

FortiGate® Security Gateway Solutions

SecGW/SEG solutions

Confidentiality, Integrity, and Authentication for distributed radio sites

Securing radio access network (RAN) connectivity to the core of the mobile network is increasingly important with the evolution of LTE, 5G, and small cell deployments.

- Mobile Network Operators (MNOs) need tens of thousands of radio sites to cover a national territory. These sites are distributed, with limited physical security, and can be used as an attacker entry point into the mobile network
- 5G radio networks are expensive to deploy, so more and more MNOs are implementing RAN sharing with competing operators to reduce costs. RAN-sharing deployments must ensure the separation and protection of user and control data between the different MNOs

Fortinet Security Gateway (SecGW or SEG) solutions offer a broad, scalable, and flexible set of tools, consumption models, and form factors. Fortinet empowers service providers to protect their mobile cores from RAN-originating attacks, misbehavior, misconfiguration, and other types of threats that may impact the network’s overall availability, confidentiality, and integrity.

Fortinet SecGW is natively secured with stateful L4 firewalling and continuous threat intelligence from FortiGuard Labs security services.

Confidentiality, Integrity, and Authentication

- Implements key SecGW function as defined by 3GPP specifications to protect 5G and 4G mobile packet core and RAN networks
- Adds a security layer between the distinct RAN and core domains, adding confidentiality and integrity to the traffic
- Protects user-, signaling-, and management-traffic planes even when using a third-party transport network
- Authenticates RAN sites and core using certificates even if RAN sites belong to a competing MNO
- Prevents rogue radio sites from connecting to the packet core network
- Includes quantum key distribution (QKD) with carrier-grade scalability with ultra-high number of IPsec sessions and connection setup rates, and high throughput

Security

- Provides powerful and stateful GTP and SCTP firewalling for the N3, S1-U, N2, S1-MME interfaces for blocking RAN/mobile-core attacks
- Detects and prevents known attacks by using continuous threat intelligence from FortiGuard Labs security services

Total Cost of Ownership (TCO) Reduction

- High performance, low footprint physical and virtual appliances, coupled with flexible licensing
- Lower TCO through efficient space and power consumption and efficient management and operations tools

Certification

- Independently tested and validated best security effectiveness and performance

Performance

- Specialized hardware and virtual acceleration architecture
- High-performance IPsec aggregation gateway with IKEv2 support and high single-tunnel throughput
- Carrier-grade connections per second (CPS) performance and delay for processing massive signaling surges due to RAN transport failures Low footprint form factors for very distributed deployments, such as O-RAN and MEC
- Detailed statistics per RAN site and IPsec session
- Consistent low latency for URLLC services
- Purpose-built NP7 security processor units (SPUs) deliver the industry’s best performance and ultra-low latency
- Virtual SecGW appliances feature advanced virtual security processing units (vSPU) for high performance
- Low footprint form factors for very distributed deployments, such as O-RAN and MEC

Management

- Centralized management console that is effective and simple to use, and provides comprehensive network automation and visibility
- PKI integration using Certificate Management Protocol version 2 (CMPv2) for automatic enrollment and renewal
- Zero-touch provisioning with single-pane-of-glass management via the Fabric Management Center
- Application programming interfaces (APIs) and connectors for operations and management integration

Form Factors

- FortiGate physical appliances: 1800F, 2600F, 3000F, 3500F, 4200F, 4400F, 4800F
- FortiGate virtual appliances: VM04, VM08, VM16, VM32, VMUL
- FortiFirewall series: 1800F, 2600F, 4200F, 4400F, VMUL
- Public cloud support: AWS, MS Azure, Google Cloud, Oracle Cloud

FEATURE HIGHLIGHTS

Proven, High Performance, and Flexible SecGW Platforms

FortiGate Next-Generation Firewalls running the FortiOS operating system, have long provided high-performance security in service-provider and large enterprise networks.

