FUJITSU Cloud Service K5 - IaaS Service Description

September 28, 2017

1. General Overview

The FUJITSU Cloud Service K5 is provided via a standardized platform and common architecture, which is deployed at the locations identified in the K5 Service Portal.

There are four deployment modes for the FUJITSU Cloud Service K5, each of which can be consumed independently:

- **Type 1: Public Cloud** – a multi-tenant shared platform, hosted in a Fujitsu datacenter, for which there are no minimum volume requirements or contract periods. Physical compute and storage resources are shared with other Customers,

- **Type 2: Virtual Private Cloud** – a multi-tenant shared platform hosted in a Fujitsu datacenter but with Customer dedicated and logically separate computing hosts and networking for which there are no minimum volume requirements or contract periods

Within each deployment mode, FUJITSU Cloud Service K5 can be configured by a Customer to provide either Infrastructure as a Service (IaaS) or Platform as a Service (PaaS) capabilities.

The K5 Service Portal and APIs enable Customers through their End Users to consume, configure and manage the Customer's Cloud Services.

This document describes the IaaS capabilities of the FUJITSU Cloud Service K5 for Type 1 and Type 2.

2. IaaS Service Overview

Fujitsu provides the FUJITSU Cloud Service K5 - IaaS Service that this document describes ("K5 IaaS") as units in which physical facilities such as a data center or equipment required in service provisioning are shared (each an "Availability Zone") Each Availability Zone is typically located in a specific geographical area where computers and other facilities are installed as a group (a "Region"). The Customer can choose its Region and Availability Zone from the following list:

Region	Availability Zone
Eastern Japan Region 1*1	jp-east-1a
	jp-east-1b
Eastern Japan Region 2*1	jp-east-2a
	jp-east-2b
Western Japan Region 1*2	jp-west-1a
	jp-west-1b
Western Japan Region 2	jp-west-2a
	jp-west-2b
UK Region 1	uk-1a
	uk-1b
Finland Region 1	fi-1a
	fi-1b
Germany Region 1	de-1a
	de-1b
Spain Region 1	es-1a
	es-1b
US Region 1	us-1a
	us-1b

*1 Eastern Japan Region 1 and Eastern Japan Region 2 are groups of computers and other facilities installed in the same geographical area. When using multiple Regions for disaster recovery purposes, please select a different Region.

*2 Western Japan Region 1 is not available for new deployment.

3. Computing

This component of K5 IaaS provides a virtual infrastructure accessible via the Internet within which physical computers are divided using virtualization technology.

(1) Standard Service

   a. **Virtual Server**

   ・ By dividing physical computers using virtualization technology, K5 IaaS provides a logical computer ("Virtual Server") on which discrete operating system (an "OS") can be run.

   ・ K5 IaaS allows Customers to remotely create and use Virtual Servers (and define the CPU and memory characteristics of those Virtual Servers) and then allocate storage to Virtual Servers using the K5 Service Portal, as accessed by the Customer from any Internet-connected device running an Approved Browser.

   ・ The Customer can create Virtual Servers of the following types.

[Standard CPU]

Functions		Details										
Virtual Server type		S-1	S-2	S-4	S-8	S-16	M-1	M-2	M-4	M-8	M-16	XM-4
Virtual Server specifications	Number of virtual CPUs (vCPUs)	1	2	4	8	16	1	2	4	8	16	4
	Allocated memory (GB)	4	8	16	32	64	8	16	32	64	128	128

Functions		Details						
Virtual Server type		P-1	T-1	C-1	C-2	C-4	C-8	C-16
Virtual Server specifications	Number of virtual CPUs (vCPUs)	1	1	1	2	4	8	16
	Allocated memory (GB)	0.5	1	2	4	8	16	32

Functions		Details					
Virtual Server type		LM-1	LM-2	LM-4	LM-8	L-12	L-24
Virtual Server specifications	Number of virtual CPUs (vCPUs)	1	2	4	8	12	24
	Allocated memory (GB)	16	32	64	128	128	128

[High-Speed CPU]

Functions		Details										
Virtual Server type		S2-1	S2-2	S2-4	S2-8	S2-16	M2-1	M2-2	M2-4	M2-8	M2-16	XM2-4
Virtual Server specifications	Number of virtual CPUs (vCPUs)	1	2	4	8	16	1	2	4	8	16	4
	Allocated memory (GB)	4	8	16	32	64	8	16	32	64	128	128

Functions		Details						
Virtual Server type		P2-1	T2-1	C2-1	C2-2	C2-4	C2-8	C2-16
Virtual Server specifications	Number of virtual CPUs (vCPUs)	1	1	1	2	4	8	16
	Allocated memory (GB)	0.5	1	2	4	8	16	32

Functions		Details					
Virtual Server type		LM2-1	LM2-2	LM2-4	LM2-8	L2-12	L2-24
Virtual Server specifications	Number of virtual CPUs (vCPUs)	1	2	4	8	12	24
	Allocated memory (GB)	16	32	64	128	128	128

