# HP Enterprise Services for Cloud Computing

Frequently Asked Questions

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## Enterprise Cloud Services – Compute

1. Describe from start to finish the request and provisioning process, including the request resolution timeframes, and application and content deployment.

The following is the sequence of activities from request to provisioning, including timeframes. More information about ECS process flows is included in the architecture section of this document.

- Requestor makes a request for an ECS cloud service through the ECS portal, and back-office validates request against current inventory.
- Request is approved by customer-identified approvers—up to two approvers (based on approval dollar levels).
- Request is staged for provisioning (immediate).
- At time of provision (may be immediate or scheduled day/time), the ECS system uses its back-end automation to provision the service for the customer (less than 60 minutes-to-hours depending on complexity of services ordered). Provisioning includes bare metal to OS-to-all support software such as monitoring, virus protection, performance agent, etc.
- Once complete, email notification is sent to the user with access credentials, as needed.

Activity	HP Managed	Customer Managed
Provisioning activities to establish a new customer compartment for ECS Services with ECS portal access (Within Provisioning start and end times as defined above)	7 business days	7 business days
Provisioning approved servers and HP provided or	5 hours physical	5 hours physical
certified O/S, and base storage (to an established customer compartment)	2 hours virtual	2 hours virtual
Provision of base firewall rules (to an established customer compartment)	3 business days	3 business days
Other Services (to an established customer compartment) <ul> <li>Server Backup</li> </ul>	1 business day?	NA

#### 2. How is the ECS accessed, from where, and by what?

The ECS Service can be accessed using multiple methods:

- **Direct via Internet**: Customers can use SSH to connect directly to an ECS public Internet-accessible CaaS server hosted within the client's compartment. Once securely connected to the server, the customer can access any system directly within their ECS compartment.
- VPN: ECS provides multiple options for customers to connect to their ECS compartment using standard SSL VPN technologies.
- **Dedicated circuits**: Customer may order a dedicated circuit between their enterprise network and the ECS network, providing direct access into their ECS compartment.

#### 3. How is ECS measured, metered, and paid for?

ECS uses a reservation-based system for subscribing to and billing for ECS services. Customers reserve resources for a specific time period, and those resources are billed to the customer for that particular timeframe. Within the ECS portal, the customer has access to specific billing detail on all their reservations.

An example of the billing detail provided through the ECS portal is provided below. A collation of screencaptures of the ECS Client Portal is contained in Appendix C of this submission.

hp Enterprise	e Cloud Sei	vices								Welcome ecs user <u>Home   Profile   Sign (</u>	<u>out</u>
Order Services 👻 Servic	e Health 👻 🛛 Sys	tem Reports	▼ Billing <del>▼</del>	Site Opera	ations 👻	Docu	imentation C	enter <del>v</del> 🛛 N	Manage My Cloud	l Services <del>-</del>	
Billing Details											ŕ
Filter Options											
Invoice Month:*	September 2010		-	Ser	vices:*		All		•	•	
									Filter	Reset	
						_				Export to File	
CaaS Cloud Services List		# Ctort	End Data	Deservatio		Status	Desurring	loothk			E
Resource R	eservation/Orden	Date	End Date	Cost Detail	ls	Status	Charge	Nonthiy	(\$)	Month Total (\$)	
Client Managed Virtual E Cloud Server – Medium	CS-CAAS-561	7/15/2010	Run until cancelled	Click for Det	tails.	Active	Recurring		30 \$XXX.XX	SYYY.YY	
Client Managed Virtual E Cloud Server – Medium	CS-CAAS-563	7/15/2010	Run until cancelled	Click for Det	tails.	Active	Recurring		30 \$XXX.XX	\$777.77	
Client Managed Virtual E Cloud Server – Medium	CS-CAAS-567	7/15/2010	12/31/2010	Click for Det	tails.	Active	Recurring		30 \$XXX.XX	\$777.77	
Client Managed Virtual E Cloud Server – Medium	CS-CAAS-568	7/15/2010	Run until cancelled	Click for Det	tails.	Active	Recurring		30 \$XXX.XX	\$777.77	۲
ECS Home Node Server E	CS-HN-345	6/28/2010	Run until cancelled	Click for Det	tails.	Active	Recurring		30 \$XXX.XX	\$777.77	
									\$XXX.XX	\$YYY.YY	Ц,
Shared Server Services	List									I	1
Resource	Rese	rvation/Orde	r# Reservati Details	ion Cost	Recurri Charge	ing/One	e-time	Notes	Monthly (\$)	Current Month Total (\$)	
Customer Provided O/S Dist Certification	tribution - ECS-0	COS-562	Click for De	etails.	One-Tim	ie		Red Hat Linux 5.3	n/a	\$YYY.YY	
Customer Provided O/S Dist Certification	tribution - ECS-0	COS-564	Click for De	etails.	One-Tim	ne		Windows 2003E	n/a	\$YYY.YY	
Customer Provided O/S Dist Support	tribution - ECS-0	COS-562	Click for De	etails	Recurrin	ıg	1	Red Hat Linux 5.3	n/a	\$YYY.YY	
Customer Provided O/S Dis Support	tribution - ECS-0	COS-564	Click for De	etails	Recurrin	ıg		Windows 2003E	\$XXX.XX	\$YYY.YY	
Customer Dedicated ESX se Virtualization	ervers for ECS-(	COS-567	Click for D	etails	Recurrin	ng			\$XXX.XX	\$YYY.YY	
									\$XXX.XX	\$YYY.YY	4
Network & Load Balancin	ig Services List									LT.	
Resource	Reservation	Order# Star Date	rt End D e	ate Re De	eservatio etails	n Cost	Recurrin Charge	g/One-time	Monthly (\$)	Current Month Total (\$)	
Load Balancing Services	ECS-LB-348	6/28	2010 Run un cance	ntil <u>Cli</u> Iled	ck for Deta	ails	Recurring		\$XXX.XX	\$YYY.YY	
Load Balancing Services	ECS-LB-348	7/3/	2010 Run un cance	ntil <u>Cli</u> Iled	ck for Deta	ails	Recurring		\$XXX.XX	\$YYY.YY	
Network - VPN Services - Setup	ECS-NW-561	7/15	2010 Run un cance	ntil <u>Cli</u> Iled	ck for Deta	ails	One-Time		\$XXX.XX	\$YYY.YY	
Network – VPN Support Service	ECS-NW-561	8/1/	2010 Run un cance	ntil <u>Cli</u> lled	ck for Deta	ails	Recurring		\$XXX.XX	\$YYY.YY	
Network Compartment – 2n Compartment	d ECS-NW-2CM	8/1/	2010 Run u cance	ntil <u>Cli</u> Iled	ck for Deta	ails	Recurring		\$XXX.XX	\$YYY.YY	
									\$XXX.XX	\$YYY.YY	

