SKYLAB

Data Logisctics Cloud
Data Acceleration For IoT Revolution

HIGH PERFORMANCE DATA DELIVERY

DATA PIPELINING & PROCESSING

ADVANCED NETWORK INFRASTRUCTURE

DATA VAULT

MARKETPLACE & MEC

DEVICE MANAGEMENT

DATA HAVERSTING

DEVICE AND DATA SECURITY

SECURITY
- End to End Encrypted Communication
- Secure device enrollment and authorisation

LATENCY
- Radically improved latency by SkyLab Transport Acceleration over SkyLab Overlay Network
- Guaranteed SLA in latency

SCALABILITY
- Global scale data delivery network
- High level of flexibility in capacity planning

Accelerate IoT Adoption with Data Logistics Cloud ™

IoT is revolutionizing and changing the way we make decisions both at the macro and at the micro level every minute of our day. From building smart homes to smart and green cities IoT solutions need a robust and always available Infrastructure. SkyLab has designed a upstream to downstream data integration and technology solution - Data Logistics Cloud (DLC) that can drive synergies and network effects through improved Security, Latency and Scalability across multi-generations of control systems over a large scale network.

Technology Offerings

Accelerating Data Delivery over Heterogeneous Networks with SkyLab Transport Accelerator™

Transmitting data across the long distance and various networks require the understanding and cooperation of different network technologies. We develop SkyLab Transport Accelerator (STA) to speed up data delivery. SkyLab has the expertise to seamlessly integrate the various networks to accelerate the data transmission entirely transparent to the end users.

Data Pipelining and Processing

Data does not just originate from your IoT devices, you may need to also ingest data from existing systems, transform this data and output to other destinations. DLC provides the tools to not only take control of the ins-and-outs of your data's journey and lifecycle, but apply advanced data processing to fully realise your data's potential.

Device Management

Support for devices of any type and scalable into the millions, DLC caters for any number of different device type amidst millions of devices. From gateways to sensors and even servers and network equipment, centrally manage all your devices remotely and securely

Marketplace and MEC

With an integrated marketplace allowing for any number of edge computing applications to be uploaded, purchased and deployed to your edge devices through DLC's centralised portal. Combined with SkyLab's Multi-access Edge Computing devices or MECs, allows for powerful containerised applications via docker technology to be deployed and run effortlessly, from video analytics to facility management and more.

Safeguard your Unstructured Data with SkyLab Data Vault

Our Secured Unstructured Data Vault provides a highly-secure mechanism for storing any type of data without restrictions on data structure or its format. It also provides a user-friendly interface that lets customers effortlessly generate business reports.