- The Customer can release a created Virtual Server at any time.
- Customers are charged for Virtual Servers depending the status of each Virtual Server created in respect of the Customer at the time that charges for the Cloud Service are calculated. The applicable consumable unit of measure and unit rate will be charged to and payable by the Customer as follows:

Status	Details	Chargeable
Active	The Virtual Service is running.	Yes
Inactive	The OS of the Virtual Server is shut down without releasing the CPU and memory resources.	Yes
Released	The CPU and memory resources have been released.	No

- The Customer can change the type of Virtual Server being deployed at any time the Virtual Server must be inactivated by the Customer before the Virtual Server type is changed.
- When a Virtual Server is created, K5 IaaS creates a port that associates a private IP address so that Virtual Server can be connected to the Customer's Virtual Network.

b. **Virtual Private Cloud**

By applying in writing separately using the application form, the Customer can deploy Virtual Servers at the physical servers for the dedicated use by the Customer and its End Users. The following resources are available for each physical server.

Number of Virtual CPU	40
Memory Size	250GB

Note, however, that only the following OS can operate on K5 IaaS Dedicated Virtual Servers.
- Windows Server
- Red Hat Enterprise Linux

c. **OS Provisioning Service**

The Customer can choose an OS from those listed in the Attachment Table 1 and use it. To use the OS, the Customer must agree and conform to Fujitsu's or the OS's licensors' terms and conditions of use as set out in the applicable software licensing agreement for the OS referenced in the attached Table 1 or otherwise notified by Fujitsu in writing. Customers will require the software support service to run some of the operating systems.

d. Middleware Provisioning Service

The Customer can choose a virtual server with installed middleware from the options listed in the Attachment Table 2 and use it. To use the middleware, the Customer must agree and conform to Fujitsu's terms and conditions as set out in the applicable licensing agreement.

e. Imaging

The Customer can acquire an image of a Virtual Server being built. An image of the block storage used by that Virtual Server will be created at the time of image acquisition. The acquired image can be shared among the projects.

f. Key Pair

The Customer may create and register a key pair used to login to the Virtual Server using the SSH authentication method A key pair created in an external environment may be registered using this method. By registering the key pair, the Customer will be permitted to acquire a key file (*.pem) for use in SSH authentication. If the Customer associates a pre-registered key pair to the Virtual Server when the Virtual Server is created, then the SSH client software authenticates it using the corresponding key file for SSH authentication (*.pem) and allows the Licensee to login to the Virtual Server.

g. Auto-Failover

The Customer can use the auto-failover function under which the failover occurs automatically for the Virtual Servers when there is a failure in the service provisioning equipment. Note, however, that the integrity of data being processed on the memory of the Virtual Server is not guaranteed in the event of the auto-failover.

h. Auto-Scaling

· The Customer can configure certain conditions as auto-scaling rules via the K5 Service Portal to automatically grow or reduce a system, For example, the number of Virtual Servers defined in the K5 resources during a busy period for the Customer, automatically controlling increases or decreases to the Virtual Servers within the K5 Resources according to those conditions.

· Other examples include a Customer applying as an auto-scaling rule a threshold value or schedule linked to the monitoring capabilities of K5 IaaS based on Virtual Server or Virtual Network metrics.

· The auto-scaling function cannot be used if the auto-failover function is enabled for the same Virtual Server.

· A Customer may request K5 IaaS to send an automated notification to a Customer nominated email account when a Virtual Server implements any auto-scaling rule for a Virtual Server.

i. Virtual Server Import Service

The Customer can migrate an image of a Virtual Server running outside the K5 Resource to the K5 Resource if the image of the Virtual Server meets the requirements specified in "Virtual Server Import Service" of FUJITSU Cloud Service K5 IaaS Features Handbook.

j. Virtual Server Export Service

The Customer can export an image of a Virtual Server, which was imported through Virtual Server Import Service and is running on the K5 Resource. The image of the Virtual Server must meet the requirements specified in "Virtual Server Export Service" of FUJITSU Cloud Service K5 IaaS Features Handbook.

(2) Services for SAP

This function is available in Eastern Japan Region 1 (only jp-east-1a Availability Zone), Western Japan Region 2 (only jp-west-2a Availability zone), UK Region 1, Finland Region 1 and Germany Region 1.

a. Virtual Server for SAP

- This function enables the deployment of Virtual Servers for SAP applications, by providing the virtual environment that SAP can support.
- The environment must be activated for projects in which Virtual Servers will host any SAP applications.
- The Customer can create a Virtual Server by selecting a type from the following table:

Function		Details				
Virtual Server type		WS-2	WS-4	WS-8	WS-16	WS-32
Virtual Server specifications	Number of virtual CPUs (vCPUs)	2	4	8	16	32
	Allocated memory (GB)	8	16	32	64	128

- The Customer can release the created Virtual Server at any time.
- Customers are charged for Virtual Servers depending on the status of the Virtual Server created in respect of the Customer at the time the charges for the Cloud Services are calculated. The applicable consumable unit of measure and unit rate will be charged to and payable by the Customer as follows:

Status	Details	Chargeable
Active	The Virtual Server is running.	Yes
Inactive	The OS of the Virtual Server is shut down without releasing the CPU and memory resources.	No

- The Customer can change the type of Virtual Server being deployed at any time. The Customer must inactivate the Virtual Server before its type is changed.
- When a Virtual Server is created, K5 IaaS creates a port that associates a private IP address so that Virtual Server can be connected to the Virtual Network.

b. Virtual Private Cloud for SAP

By applying in writing separately by using the application form, the Customer can deploy Virtual Server at the physical server for the dedicated use of the Customer. The following resources are available for each physical server.