Firewall Services List						Γ
Resource	Reservation/Order#	Number of Rules	Reservation Cost Details	Price per Rule	Monthly (\$)	Current Month Total (\$)
Firewall rules under management	ECS-FW-001	73	Click for Details	\$XX.XX	=73*XX.XX	=73*XX.XX
Firewall rules under management	ECS-FW-002	75	Click for Details	\$XX.XX	=75*XX.XX	=75*XX.XX
Firewall rules under management	ECS-FW-003	72	Click for Details	\$XX.XX	=72*XX.XX	=72*XX.XX
Firewall rules under management	ECS-FW-004	63	Click for Details	\$XX.XX	=63*XX.XX	=63*XX.XX
Firewall rules under management	ECS-FW-005	77	Click for Details	\$XX.XX	=77*XX.XX	=77*XX.XX
						******
					\$XX*XXX.XX	\$YY*YYY.YY
			G	Grand Total for O Total for Unused Bas	\$XX*XXX.XX rder (One-tin Order (Month ed Adjustme	syrryyyyyy ne charges): \$000,000.00 Ily charges): \$ZZZ,ZZZ.ZZ nt (Monthly): \$YYY,YYY.YY
			G	Grand Total for O Total for Unused Bas Grand To	\$XX*XXX.XX rder (One-tin Order (Month ed Adjustme otal for Order	syr*yyy,yy ne charges): \$000,000.00 ly charges): \$ZZZ,ZZZ.ZZ nt (Monthly): \$YYY,YYY.YY · (Monthly): \$XXX,XXX.XX
			G	Grand Total for O Total for Unused Bas Grand To	\$XX*XXX.XX rder (One-tin Order (Month ed Adjustme otal for Order	syr*yyy,yy e charges): \$000,000.00 ly charges): \$ZZZ,ZZZ.ZZ nt (Monthly): \$YYY,YYY.YY (Monthly): \$XXX,XXX.XX Export to File
	E	Silling totals are for es	G timate only, taxes are not includ	Grand Total for O Total for Unused Bas Grand To Jed.	\$XX*XXX.XX rder (One-tin Order (Month ed Adjustme otal for Order	syr*yyy.yy ne charges): \$000,000.00 ly charges): \$ZZZ,ZZZ.ZZ nt (Monthly): \$YYY,YYY.YY (Monthly): \$XXX,XXX.XX Export to File

With a future version, the product roadmap calls for enhancing the ECS User Portal usage and measurement capabilities to provide an additional metered pay-per-use billing option in addition to the reservation-based measurement and billing mechanism of ECS V1.0.

#### 4. How can ECS be scaled up (including burst capability, if any) or scaled down quickly?

The ECS service can be scaled up or down immediately based on customer requests. ECS is designed to be an on-demand service; services (compute, storage) can be scaled up or down on demand. The limits to its scalability are based only on inventory in the desired ECS location. As part of the contract, the customer defines both a base commitment and a peak need level over a defined usage period. ECS provides assurance that the customer will have access to their defined peak resource requirements, on-demand and within extremely short provisioning cycle timeframes. Future ECS releases will support automatic cloud environment scaling capability controlled through an application API. This will allow client business applications to interact with the ECS cloud environment, to provide scaling directives to the orchestration engine for automatic provisioning and billing handling.

#### 5. Describe the self-service features of ECS.

The primary self-service mode is the client user portal provisioned as part of ECS.

The client portal provides the initial interface for ECS clients to interact with ECS services. ECS clients can be either <Client Name> direct customers or HP Services teams acting on behalf of <Client Name>, providing additional services built on ECS. Clients can configure and order services as well as manage services that are under subscription.

The portal layer is completely separate and distinct from all other ECS services, to allow alternative interaction methods. For example, a Representational State Transfer (REST) based API will be provided to allow other HP services and clients to interact programmatically with ECS services without going through the portal. This includes all functions, from order services to managing services to reporting.

Key self-service portal features and capabilities are as follows:

- **Online catalog:** ECS provides a Web-based online catalog for ordering all ECS services, including physical and virtual servers, storage, firewall requests, VPN setup requests, backup and recovery services, load-balancing pool setup and server assignments, system user management, and OS setup.
- Order approvals: Clients can set up their own approval chain (up to a maximum of six approvers) that allows all ECS orders to be approved first by multiple individuals with varying dollar approval levels.

Each approver has an authorization limit. Orders are executed in sequential order. The person with the lowest approval authorization approves first, followed by the next highest level approver, and so on until the order is either approved or not approved.

- Service health dashboard: Displays the health of ECS services in each geographic location.
- Clients CaaS system health and performance reports: More than 60 statistics available for reporting on CaaS systems, including stats such as one-minute load average, swap available, swap-in rate, swap-out rate, percent time idle, percent of time user, and so on.
- **Reports:** Through the ECS portal, customers also have access to billing and service health reports. The billing metrics, including reservation start and stop times, are provided, with rated pricing included in the reports. Also, access to more than 65 metrics for HP managed cloud servers is provided to ECS customer subscribers through an ad hoc reporting function within the ECS portal. Examples of provided metrics include:
  - Memory free
  - Memory locked
  - Memory paged-out rate
  - Memory swap-out Rate
  - Network in-error rate
  - Network out-error rate
  - CPU wait
  - CPU load average
  - Disk I/O rate
  - Swap spaced used
- **Site operations:** Customer has the ability to open, view ticket details, and update all their service tickets. Tickets may be created for incidents, requests (e.g., billing inquiry, new service inquiry, and so on).
- Manage my cloud services: Provides customer with the ability to manage their subscribed-to ECS resources. Customer may execute functions such as archive a virtual server, activate a virtual server, request a server to be backed-up, add/remove/change a user on a system or systems, add/remove storage, and add/delete firewall rules. The customer also can manage their maintenance window by selecting a specific start date/time for the maintenance window, or request that a maintenance window be skipped.
- Order catalog: The catalog for each customer is setup as entitlements. Each customer can only order services to which they are entitled. For example, a customer can be set up to have access only to order virtual servers.
- ECS maintenance window: The customer can set the start time and date for their maintenance window. This customization is specific to the HP Managed CaaS (virtual and physical) server. During the maintenance window, we will do the appropriate maintenance to the customer's servers, including tasks such as patching and base (virus protection, backup, and software maintenance functions).

# 6. Describe the network architecture that will connect the HP ECS hosting sites to ECS customer networks and business locations.

There will be three ECS standard connectivity options:

- SSL VPN between customer site and ECS.
- Direct connectivity via Internet. The customer will be able to login to a public facing server, and from there jump to all their servers. For servers with pubic IP addresses that are exposed to the Internet based on customer request, the customer can direct access (SSH) to those servers over the Internet.
- Direct network connection. The customer can order a dedicated network connection between their site/network and their ECS compartment.

The HP ECS offering will also be geared to leverage and use the customer's existing internal networks (e.g., MPLS networks) to connect to HP data centers for access to both conventional hosting and ECS cloud services compartment environments. Devising the specific network design and architecture for a client ECS deployment will be a key part of ECS planning and pre-service due-diligence.

#### 7. Describe the key capabilities of ECS.

In ECS, we incorporate compartmental segregation environments, i.e., we include network segregation and DMZs to protect the various environments in the cloud and to enable communications functionality with the conventional hosted environment. ECS provides the functionality to support a formal test/dev/pre-prod compartment construct. HP intends to onboard new functionality during the evolution of our ECS offering from V1 onward, to provide specific pre-defined services for orchestrated test/dev/pre-prod compartment functionality.

#### 8. Describe the key application middleware platforms supported by ECS (e.g., .NET, Java, etc).

ECS supports a variety of middleware applications. Basically, any application or middleware can run in the cloud if designed or re-factored to do so. HP can support just about any middleware or application in the market just as in a conventional computing environment, and will bring additional capabilities in automating this support in V2 and V3 releases of the ECS offering. However, these automation benefits may not be fully supported by the application; if this is the case, a conventional toolset and support model will be utilized. HP Enterprise Services or the customer can provide and support any application on any ECS server. It is a software service enhancement timing question as to what applications will be provided with a full suite of automation and management through ECS and benefit from the cloud services provided. HP is currently working with key ISVs for application automation within ECS.