Our Carrier-Grade IPsec/IPv4/IPv6/GTP/SCTP network services are based on the same familiar interface and proven carrier-grade reliability.

Fortinet SecGW solutions deliver high predictability and service-level consistency to environments that generate massive amounts of connection set-ups and teardowns.

With Fortinet's powerful security processing units (SPUs), a high level of performance is provided supporting up to 200,000 VPN tunnels from eNodeBs and gNodeBs, 40,000 VPN tunnels from other packet core sites, and 800 Gbps of throughput in a single SecGW appliance with hardware acceleration, ensuring consistent top performance.

Highlights

- Security layer between RAN and core domains and in the O-RAN domain: **S1-MME, S1-U, N2, N3, X2, Xn, F1, E2, Operations, Administration, and Maintenance (OAM)**
- **Predictable high performance** for centralized and regional sites with security processing units (SPU and vSPU) for offload and acceleration, including packet encryption/decryption, hardware-generated NAT logs, and IP fragment handling in the SPUs
- **Native multi-tenancy support** with virtual domains (VDOMs) enables separate SecGW policies per network slice, eNodeB/gNodeB sets, and traffic plane
- **Compact form factor** is ideal for space-constraint applications and lowers colocation cost for operators
- The most efficient, **smallest footprint SecGW VNF** enables energy efficiency and is a good fit for environments with limited resources, such as Private 5G, O-RAN or multi-access edge computing (MEC)
- **A rich ecosystem of application programming interfaces** (APIs) and connectors for ease of onboarding and integration to the MNO's ecosystem, such as operation and management, orchestration, and business support system (BSS)

MODEL	4800F	4400F	4200F	3500F	1800F	VMUL	VM32	VM16	VM08	VM04
IPsec VPN Throughput Gbps (512 byte)*	800	310	210	165	55	NA**	18.8	13.2	9	1.9
Gateway-to-Gateway IPsec VPN Tunnels	40K	40K	40K	40K	20K	NA**	50K	50K	50K	40K
Client-to-Gateway IPsec VPN Tunnels	200K	200K	200K	200K	100K	NA**	50K	50K	50K	40K

* IPsec VPN performance test uses AES256-SHA256.

** Will depend on the characteristics of the underlying platform.



FLEXIBLE LICENSING

SecGW platforms and functionality can be delivered via two different pricing models.

CAPEX Pricing Model - FortiGate

In this pricing model, the complete platform, physical and/or virtual FortiGate, is paid up front covering the full capacity that the platform can deliver.

Bandwidth-based Pricing Model - FortiFirewall

This pricing model consists of two components:

- The barebones platform, physical and/or virtual FortiFirewall, is paid up front.
- Perpetual and stackable bandwidth licenses in steps of 10 Gbps and 100 Gbps are added to meet capacity needs. This is a network-wide bandwidth license that allows for short, rare bursts of traffic exceeding the licensed capacity.

This pricing model allows operators to better align their costs with revenues from their customers, with the flexibility of adding a network-wide peak bandwidth license based on traffic usage.

