

SERVERIRON

- ▶ INTEGRATED LAYER 2 THROUGH LAYER 7 SWITCHING
- ▶ SUPPORT FOR UP TO 16,000,000 CONCURRENT SESSIONS, AND 56 GBPS OF THROUGHPUT
- ▶ HIGH AVAILABILITY SERVER LOAD BALANCING WITH ACTIVE/ACTIVE CONFIGURATION AND STATEFUL FAIL-OVER
- ▶ INDUSTRY'S MOST POWERFUL CONTENT SWITCHING CAPABILITIES INCLUDING URL, COOKIE AND SSL SESSION ID BASED SWITCHING
- ▶ CONTENT AWARE CACHE SWITCHING
- ▶ HIGH PERFORMANCE VPN/FIREWALL LOAD BALANCING
- ▶ MOST COMPREHENSIVE GLOBAL SERVER LOAD BALANCING WITH DNS PROXY AND CLIENT PROXIMITY MEASUREMENTS
- ▶ SUPERIOR SUPPORT FOR ALL MAJOR STREAMING MEDIA PROTOCOLS
- ▶ ENHANCED NAT CAPABILITIES



INTERNET WEB SWITCHES



SERVERIRON™ INTERNET TRAFFIC MANAGEMENT SYSTEM WITH INTERNET IRONWARE™ LAYER 2 THROUGH 7 SWITCHING

Foundry Networks' ServerIron Family of Internet web switches provide high performance, Layer 2 through 7 switching enabling network managers to control and manage today's exploding web transaction, web application and eCommerce traffic flows. Internet IronWare - Foundry Networks' unique software suite of Internet traffic management capabilities, powers the ServerIron web switches to direct requests to the right server and application based on the information that resides beyond the traditional Layer 2 and 3 packet headers. ServerIron eases escalating Internet traffic overload, reduces the burden of server farm management, and allows the entire web facility to scale to its fullest potential.

Built on Foundry Networks' IronCore ASIC designs and switch-based platforms, ServerIron enables Internet traffic switching based on Layer 2 through Layer 7

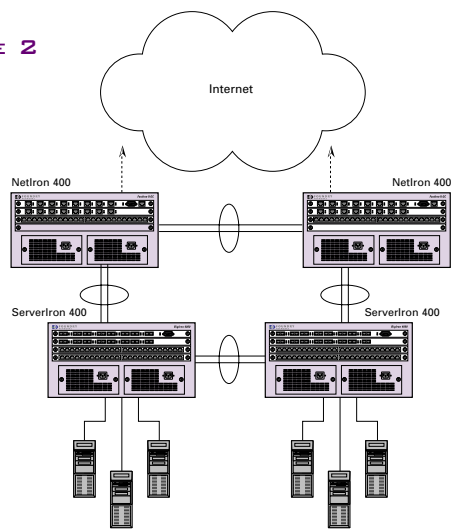
definitions. ServerIron delivers industry leading performance for Internet traffic management functions including local and global server load balancing, firewall load balancing, transparent cache switching, application redirection, packet filtering and prioritization, and support for content-intelligent switching such as cookie-, URL-, and SSL Session ID-based redirection and load balancing. Furthermore, ServerIron provides the foundation for high service availability, disaster recovery, location and server transparency, backbone cost control, and a consistent user experience.

ServerIron supports four major Internet traffic management applications:

1. **Reliable Server Load Balancing (SLB)** – Distribute IP-based services and transparently balance web traffic across multiple servers while continuously monitoring server, application and content health. This enhances overall reliability and availability of the services while simultaneously ensuring server farm accessibility.



FIGURE 2



ServerIron aids in the widespread deployment of Internet caching, used to improve web-service response time and user experience. Network administrators can now use multiple caches to increase redundancy because ServerIron supports the creation of up to four caching server groups per device for added cache reliability. ServerIron distributes load across multiple caching servers for scalability and sends traffic directly to the origin servers if all the caches fail.

EASY TO SETUP AND MANAGE

Based upon Foundry's powerful hardware switching platforms, configuring and managing a ServerIron is simple using the Foundry Command Line Interface (CLI) or built-in web browser based interface. In addition, Simple Network Management Protocol (SNMP) device management and configuration applications are available on major server platforms, including HP OpenView for Sun Solaris, Windows NT, and standalone Windows NT. Remote Monitoring (RMON) and port mirroring provide network monitoring and troubleshooting.

