

CenturyLink Technology Solutions Service Guide

Managed Server 1.0: Managed Server

Intelligent Hosting

This Service Guide (“SG”) sets forth a description of the CenturyLink Intelligent Hosting Service, Managed Server 1.0: Managed Server (i.e. Intelligent Hosting) (the “Service”) offerings including technical details and additional requirements, if any. This SG is subject to and incorporated into the Agreement and Service Schedule between the parties. The specific details of the Service ordered by Customer will be set forth on the relevant Service Order. The specific details of the Service ordered by Customer will be set forth on the relevant Service Order. For avoidance of doubt, any references in the Agreement, Schedules, or Service Orders to SSG, shall mean SG.

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Standard Service Description

1. Standard Service Description: Managed Server 1.0: Managed Server (i.e. Intelligent Hosting) is a managed hosting service. The standard “Service” consists of the licensing, installation, configuration, administration, monitoring, maintenance and support (the “Management”) for the Components described in Section 1.0. The Service Level Agreement (SLA) associated with this Service Guide is the “Managed Hosting Services SLA”.

1.1. Standard Components

1.1.1. Server Hardware: Dedicated physical computing hardware consisting of various CPU/processor, hard disk drive, and RAM memory values as selected by the Customer on the Service Order. The Service includes RAID 1 disk array (locally) and pre set up disk drives and space. Custom configurations can be available upon request.

1.1.2. Secure Physical Space: The Service is hosted in a CenturyLink managed Data Center with secured access and redundant power to the server.

1.1.3. Operating System: Not all OS software listed is available for new installations. CenturyLink support for OS software will be extended as long as the OS software vendor continues to provide support. Contact a sales representative for specific version information.

1.1.3.1. Supported Versions

1.1.3.1.1. Red Hat Enterprise Linux (RHEL)

1.1.3.1.2. Microsoft Windows Server

1.1.3.1.3. Oracle/Sun Solaris

1.1.4. Hosted Area Network (HAN)

1.1.4.1. HAN/VLAN Ports: CenturyLink provides physical Ethernet connectivity to the Hosting Area Network. Customer is provided with an IP transit VLAN at the routing gateway of the HAN and a single VLAN per Data Center. Available VLAN Options are detailed in Table 2.0. Customer can purchase additional VLANs if needed (see Section 3.0) All networking infrastructure is redundant. See Table 2.0 for configuration options.

1.2. Licensing: CenturyLink provides the OS and Anti-Virus licenses.

1.3. Installation CenturyLink will provide installation tasks marked with an “X” in the CenturyLink column in Table 1.0 Roles and Responsibilities.

1.3.1. Hardened OS: CenturyLink provides a Hardened OS image that includes anti-virus software.

1.3.1.1. Anti-Virus Protection: CenturyLink provides anti-virus software for every managed Windows Server environment, and upon request for Linux environments. No anti-virus software can guarantee a 100% prevention rate and therefore CenturyLink disclaims any liability for any damage or loss resulting directly or indirectly from any failure of the anti-virus software. Should disruption occur, CenturyLink will use commercially reasonable efforts to promptly remedy the situation.

1.4. Configuration: CenturyLink will provide configuration tasks marked with an “X” in the CenturyLink column in Table 1.0 Roles and Responsibilities.

1.4.1. HTTP Proxy Services: HTTP Proxy services are not enabled in the standard Service. CenturyLink will complete the configuration upon receipt of Customer request.

1.4.2. DNS Services: DNS services are not enabled in the standard Service. CenturyLink will complete the configuration upon receipt of Customer request.

1.4.3. NTP Services: NTP services are not enabled in the standard Service. CenturyLink will complete the configuration upon receipt of Customer request.