Number of Virtual CPU	42
Memory Size	245GB

c. OS Provisioning Service

The Customer can choose an OS from those listed in the Attachment Table 3 and use it. To use the OS, the Customer must agree and conform to the license agreement designated by Fujitsu. To use certain OS, software support will be required.

d. Imaging

The Customer can acquire an image of a Virtual Server being built. An image of the block storage used by that Virtual Server will be created at the time of image acquisition.

(3) Storage Service

This Service provides block and object storage services for consumption. Block Storage is accessible to Virtual machines within K5 and Object storage is accessible over HTTPS to either virtual machines inside K5 or resources accessing the Object Storage service over the Internet.

a. Standard Service

(i) Block Storage Service

K5 IaaS provides the block storage that can be used when deploying a Virtual Machine on which the OS and data can be stored. The Customer can allocate an arbitrary amount for storage between 1GB and 10TB by 1GB unit for use as system storage or extended storage. A minimum system storage capacity is determined for each OS as follows:

Function	Operating System	Minimum Size
Minimum system storage size	Windows Server	80GB
	CentOS	30GB
	Ubuntu	3GB
	Red Hat/SLES	40GB

(ii) Snapshot Service

K5 IaaS provides a function which permits Customers to create snapshots of Virtual Servers' block storage. A snapshot of the targeted block storage is retained when the snapshot is taken Snapshots can be used by a Customer for: regression purposes – rolling back a Virtual Server to a snapshot; and creating a template – using a snapshot to create a template of a Virtual Server to deploy a copy. Snapshots are retained until the customer actively deletes them.

(iii) Object Storage Service

K5 IaaS provides object storage that permits Customers to store unstructured data and enables the data to be fetched by its object unit. Object storage is replicated between all Availability Zones within the same Region. This allows the Customer to architect its own application to load balance across multiple Availability Zones in order to fetch objects even if one Availability Zone becomes inactive. Object storage is consumed via RESTful APIs.

Function	Details
Size of one object	0B to 5GB
Number of containers	Unlimited
Number of objects in a container	Unlimited
API interface	REST (https)

(iv) Network Attached Storage (NAS) Service

K5 IaaS permits Virtual Server to be used as by a Customer as network attached storage where a Customer delays NAS images to its deployed Virtual Servers. NAS components may be used as shared storage available from multiple Virtual Servers.

Function	Details
Protocol	Select from either Glusterfs or CIFS (SMB)
Virtual Server type*1	Select from types listed in "(1) Virtual Server" in the "2. Computing" section
Size	Specify an arbitrary amount by the 1GB unit

*1 Excluding Virtual Server types P-1 and T-1.

b. Service for SAP

(i) Block Storage Service

K5 IaaS provides block storage that can be used when deployed a Virtual Server on which the OS and data can be stored. The Customer can allocate an arbitrary amount for storage between 0.1GB and 2048GB by the 0.1GB unit for use as extended storage. System storage capacity is determined as follows:

Function	Details
System storage size	• Eastern Japan Region 1 / Western Japan Region 2 Windows Server (Japanese): 80GB Windows Server (English): 180GB • UK Region 1 / Finland Region 1 / Germany Region 1 Windows Server (English): 180GB

(ii)   Snapshot Service

K5 IaaS provides a function which permits Customers to make snapshots of Virtual Servers' block storage. A snapshot of all block storage attached to the targeted virtual servers is retained when the snapshot is taken and stored in Object Storage on the K5 IaaS Platform. Snapshots can be used by a Customer for: regression purposes – rolling back a Virtual Server to a snapshot; and creating a template – using a snapshot to create a template of a Virtual Server to deploy a copy.

4.   Network Service

This Service provides a virtual infrastructure in which the physical network is divided by using virtualization technology.

(1)   Virtual Network Service

A Virtual Network can be created, modified ordeleted in order to deploy K5 Resource such as a Virtual Server. It is possible to create multiple Virtual Networks.

(2)   Subnet Service

This Service provides subnet functions including private IP address management for K5 Resource such as a Virtual Server connected to a virtual network and the automatic allocation of IP addresses by DHCP.