Supervise and collect all data types with SkyLab Data Gathering System

SkyLab has developed our data gathering platform to address the potential for software growth in managing and processing distributed data in highly networked IoT spaces between diverse computing and embedded devices. We are able to secure delivery of unlimited sets of both structured and unstructured data. We know each data set is precious because it is unique within the time domain when it was transmitted and received. These data sets become a new form of asset class for any data driven organization.
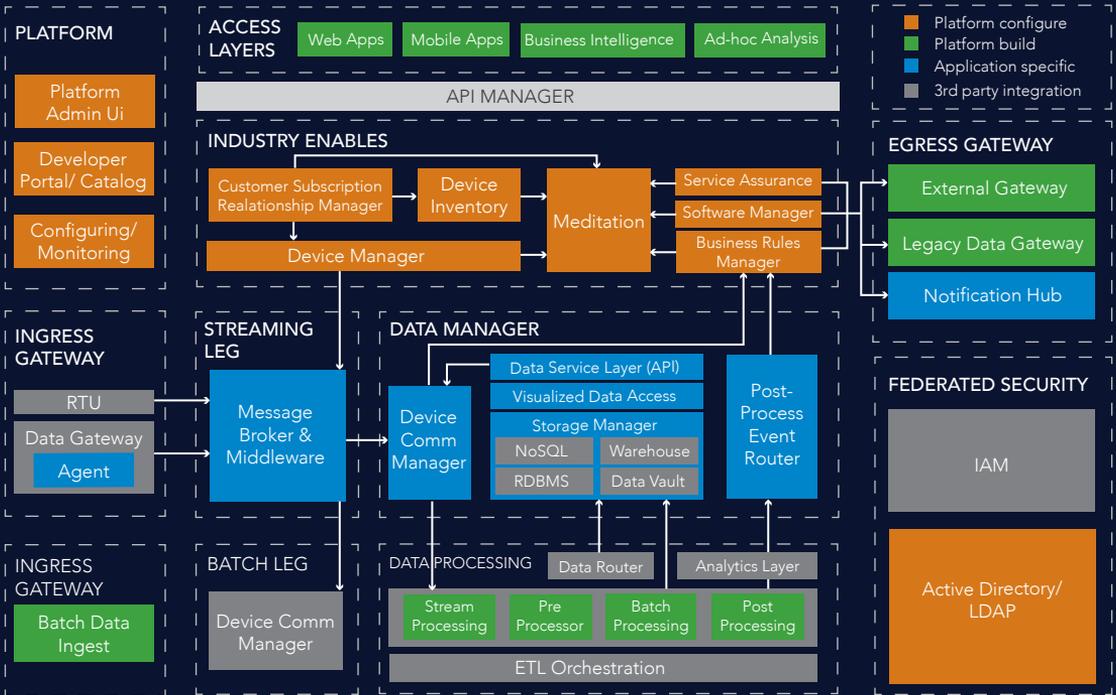
Unified all IoT Application with SkyLab Advanced Network Technology

Machine-to-Machine (M2M) interface that provides a unified communication channel with support of different device types such as sensors, PLC and machinery equipment.

Device and Data Security

Secure device enrollment with automated Device Certificate Exchange using X.509 along with secure data transmission using (TLS) for all device communication. Multi-tenancy, role based user access and full device and user audit logs

Software Reference Architecture

PLATFORM

- Platform Admin Ui
- Developer Portal/ Catalog
- Configuring/ Monitoring

ACCESS LAYERS

Web Apps | Mobile Apps | Business Intelligence | Ad-hoc Analysis

API MANAGER

Legend:
- Platform configure
- Platform build
- Application specific
- 3rd party integration

INDUSTRY ENABLES

- Customer Subscription Realationship Manager
- Device Inventory
- Meditation
- Device Manager
- Service Assurance
- Software Manager
- Business Rules Manager

EGRESS GATEWAY

- External Gateway
- Legacy Data Gateway
- Notification Hub

INGRESS GATEWAY

- RTU
- Data Gateway
- Agent

STREAMING LEG

- Message Broker & Middleware

DATA MANAGER

- Device Comm Manager
- Data Service Layer (API)
- Visualized Data Access
- Storage Manager
  - NoSQL
  - Warehouse
  - RDBMS
  - Data Vault
- Post-Process Event Router

FEDERATED SECURITY

- IAM
- Active Directory/ LDAP

INGRESS GATEWAY

- Batch Data Ingest

BATCH LEG

- Device Comm Manager

DATA PROCESSING

- Data Router
- Analytics Layer
- Stream Processing
- Pre Processor
- Batch Processing
- Post Processing
- ETL Orchestration

Solutions overview

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STA accelerates traffic by analysing traffic & routing conditions in real time to find the fastest route between the data source and the destination even on 2G/3G/4G, satellite and many types of IoT radio networks. STA reduces network latency , increases throughput, optimizes transport layer performance and reduce overall network congestion problem.

IGX Series: A new breed of IoT gateway with a modular design for both physical device connectivity and network backhaul capabilities. Powered by an advanced multi-protocol aware middleware allowing you to interface with any kind of IoT data source and destination. This allows IGX to scale efficiently and rapidly to support billions of devices while keeping costs low

SkyLab's Multi-access Edge Computing, or MECs, are designed to be deployed at the edge along with your other devices and systems, either as a physical or virtual appliance. With additional computing, storage and processing power, using the latest in containerisation technology to ensure operability for whichever application you choose to run and however you choose to develop it. Running your applications at the edge means you can offload processing, network usage and time from the cloud, complimenting your existing infrastructure.