- 1.5. Administration:** CenturyLink will provide administration tasks marked with an “X” in the CenturyLink column in Table 1.0 Roles and Responsibilities.
- 1.5.1. Access:** CenturyLink will maintain administrator-level access to the OS software and will issue access privileges to the customer for user creation and other administrative tasks.
- 1.5.1.1. Linux/Unix Servers:** For Customers running Linux or Unix (Solaris) operating systems, privileges will be set by CenturyLink system engineering to enable the Customer’s the proper level of authorization on the system necessary to manage their applications. When possible CenturyLink recommends utilizing "sudo" which is a software shell that allows for specific commands to be executed while limiting access to the system level configuration and resources which CenturyLink will maintain.
- 1.5.1.2. Windows Servers:** For servers running Microsoft Windows operating systems, CenturyLink will allow Customer administrators to have administration level access.
- 1.6. Monitoring:** CenturyLink will provide administration tasks marked with an “X” in the CenturyLink column in Table 1.0 Roles and Responsibilities.
- 1.6.1. Service Monitors:** CenturyLink provides basic monitoring that ensures that each managed server is powered on and accessible for the Customer as well as for all management services as detailed in this Service Guide.
- 1.6.2. Notification:** CenturyLink will retain primary notification and resolution responsibilities for all automated environment alerts in the production environment.
- 1.6.3. Monitored Object Credits:** As part of the standard Service, Customers are given credits for Monitored Objects (see Definitions). CenturyLink provides three monitoring credits with each Managed Server. Credits can be used for URL, TCP and ICMP (see Definition) monitoring. Customers create automatic notification monitors in the Customer web portal. Two credits are required for each URL monitor and one credit is required for each TCP/ICMP network monitor. Additional monitoring credits can be purchased as needed (see Section 3.0).
- 1.6.3.1. URL monitor.** Customer chooses the type (Content Match, Form Test, Authentication Test, or Transaction Thread). See Table 3.0 for additional information.
- 1.6.3.2. TCP Port Check:** Checks the device from an Internet perspective and measures whether the device is available and responding. This form of monitoring ensures that the process or service is running and accepting requests on the network.
- 1.6.3.3. ICMP:** ICMP (ping) monitoring checks the device from an “Internet” perspective and measures whether the device is available. This form of monitoring ensures that the device is active and available on the network.
- 1.7. Maintenance and Support:** CenturyLink will provide administration tasks marked with an “X” in the CenturyLink column in Table 1.0 Roles and Responsibilities.
- 1.7.1. Patch Releases:** CenturyLink compiles, packages, certifies, approves and delivers Software patches for installation in a Customer Environment. CenturyLink Standard Patching requires that (see Definitions) Customer initiates and approve the installation by contacting CenturyLink Service Center. Any Outages directly caused by Customer's failure to request and accept the implementation of a patch will not be subject to SLA Service Credits.
- 1.7.2. Change Management:** All changes to the CenturyLink managed applications; systems, network and facilities are subject to CenturyLink’s change management process. This process is intended to confirm that work is reviewed for completeness (risk assessment, completed test procedure, metrics for measuring progress, back out procedure, etc.) and accuracy prior to scheduling and implementation.
- 1.7.3. Maintenance Windows:** A period of time designated in advance by CenturyLink, during which preventive maintenance that could cause disruption of service may be performed. See agreed upon and current SLA documentation for specifics.

The Customer Access Extension service provides a Gigabit-based Ethernet cross-connect from the HAN to a Customer's colocation-based network.

- 3.7. HAN Port Activation:** Each Intelligent Hosting server comes with One Gigabit Ethernet hardware interfaces on each server. Customers that require physical connectivity to the HAN may request a GigE HAN port activation(s).
- 3.8. Additional Network Interfaces:** For Customers who wish to have additional physical HAN ports on their server; network interface expansion cards may be added to the server. Expansion cards are available in single, dual and quad port configurations. These additional network interface cards also require GigE HAN activation(s).
- 3.9. Additional VLANs:** Any ports and VLANs in addition to those included in the standard CenturyLink design shall be subject to incremental charges as set forth in the relevant Order Form. Any port or VLAN requested by the Customer after the initial installation of the Service shall also be subject to additional, incremental charges.
- 3.10. Advanced Patching:** If Customer-specific patch policies are required, such custom patch management can be accommodated separately as part of the Advanced Patching Solution service. This additional outsourced service level provides fee-based CenturyLink management of Customer-specified patch policies, recurring quarterly or monthly patching schedules, and non-standard post-patch installation reporting.
- 3.11. URL, TCP, and ICMP monitoring credits:** Customer can purchase additional credits see Section 1.6.3.
- 3.12. Internet Bandwidth:** CenturyLink uses the CenturyLink Internet Backbone for Internet transit services. CenturyLink manages and monitors all connectivity points both within the Data Center and on the CenturyLink Internet backbone. CenturyLink Data Centers are pre-provisioned with Ethernet cabling from the aggregation switch to each rack to minimize implementation timeframes and accidental disruption of service from build-outs in the Data Center. Managed Hosting Customers that use the Internet to provide access to their hosted applications must have a burstable Internet component included with their solution. Packets moving to or from the Public Internet are charged for separately as a HAN service.
- 3.13. Cloud Network Services (CNS):** Cloud Network Service is a carrier-neutral, network-to-network interface that provides private IP connectivity to cloud services from any cloud service provider. With Cloud Network Service, CenturyLink offers intra-datacenter fiber cross-connect services to customer colocation cages, CenturyLink IQ services, and MPLS connections from other carriers. It can also be used to connect to CenturyLink Cloud's environment from various endpoints within CenturyLink Technology Solutions HAN network. These connections are then passed over a redundant, high-bandwidth connection to the any cloud service provider infrastructure.