Function	Details
IP version	Specify with IPv4
Network address	Specify within the range of the following private IP addresses using the CIDR form • Class A : 10.0.0.0 to 10.255.255.255 • Class B : 172.16.0.0 to 172.31.255.255 • Class C : 192.168.0.0 to 192.168.255.255
IP address range	Specify the range of IP addresses to assign to the network address by using the first and the last addresses
Gateway address	Specify the gateway IP address
Auto-allocation by DHCP	Specify whether to use the auto allocation by DHCP or not by using "true" or "false"
Availability Zone name	Specify the Availability Zone where the subnet is created. When omitted, the subnet will be created in the default Availability Zone.

(3)   Network Resources

Network Resources can be created or deleted by allocating a created subnet in order to deploy the Virtual Server for SAP.

(4)   Port Addition Service

K5 IaaS permits a Customer to create and manage a port that associates an IP address (i.e. network interface) with a Virtual Server or another K5 Resource to connect it to a Virtual Network. Multiple ports can be added to one Virtual Server.

(5)   Virtual Router Service

K5 IaaS components provide a virtual router that connects to the Internet network or connects one Virtual Network to another Virtual Network.

(6) Security Group Service

K5 IaaS provides for a Customer deployed security group in which rules can be defined and configured as a group in order to make packet filtering for ports connected to a Virtual Server. Multiple rules can be configured in a security group. If a packet matches with at least one rule specified in the security group assigned to the port, such packet will be permitted to pass. Any other packets will be blocked (White list method with OR condition).

(7) Global IP Address Provisioning Service

K5 IaaS's Internet Connection Service will enable the global IP addresses used to access K5 Resource to be assigned to and associated with K5 Resource as a floating IP address. This enables services hosted on Virtual Servers associated with this IP address to be accessible to a user via the K5 Internet Connection Service from any Internet-connected advice running an Approved Browser.

(8) VPN (IPSec VPN) Service

K5 IaaS provides the gateway function used in IPSec VPN communication, offering a Customer site-to-site Virtual Private Network capabilities. It is the Customer's responsibility to arrange for a network device to be used in IPSec VPN communication on the destination side.

(9) Firewall Service

K5 IaaS permits a Customer to create software-defined firewalls and rules in the K5 platform that controls communication between a virtual system and an external network or between virtual systems using the K5 Service Portal and APIs.

(10) DNS Service

K5 IaaS permits a Customer to use its DNS content server to create DNS records and configure options such as weights, failovers and latency for services that are visible externally, such as web servers. This component also provides an environment where operational tasks such as zone management and record management can be executed on the DNS content server via the Internet through the K5 Service Portal.

a. DNS Zone Management

Zones located in the domain being managed can be registered, updated or deleted as follows:

Function	Details
Number of DNS zones registered	Up to 100 zones
Cache retention time that can be configured (TTL)	60 to 86400 secs.

b. Record Management

DNS records can be registered, updated, or deleted as follows:

Function	Details
Number of records that can be set	Up to 10,000 records per zone
Supported record type	A, AAAA, CNAME, MX, NS, TXT, PTR *: Wild cards can be configured (only A, AAAA, MX, and CNAME)

* Regarding PTR records, only global IP addresses that have been issued and allocated in Eastern Japan Region 1, Eastern Japan Region 2, Western Japan Region 1 and Western Japan Region 2 can be registered.

c. Weighted Round Robin

The weighted round robin function of the K5 IaaS DNS Service component permits the Customer control the hit rate according to the weighted values set by the Customer for each record.

Function	Details
Records that can be used	A or AAAA records only
Hit rate that can be specified	0 to 100

d.   Failover Function

This service makes it possible to detect a server that has an associated host record in the DNS Service that has become unresponsive. In the event of an unresponsive host record being return the service can remove the host record from the Service to prevent users trying to access it. Once the server associated with the host record becomes responsive it enables the host record to be accessible again.

e.   Latency Base Routing (LBR) Function

This service enables a user request to the DNS server to return a host record to return the host record that has the lowest latency response to that user from the device they are accessing the service from.

f.   Maintenance

Planned system maintenance is scheduled for between 15:00 and 16:00 (UTC) on the first day of each month (i.e. between 0:00 and 1:00 on the first day of each month (JST)). Settings cannot be registered, updated or deleted for the DNS Service during system maintenance.

(11) Load Balancing Service

This K5 IaaS component provides a load balancer which permits a Customer to distribute traffic to multiple Virtual Servers. The Customer can perform health checks on the Virtual Servers registered as a target for load distribution.

Type	public / internal
Grade	Standard / Middle / High

The estimated processing capability for each grade of a load balancer is detailed in the below table.

Grade	SSL TPS[1] Performance[2]
Standard	290 TPS (2048-bit key length)
Middle	580 TPS (2048-bit key length)
High	870 TPS (2048-bit key length)

[1]: Transactions per second

[2]: As measured in Fujitsu's evaluation environment. Fujitsu does not guarantee the above performance because the operating environment and other factors would affect it.

