information sufficient for IBM to determine that Client is in full compliance with the applicable Container Licensing requirements, in which case IBM shall withdraw its determination of ineligibility. Otherwise, Client agrees to acquire sufficient additional licenses and IBM Software Subscription and Support entitlements necessary for Full Capacity usage within the identified Client environment at then current prices.

3. **Client's Container Reporting Responsibilities**

   Client will properly install, run, and maintain the IBM License Service as described at https://www.ibm.com/software/passportadvantage/containerlicenses.html and configure the IBM License Service according to the Eligible Container Product's documentation within 90 days of deploying any Eligible Container Product.
   Manual tracking of container capacity is not permitted. Reports generated by the IBM License Service must be prepared at least once per quarter and retained for a period of not less than 2 years. In conjunction with Container Licensing, failure to use the IBM License Service and prepare and provide required reports will result in Full Capacity charging for all servers within the cluster where the Eligible Container Product is deployed.

4. **Additional Reporting Responsibilities**

   Client will not alter, modify, omit, delete, or misrepresent by any means, directly or indirectly,

   i) reports generated by the IBM License Service;

   ii) the IBM License Service code; or

   iii) reports that Client submits to IBM or to an independent auditor.

   The foregoing does not apply to changes, modifications or updates to IBM License Service expressly provided by IBM.
   Client will assign a person in Client's organization with authority to manage and promptly resolve questions on reports or inconsistencies between report contents, license entitlement, or IBM License Service configuration; and promptly place an order with IBM or Client's Reseller if reports reflect EP use over Client's authorized level. IBM Software Subscription and Support and Selected Support coverage will be charged as of the date Client exceeded Client's authorized level.

IBM Container Licensing - Reporting obligations

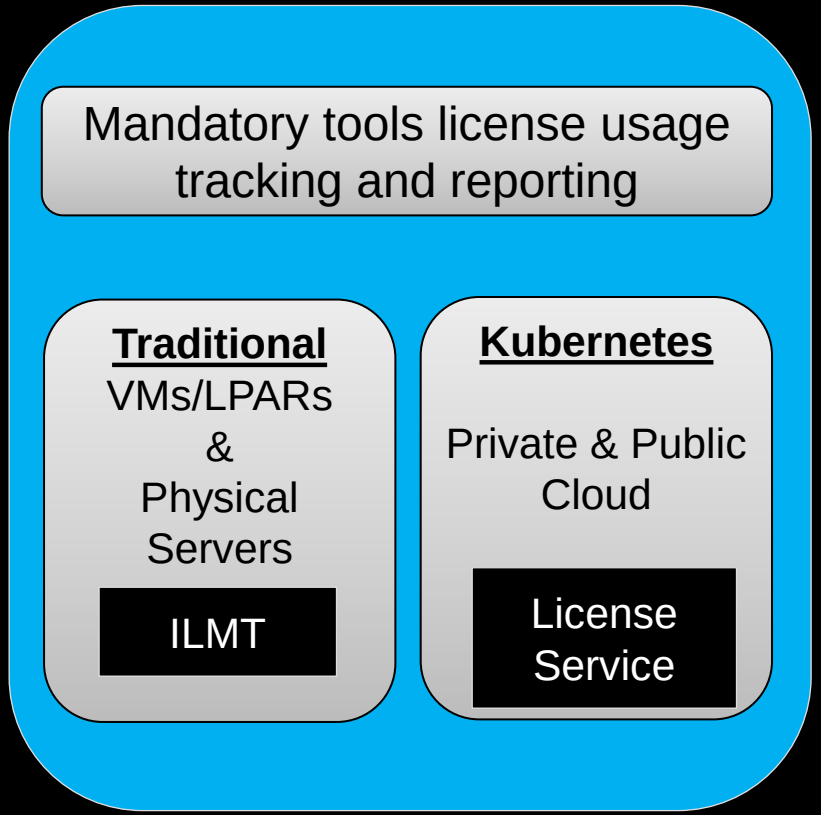
- Must use License Service within 90 days of installing any Eligible Program which takes advantage of Container Licensing
- Must generate an Audit Report at least once per Quarter (or other, if requested by IBM to do so)
- Audit reports bust be archived and stored for up to 2 years
- Audit Reports must be made available to IBM when requested

When the Reporting obligations are not met the Client will be license on Full Capacity.

