Cisco Metapod Service Description

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This Metapod Service Description describes the Cisco Metapod (formerly Cisco OpenStack Private Cloud) (**"Cisco Metapod"**) and the Cisco OpenStack Private Cloud offer (the **"Legacy SOW Service"**) that Cisco Systems, Inc. and its affiliates ("**Cisco**") will provide. Cisco Metapod and the Legacy SOW Service are referred to herein collectively as the **"Metapod Services"** or individually as a **"Metapod Service"**.

Direct or Indirect Purchases

Direct Purchase from Cisco. If a customer (**"End User"**) has purchased this Metapod Service directly from Cisco, this document is governed by and incorporates the terms of Cisco's Universal Cloud Services Agreement located here: http://www.cisco.com/c/en/us/about/legal/end-user-license-and-cloud-terms.html or an equivalent written agreement between Cisco and End User governing the delivery of cloud or SaaS offers by Cisco (the "**Agreement**"). If there is a conflict between this Metapod Service Description and End User's Agreement, this Metapod Service Description shall prevail. The terms of this Metapod Service Description are limited to the scope of this Metapod Service Description and Metapod Order under which the Metapod Service is ordered, and shall not be applicable to any other service descriptions or statements of work.

Cisco Authorized Reseller's Purchase from Cisco. If an Authorized Reseller has purchased a Metapod Service directly from Cisco for resale to an End User, this document is incorporated into the Cisco Metapod Resale Program Agreement or equivalent Cisco SaaS resale program agreement and the Authorized Reseller's Indirect Channel Partner Agreement or Systems Integrator Agreement, or the equivalent agreement governing the resale of Cisco Products and Services (the applicable agreement being referred to as the "**Reseller Agreement**"). If there is a conflict between a Metapod Service Description and the Reseller Agreement, the Metapod Service Description shall prevail. The terms of a Metapod Service Description are limited to the scope of a Metapod Service Description and the Metapod Order under which the Metapod Service is ordered, and shall not be applicable to any other service descriptions or statements of work.

End User's Purchase through a Cisco Authorized Reseller. If an End User has purchased a Metapod Service through a Cisco Authorized Reseller, this document is for informational purposes only; it is not a contract between End User and Cisco. The contract governing the provision of a Metapod Service is the one between End User and the Cisco Authorized Reseller. The Cisco Authorized Reseller should provide a copy of the Agreement and Metapod Service Description to End User. End Users can obtain a copy of this and other Cisco service descriptions at: http://www.cisco.com/c/en/us/about/legal/end-user-license-and-cloud-terms.html or other location designated by Cisco.

Definitions

Capitalized terms not defined in this Metapod Service Description are defined in the Agreement or Reseller Agreement (as applicable) or otherwise defined in the documents referenced herein.

"Availability Zone" means a single deployment of the Metapod Service including the Control Plane, the Data Plane, Hypervisors, and the servers and storage that provide cloud computing resources.

"Control Plane" provides the cloud application programming interfaces ("API") and website interfaces (Cloud Portal) used to orchestrate and manage cloud resources in an Availability Zone; this includes backend system components such as the message bus, databases and other critical internal cloud services.

"Data Plane" means the network that virtual instances use to communicate with other virtual instances within an Availability Zone and to external IP addresses and network segments outside of the Availability Zone. The demarcation point of the data plane between internal and external communications is a networking device responsible for providing the network gateway for the Availability Zone.

"Monthly Uptime Percentage" is calculated by subtracting from 100% the percentage of minutes during the calendar month in which the Control Plane or Data Plane in a single Availability Zone, as applicable, was in the state of "Unavailable". Monthly Uptime Percentage measurements exclude downtime resulting directly or indirectly from any Service Level Agreement Exclusions (defined below).

"**Response Time"** means the period between the receipt of a request and the time of an initial response by a Cisco support engineer (via phone, email or through Cisco's support portal).

"Service Credit" means the number of days, as calculated below, that Cisco may add to the end of End User subscription term.

"Status Updates" means the updates provided by Cisco on the status of a support ticket. Status Updates will be provided via email and include current state, most recent findings / updates (if any available) and next update time.

"Unavailable" or **"Unavailability"** means:
- For Control Plane, when all requests to facilitate consumption of cloud resources, via the API or website interfaces are unable to be accessed because they are down or unresponsive to requests.
- For Data Plane, when all of End User running virtual instances have no connectivity to any other virtual instances or external connectivity.