DEPLOYMENTS

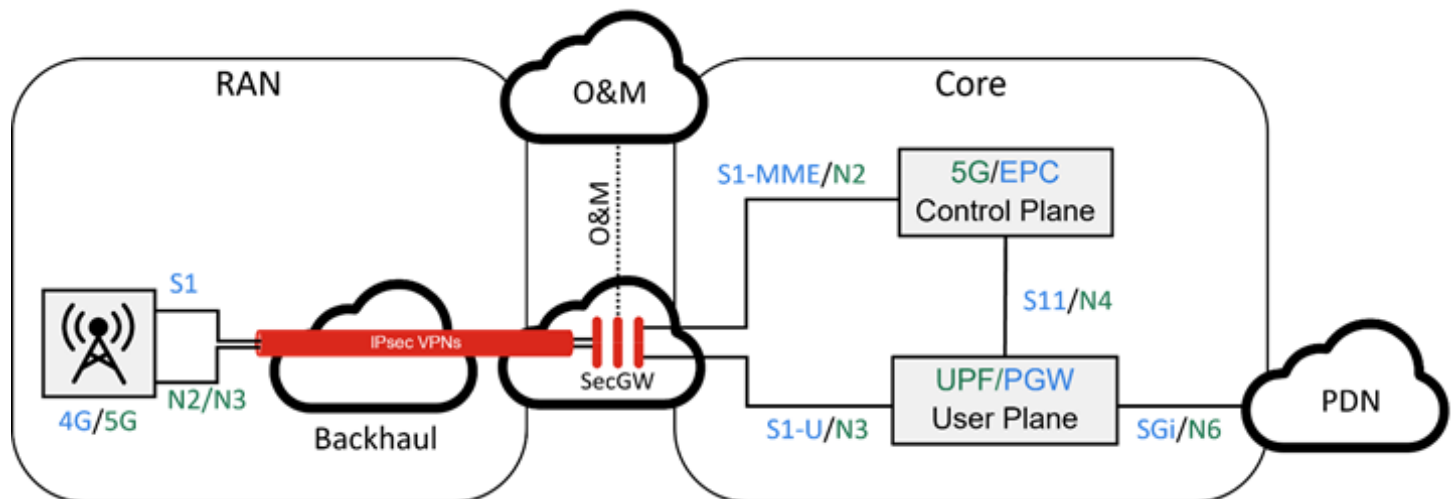


Figure 1: Centralized SecGW/SEG Deployments

DEPLOYMENTS

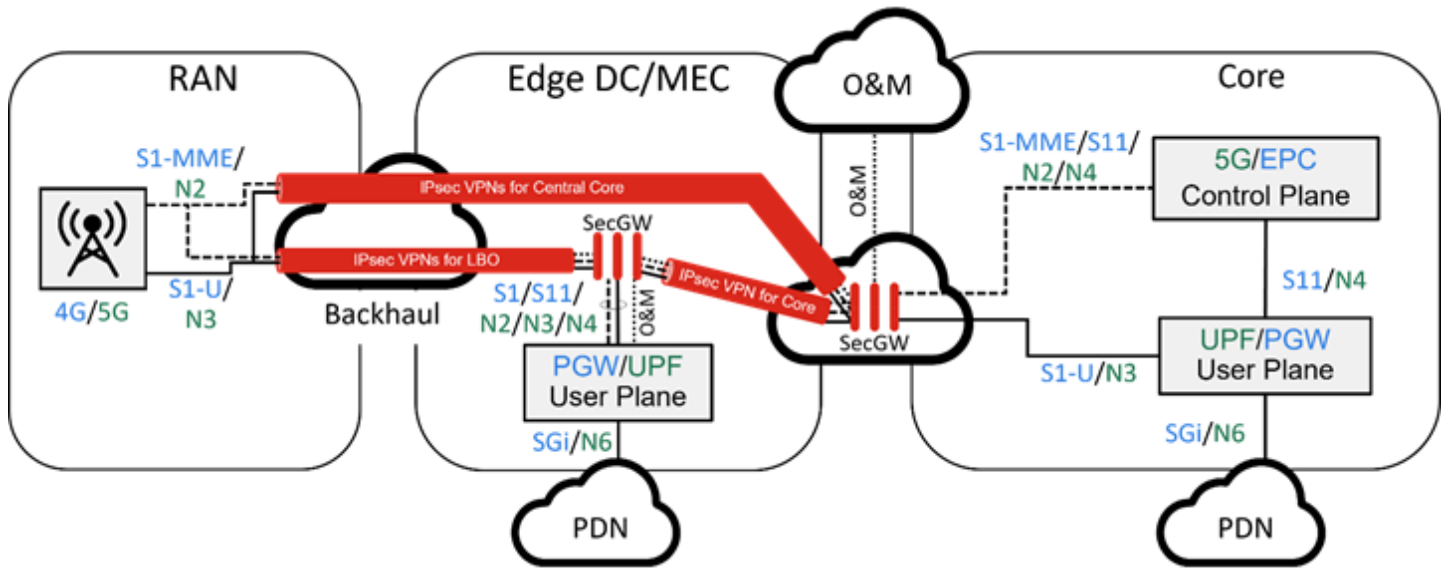


Figure 2: Distributed SecGW/SEG Deployments

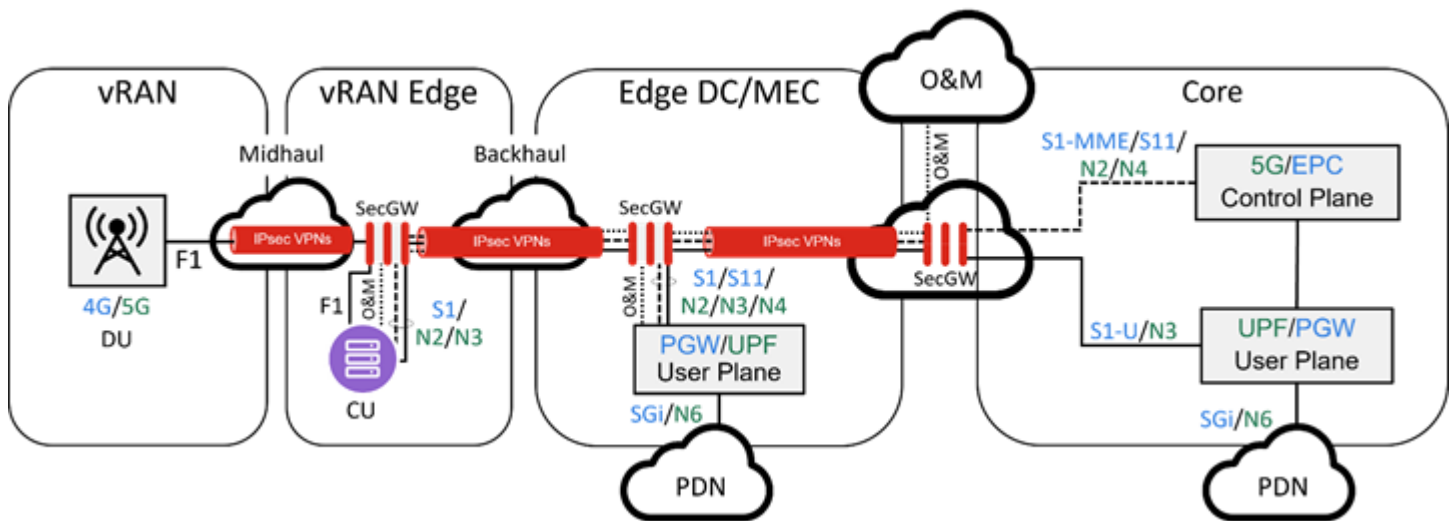


Figure 3: vRAN Decomposition SecGW/SEG Deployments



FEATURES

FEATURE	SUPPORTED MODES
Supported Interfaces	S1-MME, S1-U, N2, N3, X2, Xn, F1, E2, OAM
Authentication of Tunnel Peers	PKI-based (CMPv2), IKEv2, IKEv1, EAP
Crypto Schemes	Suite-B (AES-CBC and AES-GCM 128 and 256 bits), Diffie-Hellman Groups (15, 19, 21, 31, 32, and others), post-quantum cryptography
Dynamic L3 Routing	IPv4 and IPv6
SCTP firewall with Multi-homing Support	Yes
S1-AP/NGAP Message Flooding Protection	Yes
DoS Mitigation for the Core	Yes
DSCP Copy Down for IPsec	Yes, for prioritization of relevant traffic, even if encrypted
IPsec Tunnels	Dial-up, site-to-site
Tunnel Profiles	Yes
Protocol Inspection	SCTP, GTP-C, GTP-U, GTP-U payload
Link Aggregation Groups (LAGs)	Yes
High Availability Mode	Active/active, active/passive, clustering with geo-redundancy
Concurrent Tunnel Scale	Up to 200K
Elephant Flows Within VPN	Yes, HW accelerated
Extended Sequence Number (ESN)	Yes, HW accelerated
IP Fragment Handling	Yes, HW accelerated
Anti-replay and Packet Reordering	Yes, HW accelerated
Perfect Forward Secrecy	Yes
Dynamic Routing	Yes
Reverse Route Injection	Yes
IKE Configuration Payload	Yes