Passport Advantage Addendum – Full Capacity for a Kubernetes or RH Openshift cluster

- *“failure to use the IBM License Service and prepare and provide required reports will result in Full Capacity charging for all servers within the cluster where the Eligible Container Product is deployed.”*

IBM Tools for license compliance reporting

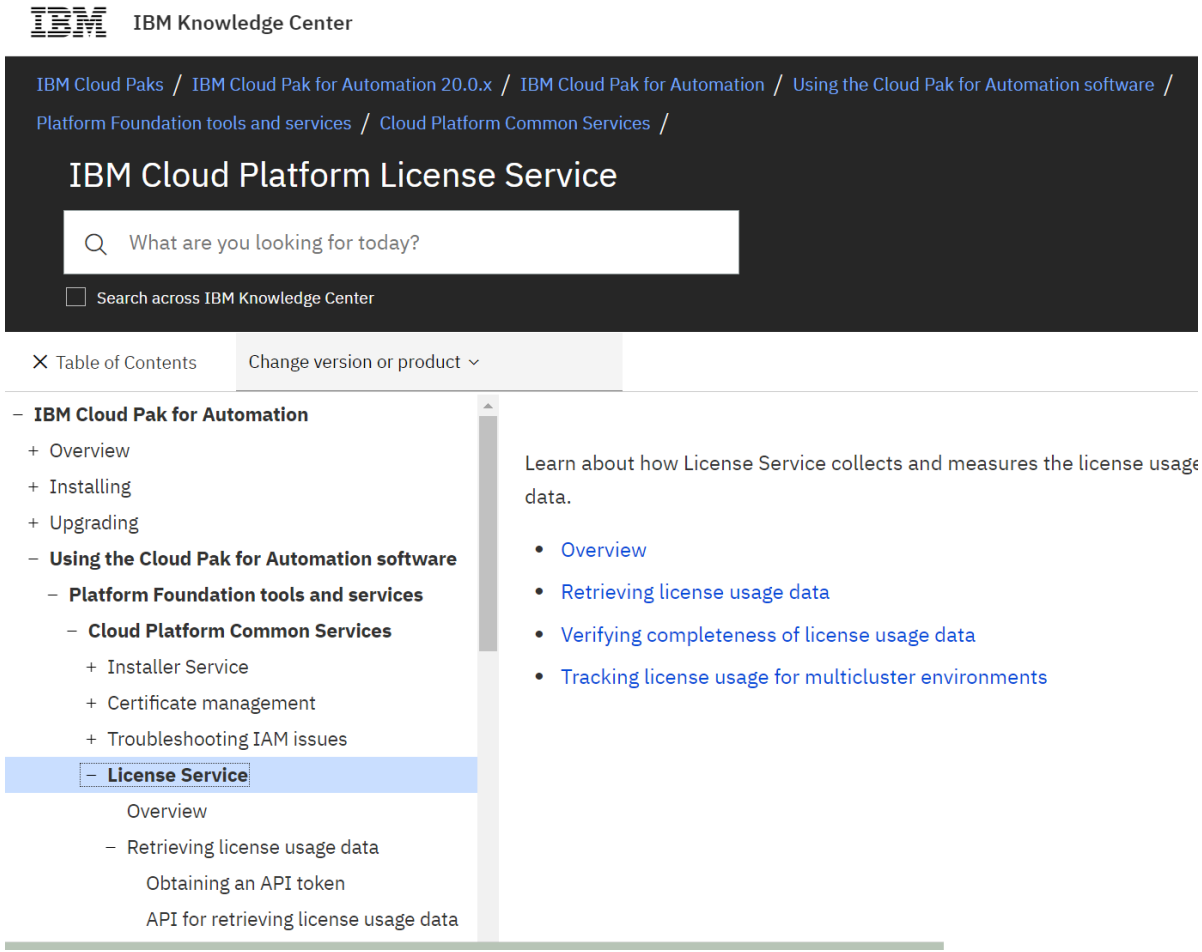


ILMT and License Service (IBM license tools)