Metapod Orders and Billing

The specific quantity and other configuration details for the Metapod Service will be documented in a Service Order (issued in the Cisco-approved form) or as ordered via the Cisco Commerce website at http://www.cisco.com or Support Portal at http://support.metacloud.com or otherwise communicated by Cisco (each a **"Metapod Order").** All Metapod Orders and Availability Zone subscriptions are final and non-cancellable. For new Availability Zones in Metapod Orders, the Availability Zone subscription term will begin when the Setup Services are completed as described in the Support Services section of this Service Description.

The number of sockets and storage amount set forth in a Metapod Order is a commitment to pay the fees for at least that number of ordered sockets and amount of storage during the term of the Availability Zone subscription even if the End User does not provide the number of physical sockets or the amount of storage to be managed that was ordered in the Metapod subscription. End User and Reseller acknowledge that the pricing in a Metapod Order is based on this commitment. Monthly subscription fees for any additional usage or overage amounts (i.e. activated sockets or storage) over and above the committed subscription will be invoiced monthly in arrears, following activation. Timing of invoices is described in the Metapod Ordering Guide located at: https://communities.cisco.com/community/partner/clouds/metapod

Overview of the Metapod Service

The Metapod Service is an Infrastructure-as-a-Service (IaaS) solution, delivered in an End User's data center as a-Software-as-a-Service offer by Cisco. The Metapod Service is intended for multi-tenant private cloud use cases for

Internal Use or Lab Use only and is not intended for Service Provision Use, or to deliver a public cloud IaaS service. Service Providers or Managed Service Providers may use the Metapod Service to deliver a managed private cloud service to one End User per Metapod cloud, in which case Cisco support will be provided to the Service Provider or Managed Service Provider and not to the End User.

Metapod, based on OpenStack® (http://www.openstack.org), is a cloud platform that is capable of instantiating independent virtual machines and storage volumes via a website dashboard, command line interface and/or application programming interfaces. It accomplishes this by orchestrating an interconnected system of components including, but not limited to, compute, storage, networking, and identity management.

Each independent deployment of the platform comprises an Availability Zone. The Control Plane provides key cloud operating platform services such as the API endpoints, (Horizon) Portal, etc. that allows for self service provisioning, management, and consumption of on-demand resources within the allocated Hypervisors of the Availability Zone and the resource quotas that have been assigned by the End User. The Data Plane provides network access to active virtual machines and the Hypervisors that support them. Each Availability Zone operates independently from each other.

Each Availability Zone is securely connected at all times to Cisco's Hosted Support Infrastructure through which Cisco provides the Metapod Service.

Each Availability Zone is procured via a subscription to the Metapod Service. The subscription amount is based on the number of physical CPU sockets on all the servers deployed in an Availability Zone, including sockets attributed to servers in the Control Plane and Hypervisors

The key features of the Metapod Service are listed below.
- Interface with cloud environments using the named and versioned OpenStack APIs listed in Metapod Service documentation, or the included web based user and administrative dashboard, or via the appropriate API call;
- Create and manage virtual partitions known as Projects between workloads, applications and teams that allow for organization and access control into portions of the environment;
- A repository and catalog of Cisco- and customer-provided virtual machine images that utilize the environment's compute, memory and storage resources to create general or workload specific virtual machines. Administrators can define through the web dashboard which images are available to which Projects and users;
- Users and Administrators have self service access to configure security and network access to individual virtual machines through OpenStack security groups as well as through traditional operating-system level network filtering within a running virtual machine;
- Self-service access through the web dashboard and OpenStack APIs to manage, monitor and terminate existing virtual machines;
- Users have self-service access to OpenStack orchestration capabilities to create and manage programmable templates that can launch and configure resources from within the Capacity of their Availability Zone;
- Administrators have self service web access to view real-time and historical data captured by Cisco on the performance, stability, and capacity of the Control Plane and Capacity of their Availability Zone;
- Administrators can configure block storage based volumes and allocate those volumes to Projects for Project users to attach and detach to and from virtual machines;
- 24x7x365 support provided by web portal, email or phone;
- Proactive monitoring and problem resolution of the Metapod Service; and,
- Metapod Service upgrades and new features are included with a subscription.