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Advanced IoT Gateway

Advanced Data Logistics For The IoT Revolution

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Multi-protocol support
IGX can gather your IoT data and transmit it safely and securely to the destination through it's embedded middleware, providing guaranteed technology integration regardless of the IoT platform or machine protocol used.
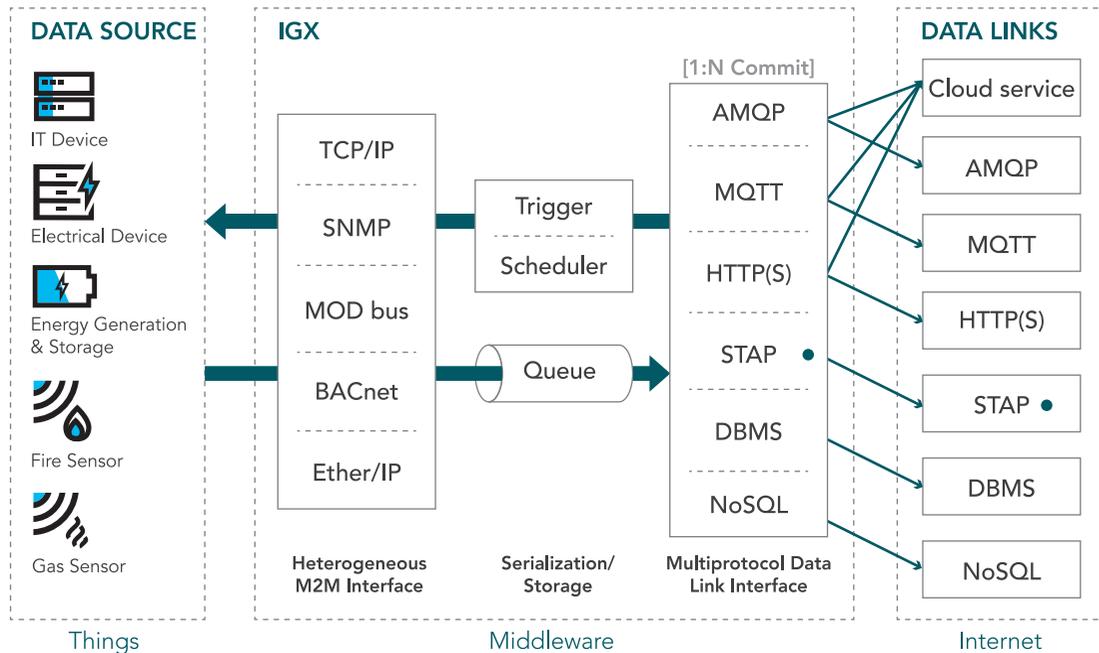
Wireless Backhaul
With in-built hardware support for various types of wireless backhaul technologies (Cellular LTE and CAT-M1, Fiber, Copper, Satellite)

Edge Computing
IGX allows you to run containerised applications on the device for advanced edge computing capabilities. Combined with DLC Marketplace for remote management and application deployment

- **IGX-Docker:** For smaller scale applications, IGX is embedded with docker for container management and deployment
- **IGX-Kubernetes:** For larger scale applications, MEC class IGX devices run kubernetes for scalability and performance
- **DLC Marketplace:** Upload, deploy and manage your edge computing applications with DLC

Use Case Scenario

DATA SOURCE — IT Device, Electrical Device, Energy Generation & Storage, Fire Sensor, Gas Sensor (Things)

IGX — TCP/IP, SNMP, MOD bus, BACnet, Ether/IP (Heterogeneous M2M Interface); Trigger, Scheduler, Queue (Serialization/Storage); [1:N Commit] AMQP, MQTT, HTTP(S), STAP, DBMS, NoSQL (Multiprotocol Data Link Interface) (Middleware)

DATA LINKS — Cloud service, AMQP, MQTT, HTTP(S), STAP, DBMS, NoSQL (Internet)

Key Benefits

🔒 SECURITY
Master IGX Device Registration with Administrator Authorization using DLC. Automated Device Certificate Exchange using X509, Sub-Device Authorization - PLC, Sensor, Meter & Inverter. Data Protection includes remote lock, deactivation & block level encryption. DLC provides secure data transmissions (TLS). User Permissions & Device Auditing using DLC Platform.