Tables and Appendices

Table 1.0 Roles and Responsibilities

Activity	Task	CenturyLink	Customer
Licensing	License key management	X	
	SPLA management	X	
Installation	Installation of hardened operating system to CenturyLink standard.	X	
	Test patches for completeness and functionality	X	
	Coordinate with a designated Customer technical contact to install requested certified patches according to available maintenance windows.	X	
	Confirm operating system functionality in Customer Environment	X	
	Sign off on that managed server is performing and ready to go live. Transition to CenturyLink support initiated.		X
	DNS Resolution: List, add, modify and remove created or imported domains	X	
	Provides post-patch reporting via Customer web portal that reflects patch information as well as success or failure of patching activities conducted	X	
Administration	Define user policy and administration	X	
	Make changes to URL, TCP, ICMP monitors in the Customer portal or by opening a ticket with the CenturyLink Service Center		X
	Password management for end users		X
	Windows and Linux user account provisioning and management	X	
Monitoring	Display CenturyLink staff modification/access information in audit logs	X	

Activity	Task	CenturyLink	Customer
	Access Customer portal for reporting and issue tracking		X
	Receive alerts when pre-set thresholds are exceeded	X	
	Generate proactive notification of expected service interruptions related to Hardware or OS	X	
	Receive Alerts for additional URL, TCP, ICMP monitors		X
	Maintain Audit Log of Customer user access/modification	X	
Maintenance and Support	Provide 24x7x365 access to live support	X	
	Create Trouble Ticket for unexpected service outage events		X
	Generate email notifications of scheduled maintenance/patching to Customer technical contacts in time to provide 48-hours (two business days) notice to Customer	X	
	Review post-patch reporting via Customer web portal		X
	Product Engineer review of all vendor-recommended patches on monthly basis	X	
	Certify a subset of OS patches for Customer patch requests based on those determined 'critical' or 'important' by vendor	X	
	Requests OS patching as needed for appropriate servers based on patches established and made available from CenturyLink		X
	Coordinate with CenturyLink for a mutually agreeable maintenance window in which to apply patches		X
	Utilize combination of vendor-recommended best practices and extensive industry experience		X
	Operating System break/fix services.	X	
	Proactively evaluate effects of patches on Customer's application tier	X	

Activity	Task	CenturyLink	Customer
	Provide hardware break-fix support	X	
	Provide vendor based maintenance / support contracts	X	

Table 2.0 VLAN Options

Option	Description
Public VLAN	Basic service used when traffic from multiple servers is not required to be segmented for performance or security. In most cases, the VLAN is configured to access the public Internet through the CenturyLink IP backbone
Private VLAN	Typically a private VLAN carries traffic that is not destined for the Internet. This can be intra-site communications, between application and database server, or for integrated connectivity with other CenturyLink Intelligent IP VPN services included in the Intelligent Hosting solution.
Tiered VLAN	Premier service in which public and private VLANs are designed specifically to isolate traffic in “tiers” within the server architecture. Firewalls are usually also used in this model to add another layer of security.

Table 3.0 URL Check Options

Option	Description
Content Match	Checks a URL for known content. If the content is not in the returned response, then an alarm is created. This test can also measure the latency in a response and create an alarm based on its time to respond
Form Test	This is a two-step URL monitor. The monitoring service submits a completed web-based form and then performs a Content Match on the response. If the Content Match fails, an alarm is created
Authentication Test	This monitoring function handles dialogue boxes that are presented in some web-based applications for authentications, for example Microsoft Outlook Web Access. If the authentication is not accepted, an alarm is created
Transaction Thread	This is a series of the three types of URL Monitors to create a series of events to monitor a complete transaction from beginning to end

Definitions

Administration Access: A user account that lets you make changes to settings, install software and hardware, and access all files on the computer.

Advanced Patching: Advanced patching supports customers that have unique patching requirements and prefer to have CenturyLink manage their patching process. Examples include: Customer selection of specific patches versus accepting all recommended patches, custom reporting to meet regulatory requirements versus standard reporting, variable patch schedule versus defined Maintenance Windows (see Definitions) and support for maintaining multiple patch levels versus having all patches applied (i.e. patches applied differ based on Production or Non-Production Environment).