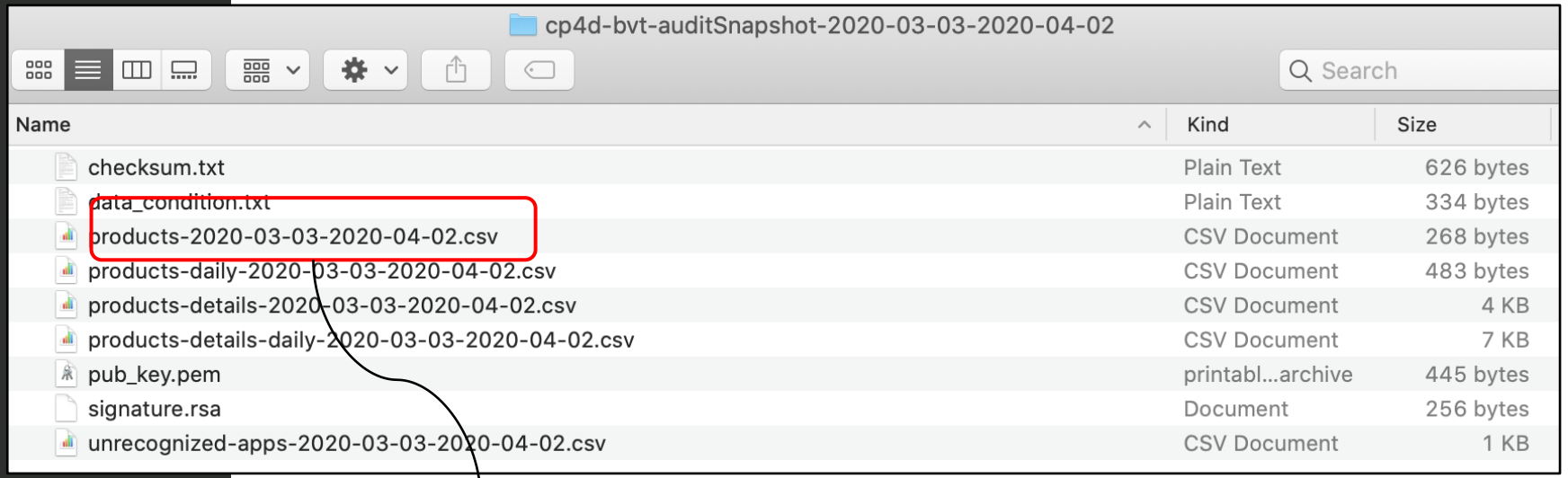
- ✓ ILMT and License Service are IBM compliance tools and legally bound to IBM virtualization capacity mandatory use terms.
- ✓ ILMT used for non-virtualized and virtual machine (VM) environments.
  - ✓ Required for PVU sub-capacity deployments (VPC supported, will be mandatory in the future).
  - ✓ Support IBM Cloud Paks & IBM FlexPoints bundles for non-container deployments
- ✓ License Service used for containerized deployments with Kubernetes orchestration
  - ✓ Included in IBM Cloud Pak services.
  - ✓ Installs automatically with container deployments, only requires configuration
- ✓ Tools can be used in support of IBM Bring Your Own Software License (BYOSL) policy for public Cloud deployments

License Service Cloud Pak documentation

https://www.ibm.com/support/knowledgecenter/SSYHZ8_20.0.x/com.ibm.dba.commonservices/license-service/1.x.x/license_service.html



License Service - Audit Snapshot



CloudPak aggregated license demand

products-2020-03-03-2020-04-02

Home Insert Draw Page Layout Formulas Data Review View

B14

	A	B	C	D	E
1	name	metricQuantityDate	metricQuantity	metricName	id
2	Cloud Pak for Data	02/04/2020	326	VIRTUAL_PROCESSOR_CORE	eb9998dcc5d24e3eb5b6fb488f750fe2
3	IBM Common Core Services for IBM Cloud Pak for Data	02/04/2020	2	VIRTUAL_PROCESSOR_CORE	ICP4D-Common-Core-Services-3-0-0
4					