(12) Network Connector Service

This K5 IaaS component enables a network connection between Availability Zones in the same Region and between the Customer's own private network connection to the FUJITSU Cloud Service K5 ("**Customer Intranet**") and the Virtual Server. When the Virtual Server is connected to the Customer Intranet, the Customer must notify to Fujitsu the relevant network's setting and connection information.

(13) Internet Connection Service (Reasonable-effort)

This K5 IaaS component provides an environment in which a Virtual Server is connected to the Internet using the global IP addresses (associated with the private IP addresses) that are deployed by the Customer under this Network Service on a reasonable-effort basis. To use this Cloud Service, at least one global IP address is required.

5.   Database

This K5 IaaS component permits a database for Virtual Servers into which the relational database function PostgreSQL is incorporated. By accessing this database service via the K5 Service Portal, the Customer can set up and operate a relational database for associated Virtual Servers.

(1) **Database Virtual Server**
- The Customer can create a Virtual Server by selecting a Virtual Server type from the following table.
- The Customer can set such features as database engine, redundancy, automatic backup, automatic maintenance, automatic minor version-up, monitoring, and event notification, as described in the following table.

- The Customer can delete a created Database Virtual Server at any time, and will not be charged for the Virtual Server, if not active as Database Virtual Server.
- The Customer can change the type of Database Virtual Server deployed at any time. Note, however, that the Database Virtual Server must be inactivated when its type is changed.

[Standard CPU]

Functions		Details										
Virtual Server type		S-1	S-2	S-4	S-8	S-16	M-1	M-2	M-4	M-8	M-16	XM-4
Virtual Server specifications	Number of virtual CPUs (vCPUs)	1	2	4	8	16	1	2	4	8	16	4
	Allocated memory (GB)	4	8	16	32	64	8	16	32	64	128	128

Functions		Details									
Virtual Server type		C-2	C-4	C-8	C-16	LM-1	LM-2	LM-4	LM-8	L-12	L-24
Virtual Server specifications	Number of virtual CPUs (vCPUs)	2	4	8	16	1	2	4	8	12	24
	Allocated memory (GB)	4	8	16	32	16	32	64	128	128	128

[High-Speed CPU]

Functions		Details										
Virtual Server type		S2-1	S2-2	S2-4	S2-8	S2-16	M2-1	M2-2	M2-4	M2-8	M2-16	XM2-4
Virtual Server specifications	Number of virtual CPUs (vCPUs)	1	2	4	8	16	1	2	4	8	16	4
	Allocated memory (GB)	4	8	16	32	64	8	16	32	64	128	128

Functions		Details									
Virtual Server type		C2-2	C2-4	C2-8	C2-16	LM2-1	LM2-2	LM2-4	LM2-8	L2-12	L2-24
Virtual Server specifications	Number of virtual CPUs (vCPUs)	2	4	8	16	1	2	4	8	12	24
	Allocated memory (GB)	4	8	16	32	16	32	64	128	128	128

Functions	Details
Applicable database engine	Symfoware Server Enterprise Edition
Redundancy setting	The Customer can create stand-by Database Virtual Server in the same Availability Zone or another Availability Zone.
Automatic backup setting	Schedule (UTC) and retention period (0 to 10 days) can be set to automatically back up the Database Virtual Server.
Automatic maintenance setting	Weekly schedule (UTC) can be set to perform security update and to apply a software patch.
Automatic minor version-up setting	The Customer can select whether or not the update is performed automatically or not when a minor version of a database engine is provided.
Monitoring setting	Resources of Database Virtual Server (e.g. OS and resources in database engine) can be monitored. The Customer can configure the threshold for each item and action (i.e. notification by e-mail) to be taken in case of the excess over the threshold.
Event notification setting	The Customer can select whether or not event occur the Database Virtual Server are notified by e-mail.

(2) Block Storage Service

This Service provides the block storage on which data can be stored. The Customer can allocate an arbitrary amount of the storage between 1GB and 10TB by the 1GB unit and use such amount as the extended storage.

(3) Snapshot Service

This Service provides a function which makes and preserves snapshots of the Database Virtual Server. A snapshot of the targeted Database Virtual Server is preserved when the snapshot is taken. A new relational database can be created from that snapshot.

(4) Backup Service

This K5 IaaS component enables the database engine logs and the backup data to be viewed and/or downloaded. The logs are kept for 72 hours but are rotated and deleted from the oldest first hourly.

(5) Subnet Group

This K5 IaaS component creates a subnet group which stores the network information used to deploy and control a Database Virtual Server. To secure the database availability, two or more subnets located in multiple Availability Zones can be registered as a subnet group.

6. E-mail Delivery Service

ThisK5 IaaS component provides e-mail delivery services, as described in the following tables.

(1) E-mail Delivery Service

Function		Details
E-mail Delivery Function	Send using API	An interface for sending e-mail Sends email using the REST API.
Delivery Status Results Monitoring		The delivery status of e-mail can be retroactively checked as far back as 14 days.
Scheduled Message Sending		E-mails will be sent at a specific time where a Customer designates a specific time for sending the Customer.