Extensive accounting and statistics allow network managers to easily collect and display detailed information about network traffic destined to server farms. Network administrators can also gauge the amount of traffic between servers and clients, as well as which application is dominating network traffic. In addition, ServerIron tracks the number of active and open sessions per server. These statistics can also be used to track traffic loads on servers that support multiple applications.

IRONGLAD WEB PERFORMANCE

Capable of 100 percent wire-speed throughput, ServerIron delivers unmatched Layer 4 through Layer 7 switching performance. All ServerIron platforms utilize a unique distributed switching fabric and powerful processors to deliver load-balancing capacity of over 600,000 connections per second with no session loss. As well, ServerIron scales to maintain 16,000,000 concurrent sessions. This ensures web site availability during peak Internet traffic load.

Key Features

EXCEPTIONAL PERFORMANCE AND CAPACITY

- ▶ **Industry Leader in Concurrent Session Capacity** – ServerIron effectively handles over 16,000,000 concurrent connections to accommodate more client traffic as the website experiences growing traffic demands.
- ▶ **SwitchBack™** – Also known as direct server return, SwitchBack takes advantage of the inherently asymmetrical nature of web traffic. The client to server traffic flows through the load balancing device but the return (server to client) traffic, which typically consumes more bandwidth because it contains the information that the client has asked for, switches directly to the client on the return path. By avoiding the load-balancing device, SwitchBack provides wire-speed throughput servicing the clients.
- ▶ **Throughput** – The various load balancing platforms provide differentiated system performance and throughput levels from 2 Gbps with ServerIronXL, right up to 56 Gbps with ServerIron 800.
- ▶ **Session Processing** – Foundry Networks leads the industry with real-world session processing capability of up to 600,000 sessions per second.
- ▶ **Symmetric Load Balancing** – Deploy multiple switches to increase load-balancing capabilities in parallel and multiply the total connection capacity and overall performance. Also known as the Active/Active configuration, Internet IronWare's symmetric load balancing provides cross platform fault tolerance, picking up the full load where the failed switch left off without losing any state information.
- ▶ **Switching Capacity** – Built on Foundry's custom ASIC designs, ServerIronXL, ServerIronXL/G, ServerIron 400 and ServerIron 800 respectively deliver 4.2 Gbps, 32 Gbps, 128 Gbps and 256 Gbps of total switching capacity.
- ▶ **Trunking for Performance** – Configure trunk groups between ServerIron devices or between the load balancing device and the server to increase overall server farm bandwidth, throughput, performance, and redundancy. ServerIronXL supports up to five trunk groups containing from two to four 10/100Base-TX ports and ServerIron 800 supports up to 22 trunk groups.
- ▶ **IP Filters** – Network managers can define up to 1024 IP filters to selectively control SLB and TCS traffic. These dynamic filters, which take effect immediately without requiring a reboot, match on source and destination IP address, network mask, and TCP/UDP port information.

- ▶ **Overflow Protection** – In the event that the local servers exceed their maximum capacity, Foundry's Internet traffic management systems can load balance the subsequent requests to remote server farms.
- ▶ **Massive Server Farms** – ServerIronXL supports up to 24 10/100 ports and 2 Gigabit ports, ServerIronXL/G supports up to 8 Gigabit Ethernet fiber ports, and ServerIron 800 supports up to 168 10/100Base-TX ports or 56 Gigabit ports. With support for unlimited Virtual IP addresses, and up to 4,096 real servers, ServerIron switches provide the highest connectivity to server farms.
- ▶ **High Performance Web Hosting** – ServerIron's many-to-one load-balancing features enables network managers to define multiple VIPs and track service usage by VIP. With this capability, a single server and port number can load balance multiple web sites across a shared set of real servers.

SERVER AND APPLICATION HEALTH CHECKS

- ▶ **Layer 3** – Upon configuration, ServerIron immediately and automatically health checks the server via ARP and ping to determine if the server is ready for operation. If problems arise, ServerIron can automatically take corrective action.
- ▶ **Layer 4** – When the network manager binds an application (TCP/UDP port) on a real server to an application on a virtual server, ServerIron perform a Layer 4 health check, which the server must pass. This guarantees that clients do not hit 'dead' servers.
- ▶ **Layer 7** – With health checking enabled for a service (TCP/UDP port), ServerIron can perform a Layer 7 application specific health check immediately after successful completion of the Layer 4 health check. These can include the following: HTTP, DNS, SMTP, POP3, LDAP, NNTP, IMAP4, FTP, Telnet and RADIUS.