Anti-Virus Protection: CenturyLink uses third-party anti-virus software in conjunction with centralized management tools to maintain AV policy control and regular signature file updates. Anti-virus technology provides reasonable protection against malware, including viruses, spyware and trojans, but such technology cannot ensure the prevention of such malware. Should disruption or changes occur due to malware, CenturyLink will use commercially reasonable efforts to promptly remedy the situation after being notified of the problem, but CenturyLink will not be responsible for any damages due to worms, phishing attacks, rootkits, trojan horses or other such malware, including infection of end-user devices or lost or corrupted data/messages. Standard practices have Anti Virus software provided included with Windows OS and by request only for Red Hat OS.

CenturyLink Service Center: The primary organization for resolving infrastructure issues that is staffed 24/7/365 to respond in a timely manner to incidents and requests pertaining to Customer IT infrastructure.

Data Center: The facility in which the Systems are located.

Dedicated Physical Server: Hosted single-tenant infrastructure that can be highly customized to your network, storage, and hardware specs

Disk Array: A disk array is a data storage system that contains multiple disk drives and a cache memory. It efficiently distributes data across multiple drives and enables fault tolerance through redundant array of independent disks (RAID).

Domain Name System (DNS): A hierarchical distributed naming system for computers, services, or any resource connected to the Internet or a private network. It associates various information with domain names assigned to each of the participating entities. Most prominently, it translates easily memorized domain names to the numerical IP addresses needed for the purpose of locating computer services and devices worldwide. The Domain Name System is an essential component of the functionality of the Internet.

Environment: The setting where software and other products are placed into operation for their intended uses by end users.

Foundation Hosting: A managed server service that includes use of (a) a dedicated standalone server provided and owned by CenturyLink, (b) space and power for the server, (c) network connectivity, and (d) failed server hardware replacement services, which are initiated in response to a trouble ticket opened by the Customer.

Foundation Hosting Springboard Server means a managed virtual machine designed to provide a persistent storage location for Foundation Hosting disk images with Fast Ethernet access to the HAN for interacting with Foundation Hosting servers via HP Integrated Lights-Out (iLO) tools.

Hardened OS: As part of the installation process, CenturyLink eliminates as many security risks as possible in the OS. This is typically done by removing all non-essential software programs and utilities from the computer. While these programs may offer useful features to the user, if they provide "back-door" access to the system, they must be removed during system hardening. Examples of steps taken include turning off file and print sharing if not absolutely necessary and installing TCP/IP as the only protocol. The guest account is disabled, the administrator account is renamed, and secure passwords are created for all userlogins. Auditing is enabled to monitor unauthorized access attempts.

Hosting Area Network (HAN) means the managed networking infrastructure that supports CenturyLink Managed Hosting services.

Host Bus Adapters: A host bus adapter (HBA) is a circuit board and/or integrated circuit adapter that provides input/output (I/O) processing and physical connectivity between a server and a storage device. Because the HBA relieves the host microprocessor of both data storage and retrieval tasks, it can improve the server's performance time.

ICMP: Internet Control Message Protocol (ICMP): is a network protocol useful in Internet Protocol (IP) network management and administration. ICMP is a required element of IP implementations. ICMP is a control protocol, meaning that it does not carry application data, but rather information about the status of the network itself. ICMP can be used to report: errors in the underlying communications of network applications, availability of remote hosts or network congestion.

Intelligent Hosting: Means a managed server service that includes use of a dedicated standalone server, space and power for the server, operating system license, network connectivity, management and monitoring of the server hardware and operating system.

Managed Hosting means the set of CenturyLink managed server services that include Foundation Hosting, Intelligent Hosting and Utility Compute.

Major Release: Major Releases (X.y.z) are vehicles for delivering major and minor feature development and enhancements to existing features. They incorporate all applicable error corrections made in prior Major Releases, Minor Releases, and Patch Releases. Software Provider typically has one Major Release per year.

Minor Release: Minor Releases (x.Y.z) are vehicles for delivering minor feature developments, enhancements to existing features, and defect corrections. They incorporate all applicable error corrections made in prior Minor Releases, and Patch Releases.

Monitored Object: Refers to Customer designated equipment; software, circuits, devices, or applications intended to be monitored.

Network Time Protocol (NTP) is a networking protocol for clock synchronization between computer systems over packet-switched, variable-latency data networks.

Non-Production Environment: A product is still being used theoretically. Users, typically engineers, look for bugs or design flaws.

Operating System: An operating system (OS) is software that manages computer hardware resources and provides common services for computer programs. The operating system is an essential component of the system software in a computer system. Application programs usually require an operating system to function.