(2) E-mail Security Service

Function		Details
Authentication Function	Authentication by sender's address	In delivering e-mail, only the registered e-mail address can be set up as the From address.
	Authentication by domain	In delivering e-mail, only the registered domain can be set up as that of the From address.
E-mail Validity Certification Setting	Sender Policy Framework	In delivering e-mail, the sender can be certified as legitimate one by using the SPF authentication method.

7. Content Delivery Network Service

This service improves user experience accessing over the internet resources hosted on the Cloud Service K5 Object Storage service by using edge servers deployed around the world on the Akamai Intelligent Platform. Static content such as images and videos are stored in a storage area (cache) on an edge server, thereby allowing End Users accessing over the internet to view and access the content from the cache of the closest edge server.

Charges are calculated based upon:

(i) The amount of data delivered from the edge servers

(ii) The number of HTTP/HTTPS requests to the edge servers in a region

Function	Details
Delivery Settings List Function	Lists the delivery settings that can be used for the Customer's project.
Delivery Settings Create Function	Creates the delivery setting and initiates content delivery.
Delivery Settings Get Function	Specifies the created delivery setting ID and obtains the delivery settings content.
Delivery Settings Edit Function	Specifies the created delivery setting ID and edits the delivery settings content.
Delivery Settings Delete Function	Specifies the created delivery setting ID and deletes the delivery settings content.
Cache Clear Function	Specifies the created delivery setting ID and clears cached content from the edge server.
Access Control Function	Restricts delivery of cached content to authorized End Users only.
Report Create Function	Enables the creation of statistical information for the delivery settings created within the scope of the Customer's project, using a combination of (1) and (2) below. (1) All delivery settings or specific delivery settings. (2) All edge servers or edge servers in a specific area.
Report Get Function	Obtains statistical information created using the Report Create Function in json format.
Access Log Collect Function	Stores edge server access logs in containers created in object storage. Enables the encryption of the access logs.

8. Template Service

This function is available only in Eastern Japan Region 1 and Western Japan Region 1. A function that creates a template of K5 Resources built by the Customer.

9. Monitoring Service

The monitoring function for the K5 Resources built by the Customer and for the applications the Customer runs on the K5 Resources

(1) <u>Custom Meter</u>

   A Customer can generate its own individual monitoring index, and monitor and register the data using this customer meter as a monitoring index.

(2) <u>Monitoring Service</u>

   Items monitored for the K5 Resource and using the Custom Meter can be viewed and acquired using the Monitoring Service API.

(3) Alarm Service

The Customer can arrange that an action such as e-mail notification or auto-scaling is taken in case of the excess over the specified threshold in monitoring the default monitoring index in the K5 Resource or Custom Meter.

10. Web Interface

(1) K5 Service Portal

Fujitsu provide the K5 Service Portal for use by the Customer to access K5 IaaS components and the other K5 Cloud Services. A Customer and its End Users may access the K5 Service Portal from any Internet-connected device if it meets the following requirements:

	Service portal
Web browser	Microsoft Internet Explorer 10/11

a. Fujitsu may at its option and discretion interrupt the provision of the K5 Service Portal at any time and without prior notice to the Customer when one of the following situations arises and otherwise in accordance with the Terms:
   - A facility required for the provision of the service portal is failed.
   - An operational or technical reason beyond Fujitsu's control has arisen.
   - Telecommunications lines required to provide the service portal become unavailable for the reasons of the telecommunications carrier which supplies the lines to Fujitsu.
   - When Fujitsu determines that an excessive increase in the amount of access or the data traffic to the service portal risks negatively affect the provision of the service portal.

(2) Remote Console
   - Fujitsu provides a remote console for the Customer to use Virtual Servers.
   - Client environment and limitations on the use of a remote console are as follows:

	Details
OS	Microsoft Windows 7 Microsoft Windows 8.1 Microsoft Windows 10
Web Browser	Microsoft Internet Explorer 11 Mozilla Firefox 49 Google Chrome 54
Limitation about session time	30 consecutive minutes
Limitation about number of connections	5 concurrent connections are available per Availability Zone for a Contract number
Limitation about Virtual Servers to connect to	Only 1 connection can be made to one Virtual Server at any one time

(3) Application Programming Interface

Fujitsu will provide the application programming interface (API) necessary to permit access of K5 IaaS and the other K5 Cloud Services. Refer to Fujitsu's API related documentation for the details of API specifications.

11. User Management

The Customer can manage privileges and permissions ("Privileges") of K5 Resources and End Users using the types of units and roles described in the following table.

Unit of management	Details
Project	Project means a unit to which the user belongs. Multiple Projects can be created.
User	User means an individual who can login to the service portal and use functions provided by the Service and manage the K5 Resources.
Group	Group means a group to which multiple Users belong. This feature is used, for example, when user privileges need to be managed in a batch.
Role	Role means information used when privileges are allocated to a user or a group. The following six roles are pre-defined. • Contractor Role • Administrator Role • System Owner Role • Operator Role • Observer Role • Member Role

End Users with appropriate Privileges can design and build Virtual Servers and or Virtual Networks using the available components set out in the K5 Service Portal. Access to an update repository is available for End Users with appropriate Privileges to patch and maintain their deployed Operating Systems.