More information on features can be found on the Cisco Metapod support site at: http://support.metacloud.com.

Hardware Requirements

Metapod requires a specific hardware configuration for the Control Plane as provided by Cisco in the published documentation. The Metapod Service also requires minimum requirements for CPU, hard drives and memory. Hypervisor configurations are dependent upon End User needs. Those requirements are provided by Cisco at http://support.metacloud.com. End User agrees that it has or will purchase the applicable Metapod Controller Bundle

Hardware and has purchased and will make available the required amount of server capacity to meet the Metapod requirements. Hardware must be purchased separately from the subscription because the subscription does not include any hardware.

Network Management Options

The Metapod Service offers three network management options. End User must choose the desired network option before purchasing the subscription to the Metapod Service and associated hardware. The available network options are:

- Cisco Managed Networking (default and recommended option)
  - o In the Cisco Managed Networking option Cisco Metapod manages the all network equipment dedicated the Metapod Cloud. Cisco Metapod provides to the End User an external gateway/router to interface with their existing data center network. Cisco uses physical routers ordered separately as part of Control Plane hardware to assist in features including Neutron routers in OpenStack. Routing between VMs in the Metapod cloud and to/from virtual machines to the End User provided upstream/external gateway is managed by Cisco. Servers in the controller bundle and compute capacity servers plug into Cisco Metapod managed (Nexus) switches that are ordered separately as part of the Control Plane hardware.

- Cisco Managed Gateway Networking
  - o In the Cisco Managed Gateway Networking option Cisco Metapod only manages the network equipment that provides the network gateway between the Availability Zone and the End User provided external gateway or router. Cisco uses physical routers ordered as part of the Control Plane hardware to assist in features like Neutron routers in OpenStack. Routing between VMs in the Metapod cloud and to/from VMs to the End User provided upstream/external gateway is managed by Cisco. Servers in the controller bundle and compute capacity servers plug into End User provided and managed switches. End User is responsible for providing, configuring and managing all physical network switches used in the Availability Zone.

- Customer Managed Networking
  - o In the Customer Managed Network option the End User manages all networking equipment within and beyond the Availability Zone. OpenStack Neutron networking services, like create routers, are not offered in this model. Routing between VMs and from/to VMs to the external world is completely managed by the customer.

End User agrees and understands that by choosing a particular network management option, End User may or may not have access to all features of the Metapod Service.

Support Services

The services and processes outlined in this Support Services section are included with the Metapod Service subscription and apply to each Availability Zone.

Cisco's general goal is to:
- Provide high quality and prompt support directly to Metapod Service End Users.
- Deliver End User satisfaction; internally, the Metapod Service support team is evaluated on their End User satisfaction metrics and are responsible for delivering consistent measured End User satisfaction.
- Effectively track and coordinate End User interactions and support activities.

Support Features

Support Help Center. Access to a Support portal, as well as phone based support, is available 24/7/365 to troubleshoot and resolve issues, and answer questions on the use of the Services. Communications regarding issues with the Services will be via Support Portal or by telephone.

Proactive Monitoring. Proactive monitoring of all servers, Cisco managed network devices and Cisco supplied software functionality contained in the Availability Zone to alert End User of potential issues, including assistance to help resolve issues detected.

Network Device Management. Cisco will provide configuration, management, and support for all Cisco-managed networking devices contained in the Availability Zone**.**

Maintenance and Updates. Cisco may apply upgrades, patches, bug fixes or other maintenance to the Metapod Services. These updates are scheduled and completed using End User established maintenance windows (except for Emergency Updates). End User agrees to use reasonable efforts to comply with any Maintenance requirements for which we notify End User.

Capacity Additions. Cisco will support implementing the Service on expanded infrastructure (e.g. expand the number of existing cloud controllers, servers, storage, or networking) in an existing Availability Zone, subject to additional usage invoicing.

Hardware Replacement Support. Cisco will reasonably assist End User with information needed for End User to replace damaged hardware when necessary. End User is responsible for coordinating hardware replacement activities with End User's hardware vendor and providing onsite data center support.

Availability Zone Setup Services
Cisco will provide the setup and provisioning for each Availability Zone subscription ("Setup Services").