SPECIFICATIONS

Please check model data sheet for exact support.

METRIC	4800F	4400F	4200F	3500F	3000F	2600F	1800F
Interfaces and Modules							
400 GE/200 GE QSFP-DD Slots	8						
100 GE QSFP28/40 GE QSFP+ Slots	12 ²	12	8	6	6	4	4 ⁵
50 GE/25 GE/10 GE SFP56/28 Slots	12						
25 GE SFP28/10 GE SFP+/GE SFP Slots		16	16	32	14	16	12
25 GE SFP28/10 GE SFP+/GE SFP HA Slots		2	2		2	2 ⁶	2 ⁶
25 GE SFP28/10 GE SFP+/GE SFP AUX Slots		2	2				
GE SFP Slots							8 ⁴
10 GE/GE RJ45 Slots					16	16	16 ⁴
10 GE/GE RJ45 Management Ports	2			2	2		
GE RJ45 Management Ports		2	2			2	2
USB Ports	1	1	1	1	1	1	1
Console Port	1	1	1	1	1	1	1
Internal Storage	4 TB (4801F)	4 TB (4401F)	4 TB (4201F)	4 TB (3501F)	2 TB (3001F)	2 TB (2601F)	2 TB (1801F)
Included Transceivers	2x SFP+ (SR 10 GE)	2x SFP+ (SR 10 GE)	2x SFP+ (SR 10 GE)	2x SFP+ (SR 10 GE)	2x SFP+ (SR 10 GE)	2x SFP+ (SR 10 GE)	2x SFP+ (SR 10 GE)
Performance and Capacity - SecGW							
IPsec VPN Throughput (512 byte) ¹	800 Gbps	310 Gbps	210 Gbps	165 Gbps	105 Gbps	55 Gbps	55 Gbps
Max GW to GW IPsec Tunnels	40 000	40 000	40 000	40 000	40 000	20 000	20 000
Max Client to GW IPsec Tunnels	200 000	200 000	200 000	200 000	200 000	100 000	100 000
High Availability Configurations	Active/Active, Active/Passive, Clustering	Active/Active, Active/Passive, Clustering	Active/Active, Active/Passive, Clustering	Active/Active, Active/Passive, Clustering	Active/Active, Active/Passive, Clustering	Active/Active, Active/Passive, Clustering	Active/Active, Active/Passive, Clustering