The following applications are some of the known considerations for ECS V2 or V3 automation:

- App server: BEA, Oracle WebLogic, ATG Dynamo, Vignette Story Server
- EAI server: Tibco Rendezvous, WebMethods, MS BizTalk, IBM MQseries
- Directory servers: LDAP (slapd), Active Directory, Oracle Directory Server, and so on

Enhanced application middleware services in ECS include automated installation and the framework around automated application management. Specific application management features include:

- Automated installation: The application is orderable through the ECS catalog and is automatically installed to the client's configuration options.
- Application patch management: Ongoing patching and upgrading of the application.
- **Configuration management:** ECS sets a standard for how the application is configured and ensures that the application is always configured to the standard (compliance).
- Application monitoring: ECS monitors all critical components of the application, for example, availability of key application processes, synthetic transactions for end-to-end functionality (if applicable), log files for potential operational and/or security issues.

#### 9. Describe the key database platforms supported by ECS (i.e., Oracle, SQL Server, etc.)

Both Oracle and MS-SQL Server database environments are target platforms for full database support services in ECS. HP or the customer can provide and support any database on any ECS server immediately provided that the database and operating system are compatible. It is an ECS service enhancement timing question as to what databases will be provided with a full suite of automation and management through ECS and will benefit from future automation and lifecycle management enhancements.

# 10. Describe how contractors are used in the delivery or support of ECS. Include their roles and responsibilities and anticipated duration of their services.

At present, there are no plans to used contractors. As with any business, HP may decide to use contractors in the future. All contractors who are contracted by HP follow HP ethics and standards of business conduct policies, along with security policies.



#### 11. Can you provide the Enterprise Cloud Services high-level service architecture?

#### **ECS Service Architecture**

The HP cloud reference architecture addresses the needs of cloud users, service providers, and developers in an integrated framework. Its objective is to serve as the basis for discussing with clients the functionality they require for their cloud implementations.

The architecture recognizes three panes: The first pane contains the operational functionalities; the second pane addresses the security requirements, and the third pane focuses on the governance aspects. We represent the latter two as panes; understanding components of security and governance are required in multiple operational functions.

Operations are divided into three main layers—demand, delivery, and supply—allowing the services provider to design, deploy, and operate the services and underlying infrastructure. The user accesses the service through a user portal and, based on defined capabilities, is allowed to:

- Create new instances of services or delete/modify existing ones
- Monitor usage of a service instance
- Monitor specific KPIs for a service instance

The demand layer exposes the services to the user. It combines one or more customer-facing services into a single end-to-end service, maintains a service catalogue, and authenticates the user to determine creation and modification capabilities. The demand layer presents both internal services (delivered by the cloud itself) and services sourced from other service providers (aggregation). If needed, the layer also provides billing and settlement information to the appropriate billing engine. It also monitors customer quality of service and compliance with service level agreements.



Sample Delivery Chain

The delivery layer is responsible for bringing together the customer-facing service. It orchestrates the combination of multiple service elements into a single service, and configures and activates the service. It selects the appropriate supply layer based on policy, demand layer request, and supply layer availability. The supply layer may be internal to the cloud or an external cloud service (bursting). The delivery layer calculates the service usage by the user and maintains information mapping services to service elements.

The supply layer is responsible for a specific resource pool and isolates the delivery layer from the resources by providing customer-facing service abstractions, potentially combining multiple heterogeneous resources into a single abstraction. It provides the necessary governance and orchestration to ensure that the resources deliver the desired customer-facing service and optimizes the usage of the resources within the pool. It optimizes the usage of the resources within the pool, monitors usage, and generates usage data records for events that may potentially be billable.

The security pane focuses on infrastructure, service, and user security. It also addresses operational aspects such as threat management and more strategic aspects such as the development of an integrated security program. Services are monitored during the development lifecycle through code and infrastructure analysis and step-by-step data tracking. Threat protection is offered during operations to protect against remaining security issues. Security compliance monitoring and reporting allows the service provider to demonstrate the overall security of the environment.

The governance pane addresses three main elements: management of the service portfolio, management of the contractual arrangements with the users, and compliance (such as privacy) aspects. It requires the appropriate management of the overall environment to collect data and events driving the governance.

The architecture also represents four ways to use the available functionality:

- The design/deploy column focuses on the configuration of the service and its inclusion in the service catalogue. Resource and service. configuration/activation templates are developed, tested, and included in the repositories. Billing schemes, user access, service description and so on, are defined in the service offer management for inclusion in the service catalogue when the service is made available to users.
- The provision column focuses on the actual provisioning of the service, starting when the user chooses the service in the catalogue until the moment the service is available for use.
- The use column manages all aspects related to actual use of the service, including release of the service when it is no longer needed.
- The assure column addresses management of the environment, ensuring the quality of service and experience and the SLA management.

This comprehensive architecture addresses multiple delivery models. It takes into account the possibility of services being sourced from external providers and for external supply layers to provide appropriate resources when required. It is fully in line with the HP vision of the CIO acting as the strategic service broker for the enterprise. It also addresses the trend of many service providers providing "white boxed" services from other providers. In that sense, it builds on several use cases as depicted here.

The ECS architecture has been developed based on an HP cloud functional reference architecture that provides a framework for delivering cloud services.

The following diagram provides a view of the ECS architecture that focuses on the specific layers of the architecture and the functions that are performed within those layers.



#### ECS Architecture – Functional View

The ECS architecture functional view is provided to illustrate the major layers of processing to support the delivery automation of services. The ECS architectural functions can be divided into the following seven layers:

- Client portal: The client portal provides the initial interface for ECS clients to interact with the ECS services. ECS clients can be either ECS client employees (IT staff) or HP Services teams providing additional services built on ECS. Clients can configure and order services as well as manage services that are under subscription. This portal layer is completely separate and distinct from all other ECS services, to allow alternative interaction methods. For example, a REST-based API is provided to allow other HP services and clients to interact programmatically with ECS services without going through the portal.
- **Portal back-office:** In order for our delivery teams to manage the ECS services, this layer provides a set of back-office functions that allow HP delivery teams to setup and manage the services provided by the ECS systems. From adding new services to the ECS catalog to managing the ECS service desk, this layer provides the necessary tools to ensure that support can be provided efficiently with minimal requirements for human interaction.
- Ordering and billing management: This layer provides the functions for ECS to manage the interactions between the ECS portal and ECS automation and management systems. It ensures that physical resources are available to fulfill orders as well as track utilization of resources for billing purposes. This layer also encompasses the lifecycle of both the service offering and the service instance, and binds the resources to the appropriate service instances.
- Service configuration and activation: This layer, which is global in nature, maintains and understands the complex automation flows required to provision an ECS service. It uses this information to split orders into provision-ready units that are sequenced for automated implementation by data center regardless of

where that data center may be located around the globe. With the objective of full automation for all ECS provisioning steps, this layer also provides the visibility to HP delivery teams to provide real-time status view for the flows that are being implemented through automation. It also is through this layer that ECS interfaces with the configuration management database (CMDB), to maintain a detailed set of configurations for all services deployed by ECS.

- **Resource provisioning and configuration:** This layer, which is also known as the end-point-automation layer, provides the functionality to automate the execution of specific tasks. It is important to understand that this layer does not have any overall understanding of the larger provisioning picture, but rather only executes tasks that are requested from the Service Configuration and Activation layer.
- **Delivery assurance and resource management:** This layer provides the monitoring, instrumentation, and management to manage both the systems that are provided to clients in the form of cloud services and the ECS physical resources for resource pool capacity management and hardware monitoring.
- **Resource pool:** The resource pool simply represents the hardware resources provided to support the ECS offerings and includes storage, compute, and network equipment that is managed by the ECS systems. The resource pool is only provisioned and managed by delivery assurance and resource management and resource provisioning and configuration layers. Other external interfaces are not allowed to manage the resource pool.