License Service – sample reports

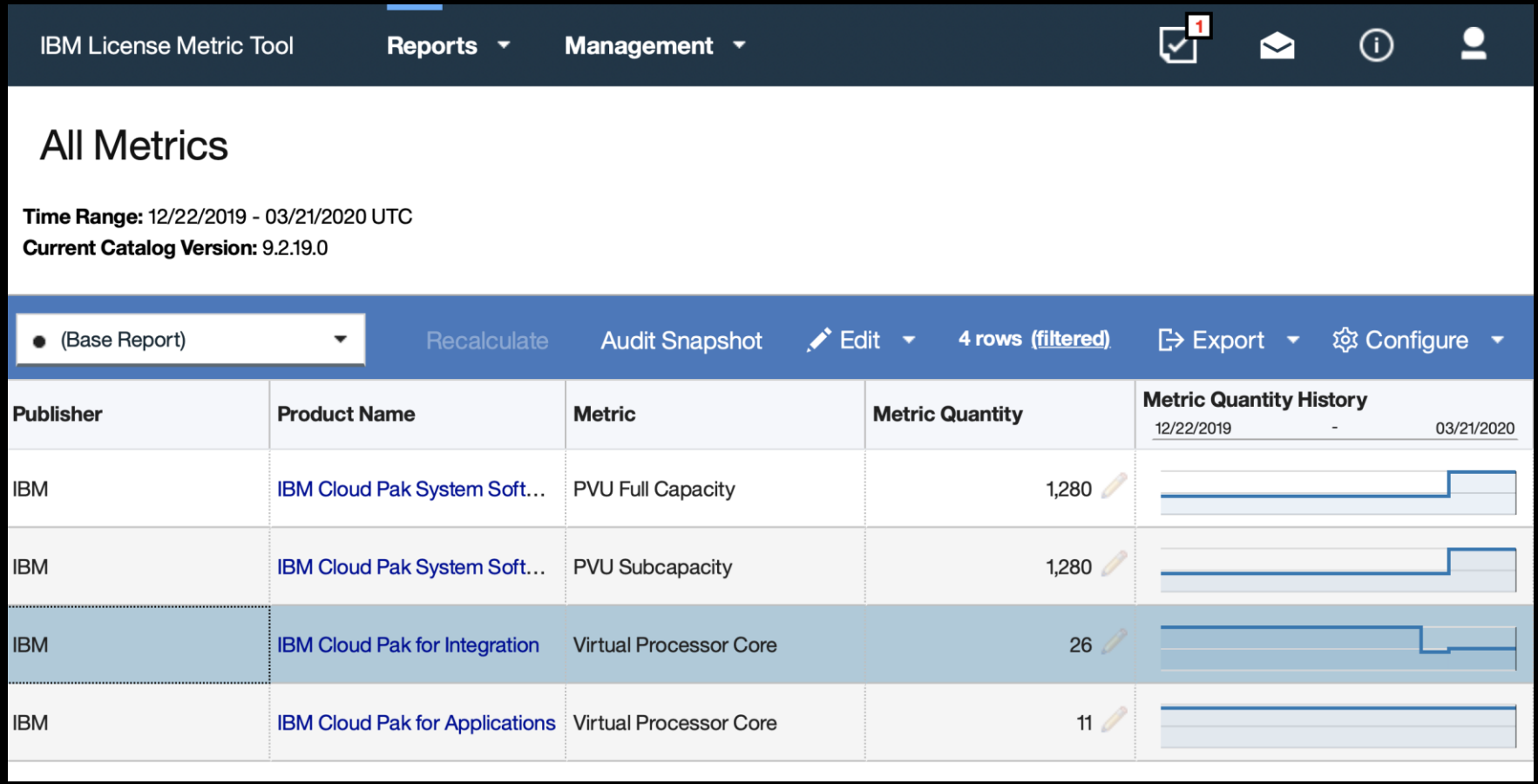
Summary CSV file of cluster aggregated daily report Cloud Pak high water mark