SPECIFICATIONS

METRIC	4800F	4400F	4200F	3500F	3000F	2600F	1800F
Dimensions and Power							
Height x Width x Length (in)	6.89 × 17.13 × 26.10	6.97 × 17.20 × 26.17	5.22 × 17.20 × 26.17	3.5 × 17.4 × 21.9	3.5 × 17.4 × 21.9	3.5 × 17.25 × 21.1	3.5 × 17.25 × 21.1
Height x Width x Length (mm)	175 × 435 × 663	177 × 437 × 665	132.5 × 437 × 664.8	89 × 443 × 556	89 × 443 × 556	88.4 × 438 × 536	88.4 × 438 × 536
Weight ³	90.83 lbs (41.2 kg)	81.8 lbs (37.1 kg)	59.75 lbs (27.1 kg)	43.8 lbs (19.9 kg)	37.3 lbs (16.9 kg)	30.6 lbs (13.9 kg)	30.2 lbs (13.7 kg)
Form Factor (Supports EIA/non-EIA standards)	Rack Mount, 4 RU	Rack Mount, 4 RU	Rack Mount, 3 RU	Rack Mount, 2 RU	Rack Mount, 2 RU	Rack Mount, 2 RU	Rack Mount, 2 RU
AC Power Supply	200-240V AC, 50/60 Hz	100-240V AC, 50/60 Hz	100-240V AC, 50/60 Hz	100-240V AC, 50/60 Hz	100-240V AC, 50/60 Hz	100-240V AC, 47/63 Hz	100-240V AC, 50/60 Hz
Power Consumption ³ (Average/Maximum)	1940 W/2372 W	1533 W/1875 W	931 W/1291 W	760 W/1174 W	425 W/680 W	416 W/510 W	388 W/544 W
AC Current (Maximum)	10.5A@200V, 12.5A@240V	20A@100V, 9A@240V	13.5A@120V, 5.5A@240V	12A@120V, 9A@240V	12A@120V, 9A@240V	6A	7A@100VAC, 3A@240VAC
Heat Dissipation ³	8087.2 BTU/h	6397.77 BTU/h	4405 BTU/h	4006 BTU/h	2321 BTU/h	1,740 BTU/h	1,854.84 BTU/h
DC Power Input Range		-48V to -60V DC	-48V to -60V DC			-48V to -60V DC	-48V to -60V DC
DC Current (Maximum)		32A/100Apk	20A/100Apk			15A	20A
Redundant Power Supplies	Yes, Hot Swappable	Yes, Hot Swappable, 2+2 (AC), 1+1 (DC)	Yes, Hot Swappable	Yes, Hot Swappable	Yes, Hot Swappable	Yes, Hot Swappable	Yes, Hot Swappable
Operating Environment and Certifications							
Operating Temperature	32°-104°F (0°-40°C)	32°-104°F (0°-40°C)	32°-104°F (0°-40°C)	32°-104°F (0°-40°C)	32°-104°F (0°-40°C)	32°-104°F (0°-40°C)	32°-104°F (0°-40°C)
Storage Temperature	-31°-158°F (-35°-70°C)	-31°-158°F (-35°-70°C)	-31°-158°F (-35°-70°C)	-31°-158°F (-35°-70°C)	-31°-158°F (-35°-70°C)	-31°-158°F (-35°-70°C)	-31°-158°F (-35°-70°C)
Humidity	20%-90% non-condensing	20%-90% non-condensing	20%-90% non-condensing	20%-90% non-condensing	5%-90% non-condensing	10%-90% non-condensing	10%-90% non-condensing
Noise Level		68.9 dBA	57 dBA	53.5 dBA	69 dBA	71.72 dBA	62.74 dBA
Operating Altitude		Up to 7400 ft (2250 m)	Up to 7400 ft (2250 m)	Up to 7400 ft (2250 m)	Up to 7400 ft (2250 m)	Up to 7400 ft (2250 m)	Up to 7,00 ft (2250 m)
Compliance		FCC Part 15 Class A, RCM, VCCI, CE, UL/ cUL, CB	FCC Part 15 Class A, RCM, VCCI, CE, UL/ cUL, CB	FCC Part 15 Class A, RCM, VCCI, CE, UL/ cUL, CB	FCC Part 15 Class A, RCM, VCCI, CE, UL/ cUL, CB	FCC Part 15 Class A, RCM, VCCI, CE, UL/ cUL, CB	FCC Part 15 Class A, RCM, VCCI, CE, UL/ cUL, CB