The ECS functional architecture can be shown further in a logical view that provides the detailed interactions between the layers as well as the specific functions within each layer. The initial view of the ECS logical architecture is shown in the following graphic. The simplest method of explaining the logical architecture is to walk through the lifecycle of an order or reservation made within ECS with respect to the following lifecycle steps:

- Ordering an ECS cloud service
- Staging and provisioning a client's order
- Provisioning an ordered service
- Monitoring and managing an active cloud service
- Billing and reporting on customer provided services



#### ECS Architecture – Functional Workflow View

#### 1) Ordering an ECS Cloud Service

The service catalog provides a client facing portal-enabled method for ordering and configuring ECS services. The service catalog must interface with ECS back-office functions to understand the services that have been entitled (enabled to be ordered) for each client, as well as role based attributes for a client user's interaction within the portal. The quote management, authorization management, and reservation management functions are also required to interact with the service catalog to support the functionality of holding resources during the quoting process, managing the customer authorization process for approving a new order, and, finally, creating the permanent reservation for the resources for the orders that have been approved successfully.

#### 2) Staging and Preparing a Client's Order for Provisioning

Once an order has been configured and approved, it is staged for provisioning. The staging of an order essentially means that the order is put into a provisioning queue by the master orchestration processor to monitor a set of criteria that would dictate the provisioning process beginning. The resource could be required immediately, in which case the provisioning process would start immediately. It may be provisioned based on some usage policy, or it could be provisioned based on a particular date/time at which the resource is needed.

Finally, there are several other activities that occur as part of staging for the order. First, the order is separated out into line items by the order deployment engine (ODE). Consider, for example, a single order that consists of one Red Hat Linux OS-based server (2-cored, 4-GB RAM and 500-GB disk) and one

Microsoft Windows-based server (2-cored, 4-GB RAM and 1-TB disk). This order would have two line items, one for each server. Then for each line item there are specific tasks that must be executed in a specific order to execute the automation to deliver the service requested. Using our previous example, the Red Hat server would first require the hardware to be allocated, then the Linux OS to be laid out on the hardware, then the server to be provisioned with the right number of cores and memory, and then, finally, have the storage allocated to the server. This process of breaking up the order into its most basic provisioning components and creating an executable sequence is all part of the functions executed within this step. Finally, the provisioning requests are sent to the local orchestration processor, which is responsible for managing the execution of the automated tasks within a specific ECS data center.

#### 3) Provisioning an Ordered Service

The first step to provision the request is initiated by the local orchestrator. The local orchestrator is specific to the ECS site for which the request has been made. The local orchestrator receives a request from the master orchestrator and is responsible for handing off in the appropriate sequence each of the tasks to complete the request to the appropriate end-point automation service. These foundational end-point automation tools cover server automation, virtualization automation, storage automation and network automation. The end-point automation tools are not intended to maintain a significant knowledge base about the infrastructure; they are, however, designed into the architecture to execute specific tasks quickly and efficiently.

#### 4) Monitoring and Managing an Active Cloud Service

Once a cloud service is provisioned, it must be monitored and managed to the end of its lifecycle. This set of functions within the architecture is responsible for executing lifecycle management and monitoring functions where applicable within the ECS architecture. At the lowest layer of the architecture, client subscribed resources must be monitored for availability, security, compliance, and performance. The ECS resource pools must also be monitored for capacity. Events that are triggered from monitoring activities are correlated and forwarded to the master orchestrator or appropriate ECS support staff, depending on the event type. Different event types will be forwarded to different support organizations. For example, a security event would be forwarded to a security operations center, while a hardware failure would be forwarded to a data center field support team. In all cases, tickets are automatically opened and, if the resolution is automated, the ticket is then automatically closed. Additionally, tickets may be opened by the customer, either through the ECS portal or through a call to the ECS service desk/help desk. The customer may view the ticket status and/or update the ticket through the ECS portal.

#### 5) Billing and Reporting on Customer Provided Services

Through the ECS portal, customers have access to billing and service health reports. The billing metrics including reservation start and stop times are provided with rated pricing included in reports. Additionally, access to more than 65 metrics for HP managed cloud servers subscribed to by ECS customers is provided through an ad hoc reporting function within the ECS portal.

Examples of metrics provided are:

- Memory free
- Memory locked
- Memory paged-out rate
- Memory swap-out Rate
- Network in-error rate
- Network out-error rate
- CPU wait
- CPU load average

- Disk I/O rate
- Swap spaced used

ECS takes advantage of several HP and third-party products as a basis for performing specific functions within the ECS architecture. The previous illustration provides a product view of the logical architecture showing the products performing the functions as described in the previous section. It must be noted, however, that these products can be replaced or removed from the architecture without notifying ECS customers. HP will upgrade and enhance the ECS environment as part of integrated cloud services currency and enhancement.

The ECS architecture can be divided geographically into two separate architecture components:

- **ECS centralized service core:** The centralized components of the ECS architecture are executed globally for all ECS customers.
- ECS data center cloud points of presence (POPs): The ECS data center POPs include the components of the architecture that are deployed into each ECS data center; they are specifically required to manage the compute resources and assignment of those resources to customers who are provided ECS services from each data center.

The following illustration provides a high-level overview of how ECS architectural components are intended to be distributed between the centralized components and the data center components.



The centralized services are provided to support ECS services globally and are generally the interaction point for most clients and ECS support teams. Although these services are centralized and operated against all ECS cloud data centers, the centralized services themselves are configured to be highly available, running in multiple data centers to ensure that these services are available in the event of a disaster or other issue within one of the data centers.

The ECS Cloud POPs are deployed to each HP data center that is hosting ECS services. There are two components of the hardware architecture—the network and the resource pooling cores—which provide the base infrastructure to support ECS clients' delivered services in the data center POP. Additionally, there are two components to the locally deployed software stack, including

1) the configuration and providing services and 2) the ECS management services. These software components provide the local orchestration, end-point automation capabilities, OS monitoring/management, and security monitoring/management capabilities.

The following is an overview of the architecture features:

- At a local ECS POP, FCS HW pooling core and ECS compartment and hosting HW core are collocated, creating a full management and client implementation context within an ES data center (or third-party facility, if required).
- At a local ECS POP, FCS QRS pool and associated tooling is provided to manage on-site HW pool functions.
- At a local ECS POP, an ECS element automation suite is provided to manage on-site compartment and lifecycle automation handoffs from the pooling processing on a continual basis, reporting upstream management information to the remote portal, management, and client visibility layers.
- At a remote ECS management POP, aggregation rollup information is provided for client and ECS business model visibility, and bidirectional management for associated ECS POPs in its target control region (NA, APJ, EMEA, and so on).
- The HP ES SSI interconnects the local and remote ECS POPs privately for geographical management and reporting, visibility, and client control execution requests to pools and compartment models.
- An ECS HW POP inherently has optimized Internet and GSN back end/management interconnectivity implemented.

#### 12. Describe how data can be integrated with other ECS Customers' internal or external partners' systems.

ECS can support systems integration in the following ways:

ECS customers will have a dedicated compartment within ECS, and HP services teams or ECS Customer teams will place within the model services such as virtualized applications and other workloads on physical ECS resources as required. These resources can be extended from ECS to an HP hosted customer's traditional IT environment privately, using the HP ES global services network. Within Tulsa (U.S. ECS Site), this would be primary layer 2 network extensions, and to a non-ECS located facility— such as an ECS Customer's existing data center—ECS can extend its resource usage using layer 3 routing (that is, IP routing) privately using the services network's private routing methodology. Application landscapes can be split and operated effectively across ECS and traditional hosting environments as needed. If the extension is outside the ES network, a private link and/or VPN will need to be implemented to transport the ECS-to-ECS Customer resource access. Wide area network (WAN) considerations are of course taken into account for outside application linkage. Within a data center such as HP Tulsa, the ECS and traditional hosting data centers are effectively in one data center on the LAN using layer 2 network extensions.