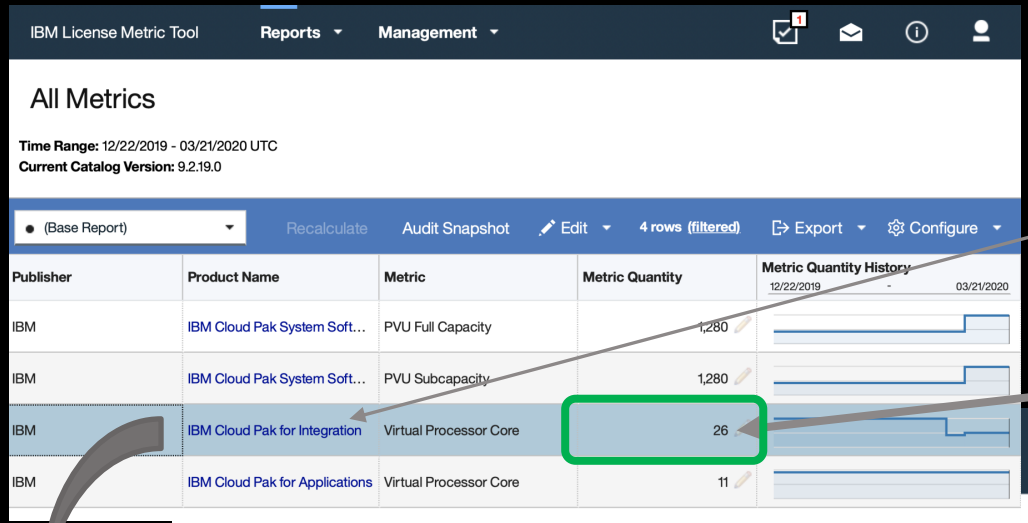
	A	B	C	D	E	F
1	name	metric	value	date	clusterName	ID
2	IBM Cloud Pak for Integration	VIRTUAL_PROCESSOR_CORE	9	02/10/2019	cluster2	c8b82d189e7545f0892db9ef2731b90d
3	IBM Cloud Pak for Applications	VIRTUAL_PROCESSOR_CORE	18	02/10/2019	cluster2	4df52d2cdc374ba09f631a650ad2b5bf
4	IBM Cloud Pak for Integration	VIRTUAL_PROCESSOR_CORE	7	03/10/2019	cluster2	c8b82d189e7545f0892db9ef2731b90d
5	IBM Cloud Pak for Applications	VIRTUAL_PROCESSOR_CORE	13	03/10/2019	cluster2	4df52d2cdc374ba09f631a650ad2b5bf
6	IBM Cloud Pak for Integration	VIRTUAL_PROCESSOR_CORE	11	04/10/2019	cluster2	c8b82d189e7545f0892db9ef2731b90d
7	IBM Cloud Pak for Integration	VIRTUAL_PROCESSOR_CORE	3	05/10/2019	cluster2	c8b82d189e7545f0892db9ef2731b90d
8						

Daily CSV file reports of Application Container license use, Cloud Pak ratio, and Cloud Pak value

	A	B	C	D	E	F
1	name	metric	value	productCloudpakRatio	productCloudPakValue	date
2	IBM App Connect Enterprise	VIRTUAL_PROCESSOR_CORE	3	1:3	9	02/10/2019
3	IBM MQ Advanced	VIRTUAL_PROCESSOR_CORE	2	2:1	1	02/10/2019
4	IBM Event Stream	VIRTUAL_PROCESSOR_CORE	3	1:1	3	02/10/2019
5	IBM App Connect Enterprise	VIRTUAL_PROCESSOR_CORE	3	1:3	9	02/10/2019
6	IBM MQ Advanced	VIRTUAL_PROCESSOR_CORE	2	2:1	1	02/10/2019
7	IBM Event Stream	VIRTUAL_PROCESSOR_CORE	3	1:1	3	02/10/2019
8	IBM App Connect Enterprise	VIRTUAL_PROCESSOR_CORE	3	1:3	9	02/10/2019
9	IBM MQ Advanced	VIRTUAL_PROCESSOR_CORE	2	2:1	1	02/10/2019
10	IBM App Connect Enterprise	VIRTUAL_PROCESSOR_CORE	2	1:3	6	02/10/2019
11	IBM MQ Advanced	VIRTUAL_PROCESSOR_CORE	1	2:1	0.5	02/10/2019