LOAD BALANCING FUNCTIONALITY

- ▶ **Round Robin** – Assigns connections sequentially among servers in a logical community. Round robin treats all servers as equal regardless of the number of connections or response time.
- ▶ **Least Connections** – Assigns a connection to the server with the least number of open connections. This option works well in web sites in which there is a group of servers with dissimilar performance capabilities. Least connection ensures adequate distribution and avoids server overload.

- ▶ **Weighted Percentage** – This option allows managers to assign a performance weight to each server. Use weighted percentage to ensure that those servers capable of processing connections faster receive the largest number of connections.
- ▶ **Response Time** – Directs requests to the server providing the best response time. Response time measurements include the network latency and the response time for the application level health checks.
- ▶ **Combined Response Time and Least Connections** – Directs requests to a server based on the server and application response time, and the number of active connections on the server.
- ▶ **Slow Start** – To protect the server from a surging flow of traffic at startup, ServerIron implements a unique slow start service that allows the server to gradually accept connections for the real server. This is especially useful for SLB implementations using least-connections as the load balancing methodology. Since most servers today cannot handle more than 2000 new connections per second, this feature helps ensure stability when bringing new servers online.
- ▶ **Maximum Connections** – Used to protect servers from bogging down due to high amounts of Internet traffic, this feature allows administrators to limit the number of concurrent connections handled by a particular server and ensure the traffic does not outpace the performance of the server.
- ▶ **Cookie Switching** – This feature directs HTTP requests to a server group based on information embedded in a cookie in the HTTP header. Using cookies, the next time the client requests information from the server, the cookie specifies which server group should handle the request. Cookie switching ensures that a particular server group always handles requests from a particular client even across sessions, thereby guaranteeing client persistence and more a satisfied end-user experience.
- ▶ **URL Switching** – ServerIron directs HTTP requests to a server or group of servers, using information contained inside the text of a URL string using defined policies. URL switching grants the network administrator greater control over the website deployment to place different web content on different servers, thereby eliminating the constraint of duplicating all content across all load-balanced real servers.

- ▶ **URL Hashing** – Using this feature enables ServerIron to examine information in the HTTP request (either the Cookie header or the URL string) and internally map this information to one of the real servers bound to the virtual server. This HTTP request and all future HTTP requests that contain this information then always go to the same real server.
- ▶ **URL Parsing** – Selects a real server or a group of servers by looking at the prefix or suffix of the URL or by applying a pattern matching expression to the entire URL. ServerIron supports up to 256 URL rules and imposes no limit on the URL length examined.
- ▶ **SSL Session ID Switching** – SSL (Secure Sockets Layer) is a protocol for secure World Wide Web connections used to protect confidential information with server authentication, data encryption and message integrity. In order for SSL to work, all the SSL connections between a client and server must reach the same host. ServerIron ensures that all the traffic for a SSL transaction with a given SSL-ID always goes to the same server. It is a ‘must have’ feature for commerce, financial, and shopping cart based web sites.

IRONGLAD SECURITY

- ▶ **Network Address Translation (NAT)** – Supporting bi-directional NAT, network administrators can assign real servers internal non-routable private addresses to enhance security and conserve address space. ServerIron also supports NAT functionality for environments where the real servers reside in different sub-nets. This translates to complete network design flexibility when laying out web server farms.
- ▶ **Enhanced NAT** – Unique to Foundry Networks, ServerIron now supports NAT for generic UDP, TCP, and ICMP applications as well as active and passive FTP, Windows™ Media, Real Audio and Video, Real Media, and QuickTime protocols.
- ▶ **TCP SYN attack protection** – ServerIron protects real servers against malicious TCP SYN attacks by allowing administrators to configure a threshold for the rate of incoming TCP SYN packets. ServerIron automatically stops binding new sessions for a user definable timeframe upon exceeding this threshold.