• If an ECS Customer has applications that are required to access ECS-housed resources, the flow would be similar to a network-to-network processing flow. For example, if an ECS customer houses its Web servers

in ECS and its backend systems in a non-ECS environment, the routing from ECS to the non-ECS customer resources would traverse the ECS network and the ES services network, and then route to the ECS Customer's back-end systems using IP routing. It would create a the processing flow required for the endto-end processing that the ECS Customer requires for the full application service.

- This similar processing construct can be repeated for subsequent ECS releases, with ECS customer migrated/transformed applications moving to the ECS model.
- ECS is targeting the creation of an API in a future release of the offering to allow customers to control ECS functions using a REST-based API. This would include all functions, from order services to managing services to reporting.

#### 13. Describe how the service integrates with other cloud services.

HP is designing the federation constructs for other providers outside the HP model, including Amazon, Google, Microsoft Azure, and others; however, these capabilities are still in development. HP has developed the constructs on how to broker and manage workloads that should be aimed at private and public clouds. ECS has been designing a standard federation model that allows the ECS and public cloud models to have a federation of exposed resources at the IaaS layer. Moreover, HP will use its patented ITSM Federation model to support a Service management to IaaS layer federation that can be reused for clients that may use cloud providers other than HP such as those named above.

ECS V2 is targeted to support the Open Virtualization Format (OVF) format for ingesting virtual images from providers that also support the OVF format. ECS will work with ECS Customers for all migration needs to move non-OVF or ECS-compatible images into ECS though re-template creation to make them ECS-compatible.

ECS transition and migration is a key part of pre-service planning and due-diligence. HP intends to provide full and complete transition and transformation support and leadership for all ECS deployments using its proven Transition and Transformation Methodology (TTM).

When its API interfaces are enabled, ECS will be able to support a federation model for clients that prefer to instrument their resources with non-ECS, using conventional hosting resources, for example. This work is with HP software and services and uses the cloud service automation model described above.

For ECS, the first target federation integration will likely be available in early 2012.

#### 14. Describe the cloud resiliency (e.g., failover, disaster recovery, and business continuity).

Resiliency has been built into every layer of the ECS service architecture:

- Intra-POP: In addition to the conventional HA, redundant I/O network, firewall, and server resiliency implementations, HP has incorporated automated resiliency features into ECS. The ECS pooling model incorporates automatic approaches to remediating pool or client compartment entity failure. When a server within a pool fails, the ECS Management Model will automatically transition impacted virtual clients to another server within the pool. This allows the virtual clients to continue to operate normally, and service disruption is minimized.
- Inter-POP: The ECS roadmap calls for the instrumentation of automated DR capabilities between ECS POP locations. Failover of workloads from a primary ECS location to a secondary location will be possible in the event of a disaster.
- Service Management: ECS will maintain internal service management integrity using the HP global delivery team and automation systems HA configuration, as well as refined ITSM processes at the core of

the ECS models from POP to POP. ECS will also deploy ITSM instrumentation and monitoring interfaces for client resources, using its front-end ITSM/cloud instrumentation. Global delivery teams provide management and supervision of all resiliency and fail-over functions.

#### 15. Describe how network latency will be addressed globally.

ECS deploys Tier 1 Internet access providers in each of its global POPs, and the ES services network is optimized for DC-to-DC transport. Also, future versions of ECS are targeted to employ CDN services (using Akamai) to optimize Internet-based processing.

# 16. How do you accommodate administrative role segregation within your offering, including supplier vs. customer, within supplier, and within customer?

HP carefully defines and separates administrative duties among various specialized administrators and uses roles-based access controls (RBAC) to enforce separation of duties. For example, administration of applications, operating systems, directories, email systems, and databases are performed by separate administrator roles. Within each technology domain, sub-roles are also defined. For example, a directory administrator may be allowed to configure replication rules, but not be allowed to create user accounts or initiate a backup of the directory. Administrative roles are defined to restrict administrators from access to client data when such access is not required to perform the defined administrative duties. For example, an email administrator is allowed to configure email server options but is not allowed to view emails. Roles are often used to segregate administrators between clients and network compartments; therefore, an administrator with access to one client-dedicated compartment may not have access other client-dedicated compartments.

A small environment with only a few administrators who can perform a wide range of duties poses a substantial security risk if one of the administrator accounts is compromised. The larger HP environment, with the relatively larger number of highly specialized administrators with granular and separated duties, enables HP to minimize and isolate security risk in the event that any particular administrator account is compromised.

## Enterprise Cloud Services—Unified Communications

#### 17. What is Enterprise Cloud Service – Unified Communications?

Enterprise Cloud Service (ECS) – Unified Communications is a 2012 Strategic Service that includes voice, voicemail, video, and audio conferencing, with the infrastructure to support these capabilities located in an ECS Data Center. The industry term is "Unified Communication as a Service" (UCaaS) and will be used after the first instance of the proper name. UCaaS will typically be integrated with ECS – Messaging and Collaboration (M&C) offerings. UCaaS will be purchased by clients on a monthly, per-seat basis.

#### 18. How is UCaaS different from UC?

UCaaS is the evolution of UC. The following chart shows some of the main differences:

Responsibility or Demarcation	Unified Communication (UC)	Unified Communications "as a service"
Owns the infrastructure	Client	Provider
Manages the Infrastructure	Client or provider	Provider
Hosts the infrastructure	Client	Provider

Deployment model	Premised-Based	Hosted or hybrid
Dedicated or shared	Dedicated	Dedicated and shared
Cost structure	CAPEX	OPEX (subscription based)

#### 19. What standard features and platforms are supported under this service?

A tiered set of capabilities is provided as part of the UCaaS offering. Instant messaging/presence is the foundation on which these tiers are layered. Each tier is essentially a class of service that provides a set of capabilities to the enterprise. These capabilities typically augment the current voice infrastructure and enhance the benefit to the enterprise. Higher tiers encompass the capabilities associated with lower tiers, thereby increasing the overall benefits afforded to the enterprise. The different tiers and capabilities available in each of those tiers are shown below. Time frames indicated are for FY12.

Category	Capabilities	Availability					
		Q2	Q4	HP has license	HP does not have license		
	Managed Video Conferencing						
Cloud Converged	Fixed Mobile Convergence						
Communications	Least Cost Routing						
	Audio Conterencing with Dial Plan						
Charles Del	Local/Long Distance/International						
Cloud Click to Didi	Emergency Services (where applicable )						
Cloud Click to Dial	Integrated Access			\$	•		
(Carrier Option)	Emergency Notification Services			۲	•	□Custom UCaaS	Standard
	IP Handset/Soft phone						UCaaS
	Enhanced Features (CallerID, Forwarding etc.)					A Custom	•
	Voice Mail, Unified Messaging <sup>+</sup>					partner	Standard
Cloud Phone	Reservation Less Adhoc Audio Conferencing					provided	partner
	Emergency Notification Support					capability	capability
	Hot Desking, Personalized Routing						
	Desktop Video*						
Cloud Collaboration	Click to Call/Conference*						

+ requires exchange 2010 capabilities (not included as pair of OCaas Service) \* Requires HP ECS-Realtime Collaboration Services (not included as part of the UCaaS Service)

#### 20. How is UCaaS delivered?

HP plans to deliver UCaaS as a private cloud service. A global network of data centers will be utilized to host the infrastructure required to support the capabilities. The network infrastructure in the data center is leveraged across multiple UCaaS platforms. The UCaaS platform itself is dedicated to a single customer. A dedicated delivery organization that will be closely aligned with the ECS-Real Time Collaboration operational support team will be utilized for Level 1/Level2 operational support. To ensure effective round-the-clock coverage, we will continue to leverage the expertise available in our global UCNOC as well.