⚙ MANAGEABILITY
Centralized Remote Management using DLC offers remote manageability of IGX devices (and sub-devices) & enhances system reliability. From DLC, you can remotely monitor, configure and update single devices or groups of devices. This secure portal allows you to rapidly deploy & manage a large number of remote locations

⤳ CONNECTIVITY
Heterogeneous machine and data protocol support for diversity in field communication. WiFi/Cellular/Bluetooth ensure interoperability between systems. Flexible expansion modules are available to support scalability.

📊 SCALABILITY
Utilizing cutting edge Enterprise level private cloud technologies allows IGX to be agile, scale efficiently & rapidly to support billions of devices while keeping costs low.

🖥 INTEGRATION
A full suite of APIs are also available to support Configuration Management, Device Status Management, ID Management and Device Authentication.

Model Specifications

with 📶STA™

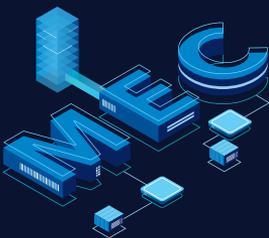|			IGX-RX-1100	IGX-RX-1100-PLUS	IGX-FN-2500
HARDWARE	**System**	CPU / Core	NXP iMX7D Arm® Cortex®-A7	NXP iMX7D Arm® Cortex®-A7	Intel® Atom™ E3826 Dual Core, 1.46GHz
		Memory	1GB	1GB	4GB
		Storage	8GB EMMC	8GB EMMC	16GB EMMC
	Networking	RJ45 Ports	2	2	2
		RJ45 By-pass ports	2	2	No
		WiFi	No	No	Optional
		BLE	Yes	Yes	Optional
		LTE 4G	No	No	Optional
		CAT M1 / NBIoT	Yes	Yes	Optional
	I/O Interface	Display Output	No	No	HDMI
		Console	UART	UART	Yes
		USB	1x USB Micro 2.0 OTG	1x USB Micro 2.0 OTG	4x USB 2.0
		RS - 232/485/422	2x RS-232 /485	2x RS-232 /485	2x RS-232 3x RS-422/485
		GPIO	1x GPIO (4 PIN)	1x GPIO (4 PIN)	1x GPIO (4 PIN)
		Audio	No	No	Yes
	Security	TPM Chip	No	No	Optional
		Watchdog Timer	Yes	Yes	Yes
	Power	Input	12V DC / 2.5A	12V DC / 2.5A	24V DC +/-20%
	Environmental Parameters	Operating Humidity (RH)	5% ~ 95% @ 50°C (non-condensing)	5% ~ 95% @ 50°C (non-condensing)	10% ~ 95% (non-condensing)
		Operating temperature	0°C to 50°C	0°C to 50°C	-5°C to 55°C
	Compliance	Certification	CE	CE	CE/ FCC Class A/ UL/cUL
	Form factor	Type	Fanless with metal casing	Fanless with metal casing	Fanless with metal casing
		Dimensions (W x H x D)	70mm x 100mm x 52mm	70mm x 100mm x 52mm	162mm x 150mm x 50mm
SOFTWARE	**OS**	OS	SkyLab IGX OS	SkyLab IGX OS	SkyLab IGX OS
		Container Technology	IGX-Docker	IGX-Docker	IGX-Docker
	Data Acceleration	With STAP	No	Yes	No