After End User purchases the Metapod Service, Cisco will contact End User by email or phone to gather required information for Setup Services. End User shall prepare the Availability Zone infrastructure for the Setup Services as documented in the "hardware installation guide" section on the Cisco Metapod support site at: https://support.metacloud.com.

More details on the setup services and process are also located at https://support.metacloud.com.

Note: Cisco prescribes an on-premises network device that will be purchased by End User as part of the Controller Bundle and installed in each Availability Zone. The network devices aid with the installation and setup and help maintain secure access to the Availability Zone. End User is responsible for any insurance, theft, damage or risk of loss of the network device.

Restrictions and Limitations of the Setup Services
- Installation and setup are only provided during Cisco Normal Business Hours only.
- Setup Service is only provided in the English language (including all written and oral communication, documents, etc.) – regardless of address/country of the End User Availability Zone.
- Cisco personnel are not required to perform any services at End User's location unless specified and detailed (including fees) in a separate written agreement.

Upon completion of the installation and setup for the particular Availability Zone, the Availability Zone Subscription term will commence, and Cisco will send an email to End User designated contacts that the Setup Services are complete and the service is ready for End User use. If End User reasonably believes the Setup Services have not been completed or there is a material error with them, End User must notify Cisco (via Cisco's Support Portal) within 7 days of receipt of the above email or the Setup Services will be deemed accepted. If there is a material error as reported by End User and deemed an error by Cisco, Cisco will work to reasonably correct the error and will repeat the process for acceptance.

Support Model
- Cisco will assign a "support owner" for each support ticket. Normally, this is a Metapod Service support team member; however, during pre-sales it could be a Metapod Service Systems Engineer, VAR, or other Cisco field resource.
- All support requests that are the responsibility of Cisco, will remain with Cisco until closure, unless there is explicit agreement between End User and Cisco to transfer management of the case to another party.
- All End User support communications should flow through the Metapod Service Support Team. This supports:
  - Proper case management and recording

○ Proper follow up is achieved throughout case lifecycle

Hours & Service
- Metapod Service support operates 24x7 for production technical support.
- For Non-production related technical support is provided during standard business hours, Monday thru Friday, 8AM - 6PM PST.
- Support Service is only provided in the language English (including all written and oral communication, documents, etc.) – regardless of address/country of the End User Availability Zone.

Service Level Objectives
The following table identifies the performance targets for support of the Service.

Severity level	Response Time by Support Type	Plan of Action Submitted	Frequency of Status Updates
P1	30 minutes	Within 4 hours	Every 30 minutes
P2	2 hours	Within 8 hours	Every 12 hours
P3	24 hours	N/A	N/A
P4	72 hours	N/A	N/A

Support Classifications
When submitting a support ticket the severity of an issue related to the Service is classified by End User based on the condition of the Service when submitted. Cisco support personnel use the following definitions to classify issues and may revise severity levels according to actual impact of a reported issue after an initial investigation.

P1 (also known as "Major Impact" or "Severity 1").
The Service is down or a primary component of the Service is inoperative. End Users are unable to reasonably use the primary functionality of Services and End User inability to use the Service as intended has a critical effect on End User operations. This condition is typically characterized by complete Availability Zone failure.

- Control Plane is completely inoperable or unreachable.
- **Data Plane is experiencing high packet loss and/or high-latency greater than in 200 milliseconds to at least 10% of virtual machines.
- Greater than 10% of total available "bare metal" Hypervisors in Availability Zone are unavailable, unreachable or inoperable within a single Availability Zone.
- Greater than 10% of Virtual Machines become unreachable within a single Availability Zone.

   ** Data Plane issues may be Customer's responsibility based on the Network Model as defined in the Service Description.

P2 (also known as "Moderate Impact" or "Severity 2").
End User can still use the Service, but it is partially inoperative or a primary component of the Services is exhibiting intermittent errors. The situation is causing a high impact to portions of the End User business operations and no procedural workaround exists that can be implemented by End User or Cisco. The inoperative portion of the product severely restricts End User operations, but has a less critical effect than a P1 condition.

- Control Plane is partially functional- some Virtual Machine operations executed via the Control Plane (reboot, launch, resize, etc.) complete successfully, while others fail.
- Virtual Machine operations executed via the Control Plane are consistently delayed and/or substantially slowed.
- One or more bare metal Hypervisors are unavailable, unreachable or inoperable.
- Greater than 5% of Virtual Machines become unreachable within a single availability zone.