Pricing for operational support, maintenance, and management is built into the UCaaS infrastructure. However, we understand that for large enterprises, a phased approach is important to mitigate risk and maximize investment in existing infrastructure. To accommodate this, the UCaaS offering is available at four different tiers, each oriented to customers that can benefit from the capabilities available at those tiers.

#### 21. How secure is UCaaS?

From a customer perspective, UCaaS is secured in multiple fronts. On the physical front, UCaaS will be provided primarily from HP Enterprise Class data centers. Typically, there are multiple stringent security controls in the data centers, including 24x7 card access, guards, cameras, locked cages, etc. By leveraging virtual firewalls and other network components, in conjunction with the robust Data Center Network Architecture framework, the UCaaS platform delivering the functional capabilities is well insulated from external and internal threats. The UCaaS platform instance is also dedicated to the customer and has role-based access control mechanisms to prevent unauthorized access. Optionally, platform-level encryption capabilities will provide an extra layer of protection. HP network operations centers monitor the network and equipment 24x7 for any alarms.

#### 22. How will HP UCaaS be differentiated in the market?

UCaaS represents a new, fast-growing market (CAGR 59 percent though 2015) opportunity that draws upon HP expertise in IP telephony transformation and messaging. The ability to support voice also strongly differentiates another 2012 Strategic Service: ECS M&C.

- As a systems integrator, HP has a strong track record of more than nine years of experience providing unified communications solutions to our clients.
- We have significant global market presence and have built strong partnerships with key vendors.
- Our UC portfolio brings forward the full technology capabilities of HP, including services, consulting, hardware/software, and global delivery.
- We provide critical capabilities around architecture, scalability, availability, management, administration, operational support, open standards, mobility, and integration that are critical to the success of UCaaS in the enterprise.

#### 23. What are the client benefits of UCaaS?

There are many ways in which clients can benefit from UCaaS:

- Avoiding capital expenditure outlay to migrate to UC
- Faster provisioning via virtualized delivery model
- Pay-per-use "utility" model
- Leveraging IP technology to cut down on travel and telephony expenses
- Improving internal and external communication-enabled business processes via presence awareness and availability
- Improving business agility by enabling access to multiple communication functions from a consistent interface
- Improving productivity in conjunction with messaging and collaboration
- Satisfying eco-friendly requirements and reduce carbon footprint

#### 24. How can I estimate cost take out using SIP Trunking?

SIP Trunking is one component of UCaaS that reduces the overall costs associated with telephony through PSTN circuit consolidation. The SIP Trunking ROI results will vary depending on geographical distribution of sites, TDM circuit utilization, number of seats, and other factors. HP has made available a UC ROI calculator (http://www.sip-calculator.com/hp/) to help sales teams estimate the potential SIP Trunking savings for their clients. Other cost savings can be realized through sharing data center infrastructure, leveraging support and tooling resources, and benefiting from economies of scale from large UCaaS implementations.

#### 25. Who should we target for UCaaS?

- New logos and existing clients across industries
- Minimum of 3000, ideally more than 4000-5000 seats
- Highly distributed global organizations
- Large, multinational companies
- Companies with complex, outdated network infrastructures
- Companies seeking CAPEX relief
- Companies in merger and acquisition mode

#### 26. Who are our competitors in this space?

The usual competitors in this space are:

- Communication service providers (Verizon, AT&T, Orange Business Services, etc.)
- Systems integrators (CSC, IBM, etc.)
- Technology vendors (Cisco, Siemens, etc.)
- Application specialists (Microsoft, Google, etc.)

#### 27. What is our pricing structure and how competitive are we?

UCaaS will be offered on a tiered pricing structure. Enterprises can consume the service on a per-seat permonth basis. Each tier is associated with a set of capabilities. Pricing will be competitively aligned with the market. To spur demand, a rich set of capabilities is offered at this competitive price.

### Enterprise Cloud Services—Messaging

### Enterprise Cloud Services—Collaboration

## Enterprise Cloud Services—Real-Time Collaboration

#### 28. What does the agreement between HP and Microsoft entail, and what are the benefits?

Microsoft and HP Enterprise Services have formed a four-year global alliance to market and sell cloudbased productivity solutions for large organizations worldwide.

- The alliance will benefit enterprises and governments by providing efficiencies and flexibility with public and private cloud solutions, delivering Microsoft's industry leading messaging and collaboration applications via the HP global private and public cloud footprint.
- HP and Microsoft will offer the following private and public cloud solutions:
  - Private cloud: HP Enterprise Cloud Services (ECS) Messaging, HP Enterprise Cloud Services– Collaboration and HP Enterprise Cloud Services–Real-Time Collaboration offer organizations choice and flexibility by delivering messaging and collaboration as a service from HP data centers worldwide. Microsoft Exchange Server 2010, Microsoft Office SharePoint Server 2007 and Microsoft Lync Server 2010 productivity applications are hosted in HP data centers, so clients can benefit from HP significant investments in data center infrastructure.
  - Public cloud: Microsoft Office 365, Microsoft's office collaboration and productivity tools, will be delivered by Microsoft via the cloud.

 Hybrid solution: HP will resell Microsoft Office 365 integrated with HP Enterprise Cloud Services– Messaging, HP Enterprise Cloud Services–Collaboration, and HP Enterprise Cloud Services–Real-Time Collaboration, offering organizations choice and flexibility to optimize the delivery of cloud services across diverse user groups, workloads, and geographies.

HP and Microsoft engineering resources will collaborate to deploy support and enhance the new solutions.

# 29. What makes this hybrid offering from HP and Microsoft unique compared to other Microsoft partners with similar offerings?

This is the first integrated enterprise standard public and private cloud offering from Microsoft and HP on a global scale. It is based on the best-in-class, cost-effective, public cloud service (Office 365), combined with the choice and flexibility that comes with messaging and collaboration as a service from HP datacenters worldwide. Clients also benefit from the significant investments HP has made in datacenter infrastructure, service excellence, and governance. This offering also allows HP and Microsoft to offer hybrid delivery, giving organizations choice and flexibility to optimize the delivery of cloud services across diverse user groups, workloads, and geographies.

#### 30. What are ECS—Messaging and Collaboration services?

Enterprise Cloud Services—Messaging and Collaboration are private cloud services that deliver easy access to a trusted set of productivity tools.

- Enterprise Cloud Services: Messaging, based on Microsoft Exchange, provides a cost-effective alternative to on-premise email management, delivering core business applications and processes in a scalable, automated, and governed cloud environment.
- Enterprise Cloud Services: Collaboration, based on Microsoft SharePoint, enables businesses to connect and empower people through formal and informal business communities within the enterprise and beyond.
- Enterprise Cloud Services: Real-Time Collaboration, based on Microsoft Lync combines enterprise-ready instant message (IM), presence, and conferencing capabilities in a single real-time collaboration solution that is delivered as a service.

HP and Microsoft have partnered to provide a combination of public and private cloud services. This hybrid service gives clients the flexibility to optimize the delivery of cloud services across diverse user groups, workloads, and geographies.