Packaging: is the process of creating a meta-program that in turn automatically installs software across multiple computers. The meta-program typically includes a set of default properties for the applications it installs.

Patch Release: A patch is a small piece of software that is used to correct a problem with a software program or an operating system. Patches are often called "Patch Updates" and are Critical or Security related.

Production Environment: A production environment can be thought of as a real-time setting where programs are run and hardware setups are installed and relied on for organization or commercial daily operations.

Proxy Server: proxy server is a server (a computer system or an application) that acts as an intermediary for requests from clients seeking resources from other servers. A client connects to the proxy server, requesting some service, such as a file, connection, web page, or other resource available from a different server and the proxy server evaluates the request as a way to simplify and control its complexity.

RAID1: An exact copy (or mirror) of a set of data on two disks. This is useful when read performance or reliability is more important than data storage capacity. Such an array can only be as big as the smallest member disk. A classic RAID 1 mirrored pair contains two disks.

SSL: Secure Sockets Layer (SSL), are cryptographic protocols designed to provide communication security over the Internet.

Standard Patching: Patches and updates are available upon request to ensure that no patches are applied without customer knowledge and consent, effectively reducing risks to application and data integrity. On a monthly basis, CenturyLink product engineers review all vendor-recommended patches made available by operating system software vendors. The OS vendor identifies a subset of these patches and updates as Critical or Important to installed operating systems, and this subset is tested and certified by CenturyLink. All certified and vendor-recommended patches are implemented with new server builds and made available for patching upon customer request for existing managed servers.

SLA Credit: Service Level Agreement Credits are refunds given by CenturyLink to a Customer if the service falls below a contractually agreed service levels. See Section 1.0 for the SLA agreement associated with this service.

SNMP: Simple Network Management Protocol n "Internet-standard protocol for managing devices on IP networks". Devices that typically support SNMP include routers, switches, servers, workstations, printers, modem racks and more.

Software Binary: A binary file is a file whose content must be interpreted by a program or a hardware processor that understands in advance exactly how it is formatted.

Software: The database server software in binary form, any other machine-readable materials (including, but not limited to, libraries, source files, header files, and data files).

Software Provider: The third party that makes and sells software products described in section 1.0.

Statement of Work: A statement of work (SOW) is a formal document that captures and defines the work activities, deliverables, and timeline a vendor must execute in performance of specified work for a client. The SOW usually includes detailed requirements and pricing, with standard regulatory and governance terms and conditions.

Storage Area Network (SAN): SAN is a dedicated fibre channel network that provides access to consolidated, block level data storage.

Systems mean the computer equipment and software that is approved by CenturyLink and utilized by the Customer in connection with the provision of Service by CenturyLink.

TCP: Transmission Control Protocol is a set of rules (protocol) used along with the Internet Protocol (IP) to send data in the form of message units between computers over the Internet. While IP takes care of handling the actual delivery

of the data, TCP takes care of keeping track of the individual units of data (called packets) that a message is divided into for efficient routing through the Internet.

Transaction Thread: This is a series of the three URL Monitor types that create a series of events to monitor a completed transaction from beginning to end.

URL Monitoring: Uniform Resource Locator (URL) monitoring checks the Web site from an internet perspective and measures whether the page and content are delivered. URL Monitoring latency thresholds can be set between 35 seconds and 90 seconds. By default, Polling intervals are every three minutes. The additional process of checking for page content has the effect of checking whether customer applications and databases are available. This is accomplished by selecting content to be monitored that is generated by an application directory or database. If it is confirmed that the expected content is delivered with the page, then it can be confirmed that the Web server and the application or database are all in working order. URL Monitoring checks the Web site from an "Internet" perspective and measures whether the page and content are delivered. The additional process of checking for page content has the effect of checking whether Customer applications and databases are available. This is accomplished by selecting content to be monitored that is generated by an application directory or database. If it is confirmed that the expected content is delivered with the page, then it can be confirmed that the Web server and the application or database are all in working order.

Utility Compute: A managed server service that includes use of a dedicated server within a collection of servers, space and power for the server, operating system license, network connectivity, use of storage services on a managed storage area network, management and monitoring of the server hardware and operating system.

Utility Storage is a CenturyLink managed storage service that includes use of a storage area network, which is provided and managed by CenturyLink.

VLAN: VLANs (Virtual Local Area Networks): VLANs provide tagged or untagged networks that provide common or separate local area networks.

Virtual Routing and Forwarding (VRF) allows CenturyLink Customers to keep their environments separate, while sharing a common infrastructure.