 P3 (also known as "Minor Impact" or Severity 3").
End User can still use the Service, with little or limited impact to the function of the Service. This condition is not critical and does not severely restrict the overall operations. The problem usually involves partial, non-critical loss of use of the Services. This is a medium-to-low impact on End User business, and may be partially resolved by using a procedural workaround.

- Control Plane is functional-most Virtual Machine operations executed via the Control Plane (reboot, launch, resize, etc.) complete successfully but some intermittent Virtual Machines operation failures occur.

P4 (also know as "General Questions" or "Severity 4").
General usage questions, documentation errors, cosmetic or formatting errors, product enhancement and suggestions. There is no significant impact on End User business or the performance or functionality of the Service.

Support Escalation Triggers
A support ticket may be escalated based on any of the following criteria:
- Recommendation by Metapod Service personnel.
    - Technical Support Engineer
    - System Engineer
    - Metapod Service Management.
- **Response time**. Failure to provide a response time or resolution within the timeframes described in the service levels above may generate an escalation.
- **Issue Severity**. System outage automatically generates an escalation. Other severe service issues may generate an escalation at the discretion of Metapod Service personnel list above.
- **End User Satisfaction**. Poor End User satisfaction scores may generate a support escalation.

Notification list and notification methodology:
If a support ticket is escalated, the following persons will be notified and kept apprised of the issue until de-escalation or resolution:
- **Tier 1**
    - End User
    - Cisco's Account Representative for End User
    - Cisco Technical Support Engineer owning the case
- **Tier 2**
    - Cisco Director of Services
    - Cisco Engineer and/or Product Manager owning any associated bug or feature

- **Tier 3**
    - Cisco V.P. of Sales
    - Cisco V.P. of Engineering
    - Cisco V.P. of Product Management

Escalation Actions:
- The team above is notified of the escalation in order of severity.
- If fully escalated, Cisco Director of Services takes ownership of issue until resolution/ priority reduction.
- Assemble appropriate team from persons listed above to assess the issue and develop a resolution plan, and communicate plan to End User:
    - Specific actions to be taken in order to resolve the issue
    - Issue owners
    - Due date/time for each action
    - Explicit agreement from engineering management for resources to perform engineering tasks
    - Decision on the next escalation meeting
    - Decision to de-escalate
- Plan is agreed upon and executed
- Case is resolved and End User are informed

Cisco Hosted Support Infrastructure
The Metapod Service's cloud support infrastructure is managed 24x7x365 to ensure high availability of the operational and support services provided to the Service deployed on-premises in an End User Availability Zone. The

Metapod Service separates Service management data from End User data. Service management data (e.g. configuration, statistics, monitoring, etc.) flows to the Cisco Hosted Support Infrastructure, located in USA, over a secure Internet connection. Consequently, Service management data (but not End User application data) flows to data center(s) located in USA. End User application data does not flow through to the cloud support infrastructure. All End User application data stays on-premise within the Availability Zone. In the unlikely event of a cloud hosted support infrastructure interruption, support services would be temporarily unavailable but all Metapod Service Control Plane and Data Plane services in an Availability Zone will continue to operate as normal.

Note: Customer must ensure sufficient (VPN) bandwidth between the data center hosting the End User Availability Zone and the Cisco Hosted Support Infrastructure, located in the USA, for unrestricted and timely flow of service management data.

Support Exclusions
The Metapod Service does not include support for or management of End User virtual machine operating systems or applications, replacing or fixing any End User owned or leased hardware components (e.g. hard drives, CPU, fans, RAM, switches, routers, etc.) or any other infrastructure outside the direct control of Cisco except as expressly provided in this Service Description or a separate written supplemental services arrangement.

Service Level Agreement

As part of delivering the Metapod Service, Cisco provides a Service Level Agreement that covers the performance and availability of the Metapod Service's Control Plane and Data Plane. The Service Level Agreement applies to each Availability Zone independently, provided End User Control Plane equipment and Cisco managed network equipment are maintained under a valid device level Cisco Technical Services contract with at least 8x5xNBD coverage. The details of the Service Level Agreement are described below.