End Users with appropriate Privileges can also:

- Configure Server Groups on the platform that group Virtual Servers together logically, in order that the group of Virtual Servers (as required):
  - o Run on separate physical host system
  - o Run on the same physical host system; and/or
  - o Are configured to enable the automatic restart of a Virtual Server on another physical host if the original host fails.
- Configure monitoring services, triggers and alerts to automatically carry out actions when certain conditions are met (for example automatically increasing the scale of a Virtual Server to meet demand during a peak period or when a capacity threshold is breached) and optionally to provide notification by email when such an action has been taken.

12. Security Service

(1) Trend Micro Deep Security as a Service Option

Provides security solutions for the Virtual Server. The function is applied only to those Virtual Servers that are deployed as a part of "Computing", described earlier in this Service Description. Support for this function is provided by a point of contact separately established. The details of support for this function are described in the Software Support Descriptions.

13. Help Desk Service

Fujitsu will provide the Help Desk service and respond to questions related to the details of the descriptions of the Service, how to set up and use the Virtual Servers and other K5 Resources (excluding questions related to software supplied as a part of the Service). The details of this Service are described in the Help Desk Service Description.

14. Software Support Service

Fujitsu will provide software support to the Customer in relation to some of the software programs supplied with the Virtual Server (including OS). To use the Software Support Service, the Customer needs to select to receive it by operating a set of prescribed procedures on Fujitsu Environment, with the exception of those programs for which software support is mandatory. The details of this Service are described in the Software Support Descriptions. For UK Region 1, Finland Region 1, Germany Region 1, Spain Region 1 and US Region 1, this service is provided as part of Help Desk Service.

15. Notes on the DNS Service and E-mail Delivery Service

(1) Use Restrictions

The use of the DNS Service and E-mail Delivery Service may be restricted without a prior agreement with the Customer when one of the following situations arises and otherwise in accordance with the Terms:

a. Fujitsu determines that It is feared that using Customer's user ID or password to access the DNS Service and E-mail Delivery Service can cause damage to a third party because of a worm-type virus infection or the use of spam e-mail pathways, etc.

b. It is suspected from the manner or nature of use of the DNS Service or E-mail Delivery Service, that the Customer's user ID or password for the DNS Service and E-mail Delivery Service is being used by a third party without the Customer's consent.

c. Fujitsu's prescribed telecommunications use a protocol that takes up the bandwidth constantly and heavily. To restrict the speed or the amount of traffic on the connected services, such telecommunications must be detected and the bandwidth allocated to Fujitsu's telecommunications must be controlled.

d. A large volume of spam e-mails have been delivered to the Customer and are affecting the K5 Resources.

e. Fujitsu considers (acting reasonably) that the sender of spam e-mails (e-mail address, IP address, etc.) capable of affecting the K5 Resources of the FUJITSU Cloud Service K5 is false or non-existent.

(2) Other Restrictions

Fujitsu may temporarily suspend in whole or in part the provision of the DNS Service or E-mail Delivery Service without prior notice to the Customer when one of the following situations arises and otherwise in accordance with the Terms:

a. Scheduled or emergency maintenance is made for the facility for the DNS Service or E-mail Delivery Service.

b. Fujitsu determines that temporary suspension of the DNS Service or E-mail Delivery Service is necessary because of an operational or technical reason.

Fujitsu will assume no liabilities if the Customer or a third party suffers damage from a delay or an interruption in whole or in part of the DNS Service or E-mail Delivery Service for any of the aforementioned reasons or other.

16. Notes Regarding the Content Delivery Network Service

(1) Only port 80 is available for HTTP access, while only port 443 is available for HTTPS access.

(2) The DNS Service undergoes scheduled maintenance (i.e. on the first day of each month, from 0:00 to 1:00 Japan Standard Time) and DNS-related operations cannot be performed during this time for the Content Delivery Network Service.

[Customer Dependencies]

In order to receive the FUJITSU Cloud Service K5, the Customer or End Users must:

- *Be able to access to the Internet using an Approved Browser.*
- *For Customer hosted Services, provide Fujitsu Personnel with such access to their datacenter as is reasonably requested or required for the purpose of deploying the infrastructure and otherwise providing the Services.*
- *For Customer hosted Services, provide Fujitsu with their exact rack locations in sufficient time to enable Fujitsu to deliver and implement the Cloud Services.*
- *Implement, operate and maintain an appropriate level of anti-virus, anti-spyware and network threat protection.*
- *Take steps to maintain confidentiality and ensure that unique identifiers and passwords and other access information required for access to the Fujitsu Cloud Service K5 and any of its components do not become known to third parties.*
- *Accept responsibility for:*
  - *Backing up the content of Virtual Servers and data that a Customer and its End Users store of the platform in accordance with the Customer organization's back-up and disaster recovery policies.*
  - *Use and strict management of unique identifiers and passwords supplied or created to enable access and use of the FUJITSU Cloud Service K5 and its components.*