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MEC

Multi-access Edge Computing

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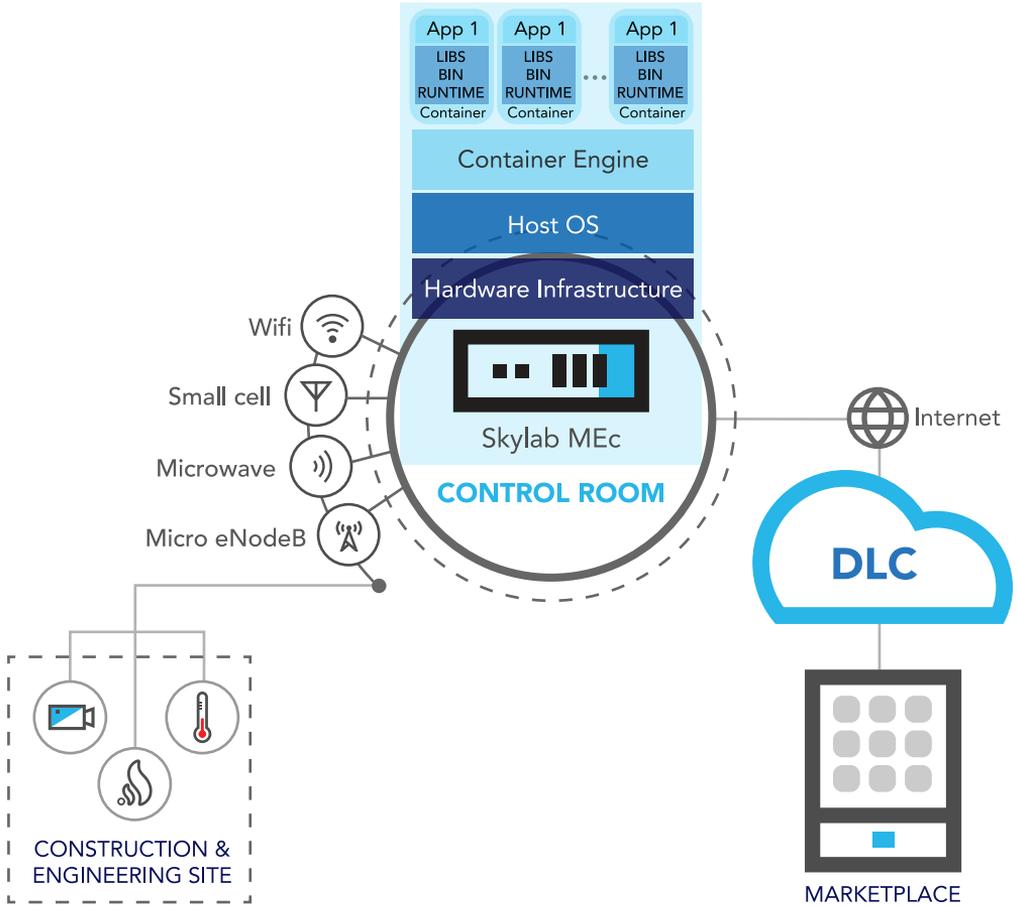
Edge Computing

Immediate on-site data processing through deployed applications, allowing for ultra-fast responses to critical information generated without having to wait.

Offload your backhaul network

Back-hauling large amounts of data can be very costly, especially considering mobile networks. Processing your data at the edge means only a minimal subset of data is sent back, often only event and management data, meaning not only vastly improved latency but cost savings.

Management and Deployment

MEC devices run Kubernetes for hyper-scalability and ease of management and deployment of containerised applications. With in-built load balancing and self healing functionalities ensures the operation of your mission critical applications.

Combined with DLC to provide a centralised portal for your device and application management, with an integrated Marketplace to select and deploy applications effortlessly across your whole infrastructure.

Skylab Transport Accelerator

High Performance Data Delivery Enabling Global
Scale Data Logistics Service

Accelerates Data Delivery with SkyLab Transport Accelerator (STA)

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Addressing industry challenges

BANDWIDTH VARIATION
- Limited radio spectrum
- Limited base-station capability
- Constantly changing bandwidth
- Propagation delays

PACKET LOSS
- Noise Interference by other devices
- Congestion
- Retransmission

CONGESTION
- Lack of protocol support for constantly changing situation
- Snow-ball effect by intermittent failure of the service
- End to End Latency

Use Cases

LEASED LINE OPTIMIZATION
In addition to wireless networks, STA can optimized fixed line connections as well. STA addresses a number of traditional protocol weaknesses to accelerate and solidify your service without upgrading bandwidth.