Service Commitment
Cisco will use commercially reasonable efforts to make the Metapod Service comprised of the Control Plane and the Data Plane, available with a Monthly Uptime Percentage (defined below) of at least 99.99%, in each case during any calendar month during the End User subscription term ("Service Commitment"). In the event that the Control Plane or Data Plane do not meet the Service Commitment, End User will be eligible to request a Service Credit as described below.

Service Credits
Service Credits are calculated as the number of days that Cisco may add to the end of the term at no charge to End User for either a Control Plane or Data Plane outage (whichever was Unavailable) in the Availability Zone affected for the calendar month in the Unavailability occurred in accordance to the schedule below. If both the Control Plane and Data Plane were Unavailable the lower of the Monthly Uptime Percentage will determine the Service Credit applied.

End User must notify Cisco of any Unavailability within thirty (30) days of the purported Service Level Failure for which End User is claiming Service Credits including the following:
- Services impacted and claimed Service Level failure, including name of the Availability Zone where the claimed Service Level Failure occurred
- Date, time, and duration of claimed Service Level Failure
- Activities performed prior to the claimed Service Level failure
- Business impact of service outage/disruption
- Any other reasonably requested information pertaining to the claimed Service Level failure (i.e. support ticket #)

Cisco will determine whether a Service Credit is due in its sole discretion.

Monthly Uptime Percentage	Service Credit
Less than 99.99% but equal to or greater than 99.9%	3 days
Less than 99.9% but equal to or greater than 99.0%	7 days
Less than 99.0%	15 days

Cisco will begin measuring the Monthly Uptime Percentage 1 calendar month after the Availability Zone has been setup and End User has access to the environment. This period of time allows End User and Cisco to evaluate the Metapod Service is being delivered according to the Documentation.

Maximum Service Credits

The aggregate maximum amount of Service Credit to be issued by Cisco to Customer for all Service Level failures that occur in a single calendar month will not exceed fifteen calendar days (15) for the Availability Zone where the Service Level failure(s) occurred. Service Credits may not be applied or credited to other Availability Zones to avoid the maximum Service Credits. Service Credits may not be exchanged for, or converted into, monetary or equivalent amounts.

Sole and Exclusive Remedy

Except as expressly provided in the applicable Agreement, Service Credits are Cisco's sole and exclusive remedy for any Service Level failures.

Service Level Limitations

The Data Plane service commitment only applies if the Availability Zone's network management option is Fully Cisco Managed Network. For the Cisco Managed Gateway Networking option, the Monthly Uptime Percentage service commitment is only applicable for the uptime of the Manage Gateway network devices. Availability Zones using the Customer Managed Networking option are excluded from the Data Plane Service Level Agreement. Any outages caused by End User controlled network layers are excluded from Service Commitment & Service Credits.