#### 31. Why should a client choose a private cloud solution over other deployment options?

HP believes that moving applications to a private cloud is a first step in a transformative journey from conventional in-house or outsourced IT infrastructure management to applications consumed "as a service" and offers Enterprise Cloud Services—Messaging and Collaboration based on a dedicated infrastructure with the necessary data segregation required to meet the client's security and compliance needs. Clients that need a flexible, scalable, automated, globally consistent IT environment with high levels of performance and availability, along with the need to support strict security and privacy policies, would choose a private cloud. HP, through these private cloud solutions, offers all the benefits of public cloud services, with the additional benefits of security, data segregation, compliance, and selective in-country hosting with Offsite Data Replication available.

#### 32. What is shared and what is private in the Enterprise Cloud Services?

HP builds private cloud solutions for messaging and collaboration on a foundation of dedicated hardware. What does this mean to you? It means that no one else shares your infrastructure—your servers and storage. Complete data segregation gives you security and peace-of-mind; it also helps you meet requirements for compliance and auditing.

Upon that foundation we layer a set of standard cloud management services and processes that enable delivery excellence. We use these consistent, repeatable services and processes to manage your cloud environment, for high levels of service performance, availability, and responsiveness. This set of management services supports each HP cloud messaging and collaboration solution. To the dedicated hardware and standard management services we layer the three HP private cloud offerings for messaging and collaboration. Here we add Microsoft features and functionality. Again, no one else shares your instance of Microsoft software.

This combination of dedicated hardware, standard management services, and Microsoft technology allows you to purchase software as a service and benefit from cloud efficiencies such as rapid on-boarding and volume scaling.

Through the HP practice of data isolation, clients can be confident that their data is secure and private. Our best-in-class security services protect all information at all times, providing the stringent security, privacy, and compliance their businesses need.

#### 33. Why would clients choose a hybrid cloud solution over a completely private or public cloud offering?

Clients who are not open to a purely public cloud for security and privacy or other reasons may be eligible for a hybrid solution. You will want to implement a service for your less-demanding "deskless" users, along with a best-in-class solution for your more sophisticated users, all without incurring unnecessary costs or over provisioning. You will want to know how to implement a solution strategically across the organization, in a way that addresses the communication needs of various types of end users, ranging from desk workers to highly mobile professionals that need 24x7 availability. Also, not all work profiles and types are subject to the same regulatory and security compliance restrictions. In this situation, users within the enterprise that need privacy and high availability would be hosted in the HP private cloud, while others that don't need the same security and privacy can by served by Microsoft Office 365. There are other drivers that could create the need for a hybrid solution such as business divisions with different compliance requirements and operations in countries that have unique rules related to data sovereignty.

#### 34. Who provides the software licenses for these offerings? HP or Microsoft?

Clients have the choice to purchase software licenses directly from Microsoft or from HP. Software licenses are not part of the HP cloud service price. All cloud solutions need to be licensed. The underlying licensing models can be extremely complex, and the cost of getting this wrong can be critical. Some clients will require new licensing agreements for their cloud environments, and others will already be licensed and needing to bring their licenses to a cloud supported position: License Mobility.

There are three methods for licensing the Microsoft products: 1) enterprise agreement or enterprise subscription agreement (EA, ESA), where annual upfront payments are made for a fixed set of products and quantities over a three-year period; 2) select program, i.e., a pay-as-you-go system with volume discounts; and 3) Service Provider License agreement (SPLA), a monthly pay-as-you-go provided by a hoster. The three methods can also be used in combination. One or more of the following licenses are required for different standard or optional features of your ECS solution:

#### Enterprise Cloud Services—Messaging

- MS Windows Server 2008 Enterprise and Standard
- MS Exchange Server
- User CALs
- Microsoft ISA 2006
- Microsoft Windows Server 2003
- Microsoft Forefront Protection
- Mobile Messaging for Blackberry
- RIM Blackberry Enterprise Server and client licenses
- SQL licenses
- Microsoft Threat Management Gateway (TMG)

#### Enterprise Cloud Services—Collaboration

- Windows Server 2008
- SQL Server 2008
- SharePoint Server (plus required client access licenses)
- Forefront
- MS Office Client Suite
- Microsoft Threat Management Gateway (TMG)

#### Enterprise Cloud Services-Real-Time Collaboration

- Windows Server 2008
- SQL Server 2008
- Lync Standard CAL
- Lync Enterprise Server CAL
- PIC Licenses and Certificates
- Microsoft Threat Management Gateway (TMG)

#### 35. How are the ECS services priced?

HP private cloud services have a one-time, non-recurring setup charge and a one-time, non-recurring data migration charge if data migration is needed. Each service is priced on a per-mailbox or per-seat basis.

The pricing strategy takes into consideration the market price by region/country for Office 365D and conventional services, pricing by competitors such as T-systems, CSC, and Telstra/Fujistsu. It keeps in mind our targeted goaled engagement margins and provides a buffer to allow discounting for larger subscriptions and long-term contracts.

Pricing varies according to country (U.S., Canada, U.K., and Australia), because there are different local market rates and differences in costing for data centers, networking, and ESM/SRA.

#### 36. What is included in the one-time setup?

This one-time set up has a one-time cost. It provides a Web portal for service requests based on the services purchased.

Also included is an active directory environment suitable for providing ECS Messaging and Collaboration services and a Dedicated Exchange, SharePoint, or Lync instance for each client.

#### 37. Are migration services included in this onetime setup?

No, a separate price is charged if data migration is part of the project. Migrations can be from on-premise to hosted servers and are standard for Exchange 2007 and Exchange 2010, MOSS or OCS, or Lotus Notes/Domino.

In what languages, regions and countries are HP Enterprise Cloud Services available?

These services are available globally; however in-country hosting is available in the following countries on first release:

- United States
- Canada
- Australia
- United Kingdom

Languages supported at first release will be English, Portuguese, French, and Spanish.

#### 38. Does HP allow for audits in the HP Enterprise Cloud data centers?

HP assumes that you will require periodic audits to maintain regulatory compliance. HP works with audit teams—typically conducted with third-party organizations in conjunction with you and the HP Security officer—to complete such audits, either electronic or logical, of the dedicated data and servers to review systems, data, controls, or any other items pertinent to your business. HP can also provide assistance with any information needed to help you with an audit.

### Enterprise Cloud Services—End Point Threat Management

#### 39. Why do I need this service when I already have an in-house anti-virus solution?

HP provides an integrated set of products that offer far greater protection than can be achieved through an anti-virus solution alone. Managed from a central console, this allows us to quickly update and enforce policy.

#### 40. We need to cut our costs, not spend more.

HP may actually be able to cut your cost or manage risk more effectively at the same cost. We can do this by using leveraged technology infrastructure (including systems, software, and facilities), by automating processes and tools, and through HP expertise.

### Enterprise Cloud Services—Vulnerability Scanning

# 41. I already have Vulnerability Scanning as part of my standard managed midrange service. Why do I need ECS-Vulnerability Scanning?

Standard Vulnerability Scanning is performed twice a year for servers managed by HP ITO and is used internally by HP to make sure patches are applied and server configuration is appropriate. However this discrete service also allows more frequent or on-demand scans and provides reports for the client, including tracking of remediation and exceptions.

## Enterprise Cloud Services—Vulnerability Intelligence

#### 42. I already have Vulnerability Scanning. Why do I need ECS-Vulnerability Intelligence?

The two services are complementary. ECS-Vulnerability Intelligence gives you near-real-time information on vulnerabilities and the priority in your specific IT environment of applying patches to deal with those vulnerabilities. In contrast, Vulnerability Scanning service checks periodically to determine whether needed patches have been applied. As a standard service, Vulnerability Scanning is performed twice yearly for servers managed by HP ITO, although the service may be purchased separately for more frequent or on-demand scans.