SATELLITE OPTIMIZATION
While convenient, Satellite experiences can often be frustrating due to high latency, high packet loss and limited bandwidth. STA can improve user experience by accelerating connectivity in a cost-effective way, without increasing bandwidth capacity.

3G/4G OPTIMIZATION
A fast and predictable user experience is essential for any successful application. Not only will STA accelerate your applications, it will also provide users with the consistent experience they expect.

HIGH-SPEED VPN
Traditional VPNs over public internet are often unstable and unreliable. By integrating VPN technologies together with STA, users can achieve service comparable to leased lines but without the cost.

LIVE VIDEO STREAMING OPTIMIZATION
Reduce traditional protocol pitfalls of live video streaming through STA's Adaptive Congestion Control and Automatic Optimization features. Bandwidth capacity is very likely not the problem or solution to your troubles.

APPLICATION ACCELERATION
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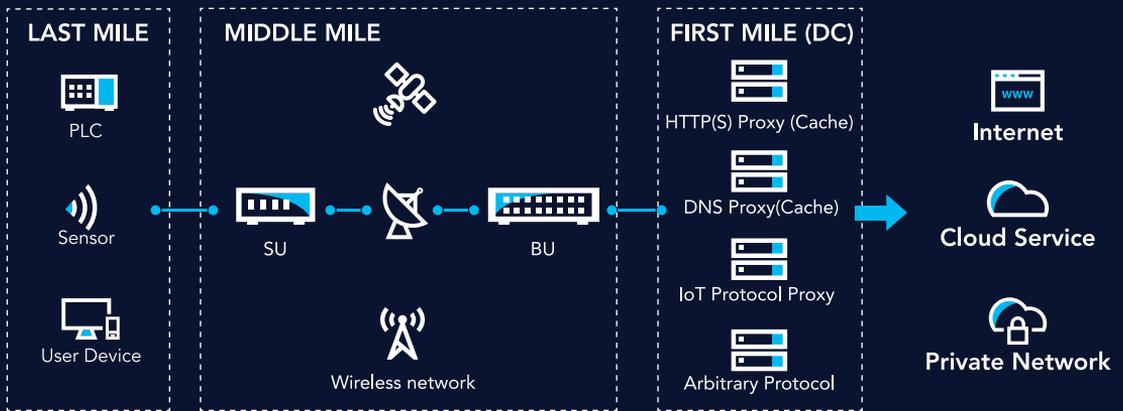
KEY FEATURES

- **STAP (SkyLab Transportation Acceleration Protocol)** — SkyLab's proprietary transport protocol that provides higher throughput and lower latency.

- **Improved Network Performance** — Provides higher through-put and lower latency.

- **Transparent Turn Reduction** — Reduces the unnecessary number of back-and-forth transfer between both ends.

- **Transport Layer Acceleration** — Optimizes transport layer performance to address TCP's three-way handshake, slow start and excessive retransmission due to packet loss and congestion, and packet coalescing and compression.

- **Adaptive Congestion Control** — Optimized congestion control mechanism for mobile/ radio networks that reduce the impact of packet loss and congestion problem.

- **Secured End to End Encryption** — Protecting data integrity and confidentiality by authenticated encryption method using Diffie-Hellman and AES-128-GCM and AES-256-GCM cryptographic algorithms, ensures safe end-to-end secure data delivery.

- **Network Change Detection & Automatic Optimization** — Detect changes of type of network and optimize STAP variables accordingly.

- **Network Connection Switching** — Seamless switchover between any connected network interface, either automatically or manually, avoiding potential network failures and loss of data.

- **Multipath Delivery** — Scheduling and delivering accelerated traffic simultaneously over multiple networks and paths for improved performance.