Attachment Table 1 OS offered under Standard Service

Operating system name	Licensed by	Eastern Japan Region 1 Eastern Japan Region 2 Western Japan Region 1 Western Japan Region 2	UK Region 1 Finland Region 1 Germany Region 1 Spain Region 1 US Region 1	Remarks
Windows Server 2008 R2 SP1 Standard Edition 64bit (Japanese)[*1]	Microsoft	○		Supplied under the SPLA license
Windows Server 2008 R2 SP1 Enterprise Edition 64bit (Japanese)[*1]	Microsoft	○		Supplied under the SPLA license
Windows Server 2012 R2 Standard Edition 64bit (Japanese)[*1]	Microsoft	○		Supplied under the SPLA license
Windows Server 2012 Standard Edition 64bit (Japanese)[*1]	Microsoft	○		Supplied under the SPLA license
Windows Server 2008 R2 SP1 Standard Edition 64bit (English)[*1]	Microsoft	○	○	Supplied under the SPLA license
Windows Server 2012 R2 Standard Edition 64bit (English)[*1]	Microsoft	○	○	Supplied under the SPLA license
Red Hat Enterprise Linux 6.x 64bit (English)[*1]	Red Hat	○	○	Use of the software support mandatory in Japan
Red Hat Enterprise Linux 7.x 64bit (English)[*1]	Red Hat	○	○	Use of the software support mandatory in Japan
SUSE Linux Enterprise Server 12 64bit (English)	SUSE		○	
CentOS 6.x 64bit (English)[*1]	(Open source software)	○	○	
CentOS 7.x 64bit (English)[*1]	(Open source software)	○	○	
Ubuntu 14.04 LTS	Canonical	○	○	
Ubuntu 16.04 LTS	Canonical	○	○	

*1: Virtual Server type P-1 and P2-1 are not supported.

Attachment Table 2 Middleware offered under Standard Service

Middleware name	Licensed by	Eastern Japan Region 1 Eastern Japan Region 2 Western Japan Region 1 Western Japan Region 2	UK Region 1 Finland Region 1 Germany Region 1 Spain Region 1 US Region 1	Remarks
SQL Server 2014 Standard Edition (Japanese)[*1]	Microsoft	○		Supplied under the SPLA license
SQL Server 2014 Standard Edition (English)[*1]	Microsoft	○	○	Supplied under the SPLA license

*1: Virtual Server type P-1 and P2-1 are not supported.

Attachment Table 3 Operating Systems offered under Services for SAP

Operating system name	Licensed by	Eastern Japan Region 1 Western Japan Region 2	UK Region 1 Finland Region 1 Germany Region 1	Remarks
Windows Server 2008 R2 SP1 Standard Edition 64bit (Japanese)	Microsoft	○		Supplied under the SPLA license
Windows Server 2012 R2 Standard Edition 64bit (Japanese)	Microsoft	○		Supplied under the SPLA license
Windows Server 2008 R2 SP1 Standard Edition 64bit (English)	Microsoft	○	○	Supplied under the SPLA license
Windows Server 2012 R2 Standard Edition 64bit (English)	Microsoft	○	○	Supplied under the SPLA license

Supplementary Provision (July 20, 2016)
  The present Service Description will be effective from July 20, 2016.

Supplementary Provision (August 19, 2016)
  The present Service Description will be effective from August 19, 2016.

Supplementary Provision (September 16, 2016)
  The present Service Description will be effective from September 16, 2016.

Supplementary Provision (October 27, 2016)
  The present Service Description will be effective from October 27, 2016.

Supplementary Provision (November 10, 2016)
  The present Service Description will be effective from November 10, 2016.

Supplementary Provision (January 10, 2017)
  The present Service Description will be effective from January 10, 2017.

Supplementary Provision (January 23, 2017)
  The present Service Description will be effective from January 23, 2017.

Supplementary Provision (February 13, 2017)
  The present Service Description will be effective from February 13, 2017.

Supplementary Provision (February 28, 2017)
  The present Service Description will be effective from February 28, 2017.

Supplementary Provision (March 1, 2017)
  The present Service Description will be effective from March 1, 2017.

Supplementary Provision (April 12, 2017)
  The present Service Description will be effective from April 12, 2017.

Supplementary Provision (June 1, 2017)
  The present Service Description will be effective from June 1, 2017.

Supplementary Provision (June 16, 2017)
  The present Service Description will be effective from June 16, 2017.

Supplementary Provision (July 18, 2017)
  The present Service Description will be effective from July 18, 2017.

Supplementary Provision (August 1, 2017)
  The present Service Description will be effective from August 1, 2017.

Supplementary Provision (August 18, 2017)
  The present Service Description will be effective from August 18, 2017.

Supplementary Provision (September 28, 2017)
  The present Service Description will be effective from September 28, 2017.