1 IPsec VPN performance test uses AES256-CBC-SHA256

2 200 GE/100 GE/40 GE QSFP56/28 slots

3 Version without storage

4 GE only

5 40 GE QSFP+ only

6 10 GE SFP+ only

METRIC	VM-UL	VM-32	VM-16	VM-08	VM-04
Performance and Capacity					
vCPU Support (Minimum/Maximum)	1/unlimited	1/32	1/16	1/08	1/04
Storage Support (Minimum/Maximum)	32 GB/2 TB	32 GB/2 TB	32 GB/2 TB	32 GB/2 TB	32 GB/2 TB
IPsec VPN Throughput (512 byte) ¹	NA ⁷	18.8 Gbps	13.2 Gbps	9 Gbps	5.1 Gbps
Max GW to GW IPsec Tunnels	NA ⁷	50K	50K	50K	40K
Max Client to GW IPsec Tunnels	NA ⁷	50K	50K	50K	40K

1 IPsec VPN performance test uses AES256-CBC-SHA256.

7 Will depend on the characteristics of the underlying platform.



ORDERING INFORMATION

SECURITY GATEWAY PHYSICAL PLATFORMS		
Model	FortiGate SKU	FortiFirewall SKU
4800F	FG-4801F	
FortiCare Support for 4800F	FC-10-F48HF-247-02-DD	
4400F	FG-4400F	FFW-4400F
FortiCare Support for 4400F	FC-10-F44HF-247-02-DD	FC-10-B440F-247-02-DD
4200F	FG-4200F	FFW-4200F
FortiCare 24x7 Support for 4200F	FC-10-F42HF-247-02-DD	FC-10-B420F-247-02-DD
3500F	FG-3500F	FFW-3500F ²
FortiCare 24x7 Support for 3500F	FC-10-F3K5F-247-02-DD	FC-10-B3K5F-247-02-DD ²
3000F	FG-3000F	FFW-3000F ²
FortiCare 24x7 Support for 3000F	FC-10-F3K0-247-02-DD	FC-10-F3K0-247-02-DD ²
2600F	FG-2600F	FFW-2600F
FortiCare 24x7 Support for 2600F	FC-10-FD26F-247-02-DD	FC-10-BD26F-247-02-DD
1800F	FG-1800F	FFW-1801F ¹
FortiCare 24x7 Support for 1800F	FC-10-F18F1-247-02-DD	FC-10-B18F1-247-02-DD ¹
SECURITY GATEWAY VIRTUAL PLATFORMS		
Model	FortiGate SKU	FortiFirewall SKU
VM-UL	FG-VMUL	FF-VMBB
FortiCare 24x7 Support for FortiGate VM-UL	FC-10-FVMUL-248-02-DD	FC-10-FVMBB-248-02-DD
VM-32	FG-VM32	
FortiCare 24x7 Support for FortiGate VM-32	FC-10-FVM32-248-02-DD	
VM-16	FG-VM16	
FortiCare 24x7 Support for FortiGate VM-16	FC-10-FVM16-248-02-DD	
VM-08	FG-VM08	
FortiCare 24x7 Support for FortiGate VM-08	FC-10-FVM08-248-02-DD	
VM-04 virtual appliance	FG-VM04	
FortiCare 24x7 Support for FortiGate VM-04	FC-10-FVM04-248-02-DD	
SECURITY GATEWAY FORTIFIREWALL BANDWIDTH LICENSES ³		
Product	FortiGate SKU	FortiFirewall SKU
10 Gbps SecGW Bandwidth License for FortiFirewall (stackable)	N/A (included in Platform)	FG-PBW-10G
FortiCare Support for 10 Gbps SecGW Bandwidth License for FortiFirewall	N/A (included in Platform)	FC1-10-FGPBW-248-01-12
100 Gbps SecGW Bandwidth License for FortiFirewall (stackable)	N/A (included in Platform)	FG-PBW-100G
FortiCare Support for 100 Gbps SecGW Bandwidth License for FortiFirewall	N/A (included in Platform)	FC2-10-FGPBW-248-01-12

¹ Scheduled for Q3 2022.

² Scheduled for Q4 2022.

³ Network-wide bandwidth licenses to be added on the top of a collection of FortiFirewall physical or virtual platforms.



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