Model Specifications

			STA-SX-2200	STA-MA-4030	STA-MZ-9500
HARDWARE	System	CPU / Core	NXP iMX7D Series Multicore Arm® Cortex®-A7	Intel Celeron J19008GB	Intel Xeon E3-1240v6
		Memory	1GB	4GB	32GB
		Storage	8GB EMMC	16GB	240GB
	Networking	RJ45 Ports	2	4	2
		RJ45 By-pass ports	2	2	Optional
		WiFi	Optional	No	No
		BLE	Yes	No	No
		LTE 4G	Yes	No	No
	I/O Interface	Console	UART	RS-232 x 1	Yes
		USB	1x USB Micro 2.0 OTG	1 x USB 2.0, 1 x USB 3.0	2 x USB 2.0, 2 x USB 3.0
	Security	TPM Chip	No	Yes	Yes
		Watchdog Timer	Yes	Yes	Yes
	Power	Input	12V DC/ 2.5A	AC 100~240V@50~60 Hz	100 - 240Vac/6.0 - 3.0A/ 50-60Hz
	Environmental Parameters	Operating Humidity (RH)	10% to 95% (non-condensing)	10% ~ 95%	8% to 90% (non-condensing)
		Operating temperature	0°C to 50°C	0°C to 40°C	10°C to 35°C (50°F to 95°F)
	Compliance	Certification	CE	FCC class B/CE class B	UL/cUL/CB/CE/BSMI/CCC Platinum Level Certified
	Form factor	Form factor	Small Form Factor	Desktop	Rack Mounted Server
		Dimensions (WxHxD)	70 x 100 x 25mm	231.9 x 44 x 152 mm	437 x 43 x 429 mm
		Weight		2.5 kg	12.15 kg
SOFTWARE	Monitoring	Connection stats	Yes	Yes	Yes
		Statistics for accelerated services	Yes	Yes	Yes
		Network interface statistics	Yes	Yes	Yes
		System dashboard	No	Yes	Yes
		SNMP v1/v2/v3 Trap	Yes	Yes	Yes
	Networking	Number of clients (IP address)	255	255	5000
		Maximum session per connection(Multi-plexing)	3000	3000	4096
		Concurrent session	65K	65K	130k
		L7 CPS	65K	65K	600K
		Number of accelerators	4	4	No limit, only licensing related
		Number of Accelerated Sevices	8	16	No limit, only licensing related
		Accelerated through-put	120Mbps	120Mbps	1Gbps
		QoS through-put	120Mbps	120Mbps	1Gbps
		Support for back-end system	Yes	Yes	Yes
		DHCP server / client	Yes	Yes	Yes
		Bridge mode	Yes	Yes	Yes
		WCCP	Yes	Yes	Yes
		Policy Based Routing	Yes	Yes	Yes
		VLAN(4096)	Yes	Yes	Yes
		By-Pass	Yes - 1 pair	Yes - 2 pairs	Optional
		Local Web Cache	No	No	No
		VPN (IPSec IKEv2)	No	No	No

Use Case Scenario

LAST MILE

PLC

Sensor

User Device

MIDDLE MILE

SU

BU

Wireless network

FIRST MILE (DC)

HTTP(S) Proxy (Cache)

DNS Proxy(Cache)

IoT Protocol Proxy

Arbitrary Protocol

Internet

Cloud Service

Private Network

Additional Features

- **Virtual Inpath Interface -** Dealing with multiple customer network segments.
- **Virtual LAN -** Supports 802.1Q VLAN tagging to separate user traffic.
- **Service Acceleration -** Easy to accelerate a service based on port, source / destination network and VLAN scope.
- **SNMP -** SNMP Version 1, 2c & v3 are supported for monitoring.
- **WCCP Version 2 -** Supports Web Cache Communication Protocol content-routing protocol that works with CISCO devices to provide a mechanism to redirect traffic flows in real-time without deploying STA MU inline the network.
- **Management -** Both the Web Interface & CLI are available for configuring the device.

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