- ▶ **Guard against Denial Of Service (DoS) Attacks** – ServerIron protects server farms against multiple forms of DoS attacks, such as TCP SYN attack, by monitoring and tracking session flows. This capability combined with the ability to support over a 16,000,000 concurrent connections protects against the highjacking of web server resources by malicious users and ensures connectivity for genuine clients.
- ▶ **High Performance Access Control Lists (ACLs) and Extended ACLs** – By using ACLs, network administrators can restrict access to specific applications from a given address or sub-net. Filters can be easily set to deny access to servers to any particular port or VIP address. For example, a network administrator can deny FTP traffic to a particular address. Conversely, filters can be set to allow access by a subset of users or sub-nets.
- ▶ **Cisco-syntax ACLs** – ServerIron supports Cisco-syntax ACLs, which enables network administrators to cut/copy/paste ACL from their existing Cisco products and drop them right into the ServerIron configuration for the ultimate in portability and security.

SESSION PERSISTENCE FOR E-COMMERCE TRANSACTIONS

Internet IronWare maintains up to seven different methods of persistence to ensure that shopping cart type applications and long running web transactions proceed accurately. When combined with the ability to handle over a 16,000,000 concurrent sessions, ServerIron provides the industry’s best persistence methods to build high-performance networks for e-commerce.

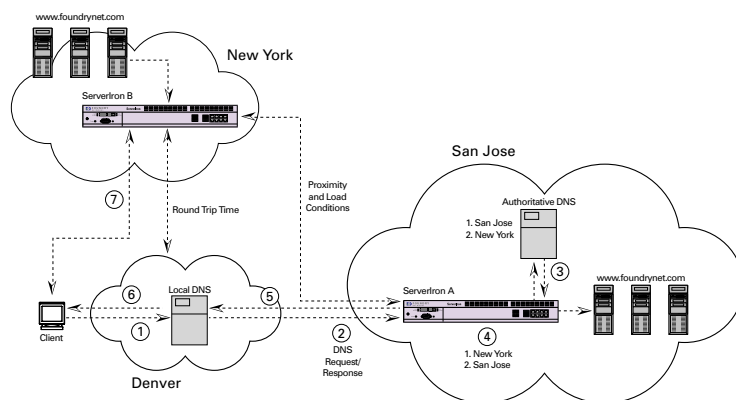
- ▶ **Port Tracking** – Some web applications define a lead port and follower ports. ServerIron ensures that all connections to the follower ports arrive at the same server as the lead port connection. For example, if SSL traffic follows HTTP traffic, the network administrator often defines that the SSL port as the follower port to the HTTP port. This ensures that both types of traffic arrive at the same server for a given customer.
- ▶ **Sticky Ports** – ServerIron support a wide variety of ‘sticky’ connections, including those where web applications require that the client request for additional TCP/UDP ports always go to the same real server, to the server using arbitrary port numbers, or to the server using sequential TCP/UDP ports.

- ▶ **Additional Persistence Methodologies** – ServerIron supports many other types of persistence based on a large range of user programmable options, including Source IP/VIP/Port, Source IP/VIP, and SSL Session ID.
- ▶ **Mega Proxy Sever Persistence** – Network managers can configure ServerIron to treat a range of source IP addresses as a single source to solve the persistence problem caused by certain mega proxy sites in the Internet.
- ▶ **Comprehensive Session Persistence** – ServerIron expands upon simple cookie based switching by including support for Source IP based persistence. When configured for Cookie based persistence, ServerIron uses Source IP based session persistence if there is no Cookie present. This provides a superior level of session persistence over other vendor implementations.

HIGH AVAILABILITY SERVICES

- ▶ **Remote Backup Servers** – If no local servers or applications are available, ServerIron sends client requests to remote servers. The remote server can be another server farm managed by another ServerIron or just another group of real servers. By defining multiple remote servers, ServerIron will load balance the traffic among them using the selected load balancing method.
- ▶ **HTTP Re-direct** – ServerIron can also use HTTP re-direct to send traffic to remote servers if the requested application is not available on the local server farm.
- ▶ **Active/Standby** – When deployed in Active/Standby mode, the standby ServerIron will assume control and preserve the state of existing sessions in the event the primary load-balancing device fails.
- ▶ **Active/Active** – When deployed in Active/Active mode, both ServerIron switches work simultaneously and provide a backup for each other while supporting stateful fail-over.
- ▶ **Quality of Service** – Network administrators can prioritize traffic based on ports, MAC, VLAN, and 802.1p attributes, as well as by service port and application type; for example, ServerIron can grant priority to HTTP traffic over FTP.
- ▶ **Redundant Power Supplies** – ServerIron supports an optional built-in redundant power supply and ServerIron 800 supports multiple (up to three additional) hot-swappable power supply options.