Service Level Agreement Exclusions

The Service Commitment does not apply to any services that expressly exclude this Service Commitment (as stated in the documentation for such services) or any unavailability, suspension or termination of the Metapod Service or performance issues in all cases resulting from: (i) End User breach of the Universal Cloud Terms and Policies; (ii) factors outside of our reasonable control, including any force majeure event or Internet access or related problems beyond the demarcation point of the specific Metapod Service (iii) any actions or omissions of End User or any third party; (iv) End User equipment, software or other technology and/or third party equipment, software or other technology (other than third party equipment within Cisco's direct control); (v) failures of individual instances or individual servers not attributable to Unavailability of the Metapod Service; (vi) any Maintenance as provided for pursuant to the Agreement, or (vii) End User failure to maintain controller equipment under a valid device level Cisco Technical Services contract with at least 8x5xNBD coverage. If availability is impacted by factors other than those used in our Monthly Uptime Percentage calculation, then we may issue a Service Credit considering such factors at our discretion.
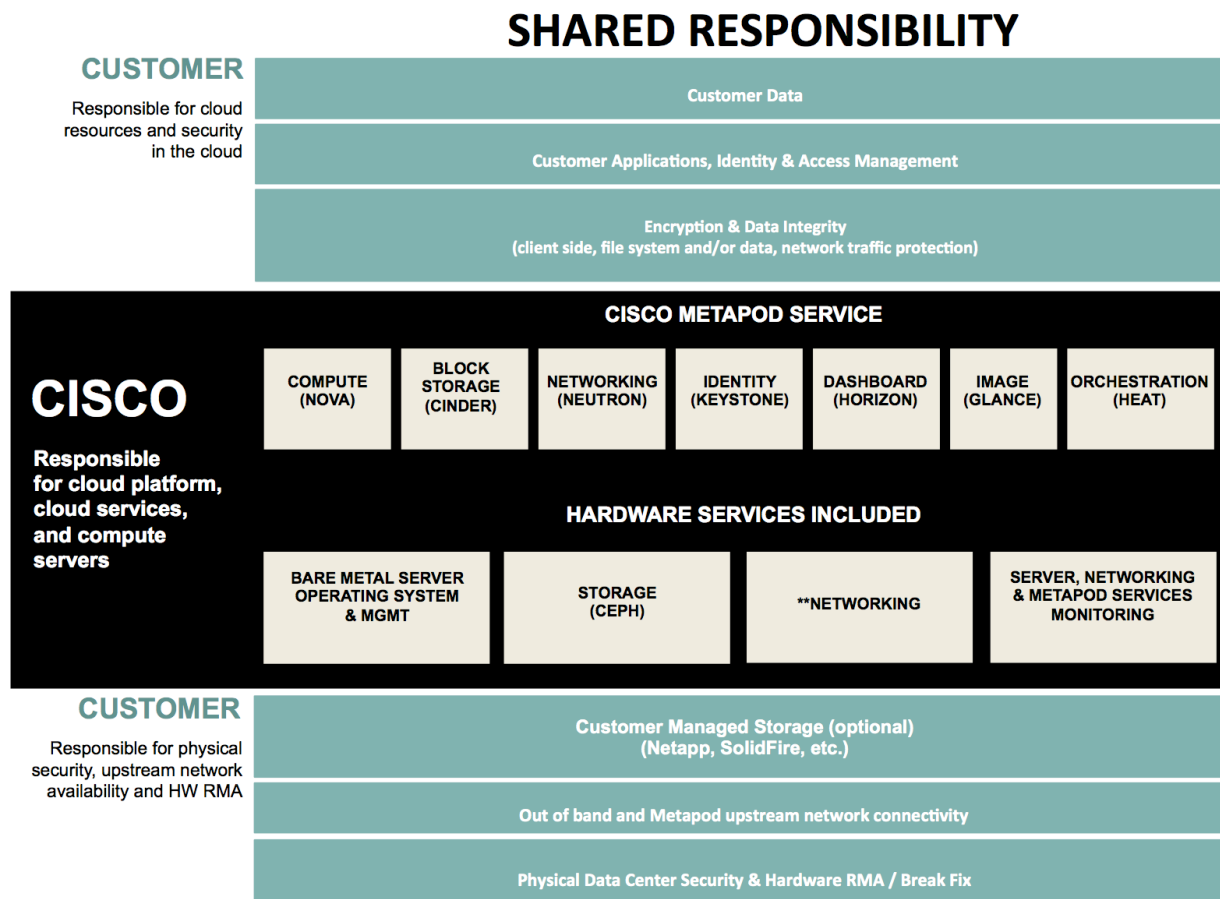
Storage Services

The Metapod Service allows for multiple storage configurations. In addition to local Hypervisor hard drives, the Metapod Service allows an administrator to create and mount persistent storage volumes to virtual machines in the same Availability Zone. These storage volumes can use resources that are managed by Cisco, an End User or both.

Metapod Service Storage subscription provides a persistent block level storage volumes for use with Metapod's virtual machines, and can be a repository for images and volume backups within a single Availability Zone. It is enabled by allowing the Control Plane to use the local storage of the Hypervisor to create a distributed storage platform (a virtual Storage Area Network or "SAN"). The Metapod Service automates the provisioning and management of the virtual SAN, which includes storing multiple copies of data. Specific hardware guidelines, as outlined in the Documentation, must be followed in order to enable the Storage service. The Metapod Service Storage subscription is optional, and is billed as the Cisco Storage Service. Pricing is based on the amount of raw storage under management.

Metapod also supports an End User Managed Storage option. This option enables support for external storage devices to be configured and attached to the private cloud, which End Users supply and manage. Details can be found in the "Storage Information" section on the Cisco Metapod support site at: https://support.metacloud.com. Cisco will configure the supported enterprise storage to operate with the Metapod Service as a part of the initial setup of the Availability Zone or, if after initial setup, through a request via the Support Portal. There is no additional charge for this storage configuration option.