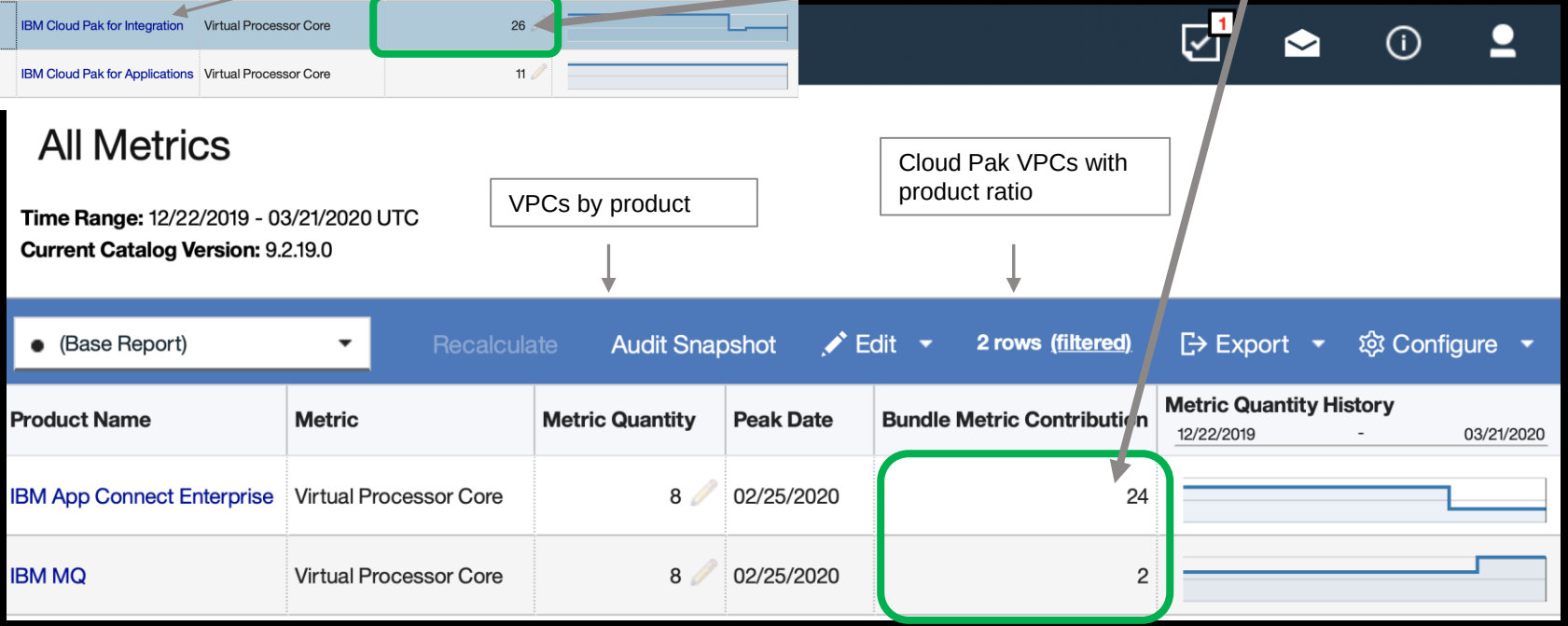
ILMT All Metrics report with “Product Name contains Pak” filtering criteria





From the Cloud Pak name you can click on it and get the detailed report view on how each product has contributed to the Cloud Pak license count

Total Cloud Pak VPCs = 26



Useful links on Container Licensing

Container licensing FAQs

https://www.ibm.com/software/passportadvantage/containerfaqov.html

IBM Container Licenses

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