FIGURE 3



EASES WEBSITE MANAGEMENT

- ▶ **Mix and Match Servers** – ServerIron increases network design flexibility and investment protection for existing resources by allowing for application distribution on different servers based on the performance requirements with dynamic adjustment without interruption of service.
- ▶ **Graceful Shutdown** – ServerIron allows you to gracefully remove the server out of the load balancing rotation without disrupting any existing session. This increases website stability when upgrading or repairing servers.
- ▶ **SNMP Reporting** – ServerIron reports SNMP traps and events to the specified trap receiver and can send those management messages to up to six different SysLogD servers.

GLOBAL WEB SERVICES

ServerIron redirects client traffic globally by site availability, site load, and site response time. ServerIron also measures client/server proximity as defined by round trip delay, and geographic location. All these features can work in conjunction with the network's existing DNS servers and results in minimizing network disruption when implementing GSLB. ServerIron continually monitor the sites to detect any changes in servers or services due to varying health and traffic conditions. Configurable site load thresholds enable network administrators to fine tune the health checking parameters to best suit the site's web server and service capabilities. [See figure 3]

FlashBack™, a unique Foundry Internet traffic management feature, measures response time between the authoritative DNS site and each data center. ServerIron actually computes proximity based on the roundtrip time between the different global sites and uses these measurements as a benchmark to determine site responsiveness and the site's range to the client. In addition,

ServerIron understands geography based site selection to keep the requests within continental domains. ServerIron constantly monitors web traffic to create a knowledge base that enables a more intelligent GSLB methodology, powering smarter site selection criteria. ServerIron handles server farm outages or overloads even after the DNS lookup by automatically triggering HTTP redirection or implementing remote server load balancing. ServerIron GSLB provides the following:

- ▶ Acts as a DNS Proxy to transparently intercept and modify the DNS responses, thereby directing customers to the best site
- ▶ Handles the server farm outage or overload after the DNS lookup by HTTP redirect or remote server load balancing.
- ▶ Leverages the existing DNS server and minimizes disruption to the existing DNS environment.
- ▶ Provides continuous site monitoring to detect changes in site health conditions.
- ▶ Allows the network administrator to tune individual site load thresholds through configurable settings.
- ▶ Monitors and selects sites based on FlashBack speed, which measure performance using site, server and application responsiveness.
- ▶ Adds an evolutionary knowledge based in the global server load balancer that enables smarter site selection as more clients access the site.
- ▶ Grants the network administrator the ability to tune ServerIron settings and ensure that minimal differences in various site metrics do not affect site selection.

Foundry offers another unique Internet traffic management feature called 'Global IP'. Working alongside Foundry routers (BigIron and NetIron) and powered by unique VIP health checking algorithms, Foundry routers inject routes to client web service based on regional data center server farm health and provide GSLB capability without relying on the DNS protocol. This enables ISPs and Enterprises to instantaneously build networking infrastructures on a global basis and offer ready-to-go differentiated services to customers for multi-site deployments.

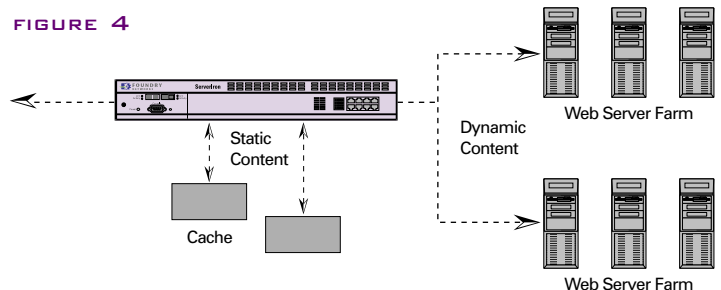
TRANSPARENT CACHE SWITCHING

ServerIron switches improve Internet response time and decrease WAN access costs by redirecting web traffic destined for remote Internet hosts to local cache servers. Foundry's TCS can be used with any cache server that supports transparent redirection including those from leading vendors such as CacheFlow, Cobalt, Inktomi, Network Appliance, Compaq and Dell.