End User Responsibilities and Service Exclusions

Metapod, while delivered by Cisco, operates within in a shared responsibility model. This model ensures that both Cisco and End User understand each other's responsibilities in providing a successful overall solution. The shared responsibilities are depicted in the diagram below.

SHARED RESPONSIBILITY

CUSTOMER
Responsible for cloud resources and security in the cloud

| Customer Data |
| Customer Applications, Identity & Access Management |
| Encryption & Data Integrity (client side, file system and/or data, network traffic protection) |

CISCO METAPOD SERVICE

CISCO
Responsible for cloud platform, cloud services, and compute servers

| COMPUTE (NOVA) | BLOCK STORAGE (CINDER) | NETWORKING (NEUTRON) | IDENTITY (KEYSTONE) | DASHBOARD (HORIZON) | IMAGE (GLANCE) | ORCHESTRATION (HEAT) |

HARDWARE SERVICES INCLUDED

| BARE METAL SERVER OPERATING SYSTEM & MGMT | STORAGE (CEPH) | **NETWORKING | SERVER, NETWORKING & METAPOD SERVICES MONITORING |

CUSTOMER
Responsible for physical security, upstream network availability and HW RMA

| Customer Managed Storage (optional) (Netapp, SolidFire, etc.) |
| Out of band and Metapod upstream network connectivity |
| Physical Data Center Security & Hardware RMA / Break Fix |

**Networking is Cisco's responsibility in the default Cisco Managed Networking configuration. Networking is a shared responsibility in the Cisco Managed Gateway Networking configuration. Networking is solely the End User's responsibility in the Customer Managed Networking configuration.

End User agrees to reasonably assist Cisco's efforts to provide the Metapod Service; provide timely information reasonably requested by Cisco in support of the Metapod Services; and perform the responsibilities outlined in the above diagram and as detailed below:

- Provide and maintain the required infrastructure and physical environment at End User's location(s) where the Cloud Service operates. This includes, but is not limited to, networking, racking, HVAC, cabling, power, network connectivity, as well as, software and hardware updates or upgrades to any infrastructure not provided by Cisco. Details of these requirements are provided or referenced in this Metapod Service Description or associated Documentation;
- Provide Cisco with reasonable advanced written notice of any material changes to the environment;
- Provide periodic maintenance windows for Cisco to perform maintenance; establish emergency maintenance windows where necessary;
- Not tamper with or interfere with any Cisco provided infrastructure or software, but may use the features of the Metapod Service, as provided in the documentation;
- Provide and build the requisite virtual machine operating system images consistent with the Documentation;

- Provide compatible applications and manage all dependencies between the application(s) and the Metapod Service captured in the virtual machine;
- Administer the cloud platform, including the creation of user accounts, creation of virtual machine instances, tenant oversight, and any other resources End Users need within the Cloud Platform(s) as provided in the Documentation;
- Allow Cisco to maintain sole and exclusive administrative (i.e. "root') remote (not physical) access to the infrastructure and systems that the Metapod Service operates on;
- Allow Cisco to provide persistent, reliable out-of-band access capabilities from a dedicated network device, which is part of the hardware requirements, to reach the consoles of the infrastructure under Cisco management;
- Allow Cisco to establish a secure virtual private network connection from the Availability Zone to Cisco according to the Cisco Metapod connectivity design to enable Cisco to provide the Metapod Service. The establishment of this connection helps ensure reasonably appropriate security against unauthorized access, use or deletion of End User data as well as protection and backup of End User configuration data and content at all times;
- Establish and maintain appropriate security policies for physical access to the infrastructure, as well as any operating systems, applications or End User application data;
- Maintain appropriate protection and backup of End User data and content outside of the environment at all times. End User assumes full responsibility and acknowledges that it has been advised to back-up and/or otherwise protect all End User data against loss, damage, or destruction;
- Ensure that all Cisco Products including servers and networking equipment have a valid support contract;
- Provide technical resources for the following: capture and provide details of reported issues; aid in replication and triaging issues as reasonably requested by Cisco; aid in testing fixes of issues; and, confirming issues are not related to End User provided hardware, software, applications, or other sources; and,
- Supply, manage and remain solely responsible for Customer Managed Storage.

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