#### 43. Why don't I just buy VeriSign's iDefense service or use public vulnerability info from vendors such as Microsoft? Aren't these the underlying basis for HP ECS-Vulnerability Intelligence?

Yes, these services do comprise the Vulnerability Intelligence Service. However, HP adds significant value to the services. One example illustrates this point very well.

VeriSign, Microsoft, and others post all vulnerabilities; in the case of Microsoft this was a total of 44 critical vulnerabilities during 2009.

VeriSign/iDefense provided guidance/filtering to reduce the number of relevant vulnerabilities by 25 percent. They reported 33 high-risk threats.

Based on one client's technology environment, the HP team added significant additional value by filtering vulnerabilities down by an additional 25 percent (down to 23 threats), and by prioritizing one threat as an emergency that needed immediate patching. This reduction of relevant threats and prioritization of threats can save your clients time and money and can help avoid system outages and/or instability. HP balances vulnerability risk against the significant cost of reacting to potential vulnerabilities. For a large enterprise, an unnecessary patch can cost one-to-two million dollars, which means that the value added by HP can be huge.

(NOTE: This example is specific to Microsoft, but the Vulnerability Intelligence Service applies similarly to non-Microsoft technologies.)

## HP Cloud Applications Services for Windows Azure

#### 44. Why is HP announcing Windows Azure services?

In July 2010, HP and Microsoft announced their intention to jointly bring Windows Azure solutions to market for enterprise clients. Market indicators show Microsoft Azure to be an industry-leading PAAS offering in the market today. Our services are designed to take advantage of the success of Microsoft and the demand for the Azure platform. Together, HP and Microsoft deliver a complete hardware, software, services, and sourcing solution that will accelerate transition to the Windows Azure platform. Following the transition, clients will be able to manage the appliance with HP Converged Infrastructure on-premises, or have HP manage their Azure implementation remotely or in one of our secure data centers.

#### 45. When will HP position Windows Azure as a platform for clients?

HP believes in a hybrid delivery approach for providing cloud solutions to clients. No single platform will meet our clients' varied needs. The Windows Azure platform is a compelling solution for those who want to extend their adoption of Microsoft technologies into their IT strategy and architecture standards.

#### 46. How are HP Cloud Applications Services for Windows Azure priced?

Pricing is the same as our conventional applications development services. The two most common models are time-and-materials or firm fixed-priced. Microsoft's published pricing for the Windows Azure platform applies.

## Enterprise Cloud Services for SAP Development and Sandbox

# 47. We already have a development environment as part of our SAP infrastructure. Why do I need these services?

These services provide access to new releases of the SAP ECC 6.0 platform to perform prototype, evaluation, and assessment of new functionality and features. Your current SAP infrastructure may not have the additional hardware capacity to support these new ECC 6.0 platforms, or you simply may not want to disrupt the existing landscape.

# 48. We just purchased the complete SAP Business Suite for ERP and hardware from HP to support it. The challenge we have is that the hardware won't be delivered for six months, but we need to start training users now due to our tight implementation schedules. How can your services help?

Enterprise Cloud Services for SAP Development and Sandbox provide users with access to a completely configured SAP environment with infrastructure, OS and database, operations, monitoring, and backup/restore services with essential technical application management services. Your users can be trained on the standard business processes, and your application will be ready to go once your production hardware is delivered.

# 49. We just merged with a company that did not have an SAP ERP application. We need to train more than 1000 users on the use of the SAP ERP application, but we don't have capacity in our data center or any capital budget to buy additional hardware. Do you have any services that can help?

Enterprise Cloud Services for SAP Development and Sandbox provides users with access to a completely configured SAP environment with a sample database. Your cost will be a monthly charge, based on the number of SAP instances required to support your 1000-user environment.

#### 50. We have an existing ERP system and we need to move data back and forth between the cloud and onpremise systems. How does HP support that?

Enterprise Cloud Services for SAP Development and Sandbox are delivered on a private hosted cloud platform. HP can help you with the initial data loads (such as master data) through our optional integration services.

#### 51. Does the solution come bundled with SAP licenses?

No, in order to keep the overall cost of the services low, and knowing that most clients already have existing SAP licenses, we have kept the SAP licenses purchase separate from the solution. Clients can use their existing licenses or have HP source licenses for them.

## Applications Transformation to Cloud (AT2C)

52. Can we sell a service to re-architect an application so that our client can sell the application as a software-as-a-Service (SaaS) application? (This question is also frequently asked slightly differently: Can we sell a service to re-architect an application to support multi-tenancy?)

While such a service could be sold, HP does not have a standard method with documented best practices to deliver the solution effectively. If sold, it should be treated as a custom solution.

# 53. How is Applications Transformation for Cloud positioned in relation to our Infrastructure-as-a-Service (laaS) offering, Enterprise Cloud Services – Compute?

ECS-Compute does not include the transformation services for our clients. If a client has a portfolio of applications that need to be assessed and migrated and/or modernized to ECS-Compute, AT2C is the offering that fills this gap.

#### 54. What target cloud platforms can this offering support?

We have prescriptive guidance for ECS-Compute and Windows Azure. Other platforms, such as Force.com, Amazon AWS, and Google App Engine, should be sold as a custom solution as we do not have prescriptive guidance, best practices, or trained delivery expertise at this time.

## Enterprise Cloud Services for Microsoft Dynamics CRM

# 55. We have already purchased Dynamics CRM and other Microsoft licenses (SharePoint, BizTalk, Outlook, Exchange, etc.) licenses through a Microsoft Enterprise Agreement (EA). Can HP provide a solution that leverages these licenses?

Yes, regardless of the deployment model you choose, HP can leverage your existing licenses. If you prefer an on-premises solution, HP can develop and implement the solution using your existing licenses. If you prefer to have HP host the solution in one of our data centers, then we can develop the solution (if it does not already exist) or transfer your existing application to our data center(s) and manage it there for you. If you prefer a solution in our virtual private cloud, then we can develop such a solution using your licenses. Of course, if you do not have exiting licenses, HP offers a subscription-based service as part of our cloud offering.

# 56. Since Microsoft offers Dynamics CRM in the cloud, why should I consider a solution from HP that leverages the same application?

Microsoft currently offers Dynamics CRM only in a public cloud environment (called Dynamics CRM Online) which might not meet some of your requirements (business, security, functional, etc). HP Enterprise Cloud Services for Microsoft Dynamics CRM is offered as a virtual private cloud solution that enables greater flexibility, security, and functionality than most public cloud solutions. Also, for large deals (say, more than 5000 named users), an HP solution can likely cost less than a similar Dynamics CRM Online solution from Microsoft. And AEs should know that they will receive quote relief for an HP solution, but not for a Microsoft Dynamics CRM Online solution.

# 57. I thought Microsoft Dynamics CRM was an SMB CRM application that could not scale up for large enterprises?

While Dynamics CRM began nearly a decade ago as an SMB application, it has evolved into a formidable enterprise-grade application. In recent industry analyst reports from both Gartner (Magic Quadrant) and Forrester (Forrester Wave), Dynamics CRM was rated as a leading CRM application for large enterprises as well as for SMB companies. Moreover, in Microsoft's March 2011 Dynamics CRM Performance and Scalability Report, their benchmark results demonstrate that a single Microsoft Dynamics CRM 2011 instance can achieve sub-second response times with 150,000 concurrent users executing a heavy workload against a large, complex database.