Foundry's TCS offers network managers a resilient web caching solution that significantly simplifies administration. Unlike proxy server solutions that require manual configuration of each client's browser, ServerIron transparently intercepts and switches HTTP client request to an available cache server without reconfiguring the client's browser. Network administrators can configure the device to switch traffic based on source and destination IP address. [See figure 4]

ServerIron switches provide the industry's most powerful content aware cache switching features to build intelligent content networks that route traffic based on content rather than just IP addresses. ServerIronXL/TCS is exclusively optimized for content aware Transparent Cache Switching (TCS) and is targeted to remove price/performance barriers to the mass deployment of content aware cache switches. ServerIronXL/TCS includes the following content switching features:

- ▶ Intelligent load balancing of caches to eliminate content duplication, increase cache-hit ratio, and improve the Internet response time.
- ▶ Accelerate delivery of dynamic content and optimize the cache utilization by bypassing the caches automatically for dynamic content.
- ▶ Specify content-based rules to determine what content should be cached.
- ▶ Organize caches into logical groups that serve different content to provide differentiated service offerings to content providers



Technical and Physical Specifications

LOAD BALANCING

METHODS

Least connections
Response Time
Response Time + Least Connections
Round robin
Weighted distribution

LAYER 2 SWITCHING

CAPABILITIES

32,000 MAC addresses
802.1d spanning tree protocol
802.1p prioritization
Policy-based VLANs
Port-based VLANs
Layer 3 protocol VLANs
Layer 3 protocol and sub-net VLANs
802.1q VLAN tagging

PROTOCOL SUPPORT

TCP
UDP
SSL
FTP
Telnet
SMTP
HTTP
IMAP4
LDAP
NNTP
POP3
DNS
BootP
TFTP
SNMP

STANDARDS COMPLIANCE

802.3, 10BaseT
802.3u 100BaseTX, 100BaseFX
802.3z 1000BaseSX
802.3z 1000BaseLX
802.3x Flow Control
802.1q VLAN Tagging
802.1d Bridging
802.3 Ethernet Like MIB
Repeater MIB
Ethernet Interface MIB
SNMPV1
SNMP MIB II

WARRANTY

1 year hardware
90 days software
Upgrades to higher levels available

MOUNTING OPTIONS

19" Universal EIA
(telco) Rack
Tabletop

NETWORK MANAGEMENT

Integrated Command Line Interface
Telnet
SNMP
RMON
HP OpenView for Sun Solaris,
Windows NT
Standalone Windows NT
Web

	SERVERIRONXL	SERVERIRONXL/G	SERVERIRON 400	SERVERIRON 800
Concurrent Sessions	1,000,000	1,000,000	16,000,000	16,000,000
Throughput	2 Gbps	8 Gbps	24 Gbps	56 Gbps
Switching capacity	4.2 Gbps	32 Gbps	128 Gbps	256 Gbps
Packet forwarding rate (packets per second)	3,000,000 pps	12,000,000 pps	48,000,000 pps	84,000,000 pps
Number of Virtual IP address	Unlimited	Unlimited	Unlimited	Unlimited
Number of Real Servers	1,024	1,024	4,096	4,096
Number of 10/100 ports	24	N/A	72	168
Number of Gigabit ports	2	8	24	56
Total number of ports	26	8	72	168
Layer 3 switching capabilities	Supports servers on different subnets from that of Virtual IP address	Supports servers on different subnets from that of Virtual IP address	BGP4, OSPF, RIP V2	BGP4, OSPF, RIP V2
Physical dimensions	2.75" h x 7.5" w x 16.75" d (6.7cm x 44.5cm x 42.2cm)	2.75" h x 7.5" w x 16.75" d (6.7cm x 44.5cm x 42.2cm)	8.75" h x 17.5" w x 15" d (22.2 x 44.5 x 38.1 cm)	20.75" h x 7.5" w x 15.25" d (52.7 x 44.5 x 38.7 cm)
Weight	18-22 lbs (8-10 kg)	18-22 lbs (8-10 kg)	60 lbs fully loaded (29.9 kg)	117 lbs fully loaded (43.7 kg)
Power supply specifications	110v/220v auto-sensing	110v/220v auto-sensing	90-250 VAC, 5.5A, 50-60Hz per auto-sensing, auto-switching power supply	90-250 VAC, 5.5A, 50-60Hz per auto-sensing, auto-switching power supply



FOUNDRY NETWORKS

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