TERAGO CONNECTIVITY PRODUCTS & SERVICES

TERAGO is a leading provider of wireless network services, delivering Internet, wide area network (Ethernet Services) and Private Wireless Networking solutions to Canadian businesses. TERAGO maintains a national network covering all of Canada's top 10 cities and 17 of Canada's top 20 cities[1]. TERAGO owns more than 90% of the licensed millimeter wave spectrum in Canada, ensuring secure and reliable network connections for all of its business customers.

1   Network & Services

TERAGO combines high speed wireless networks with a Canada wide fiber optic network to provide businesses with secure, reliable and scalable Internet, WAN and Private Networking solutions. TERAGO's network supports connectivity speeds up to 10 Gbps across a variety of access mediums, including licensed and unlicensed wireless, fiber, cable and DSL.

1.1   Dedicated Bandwidth

With the exception of DSL access, Cable access and the "TERAGO Internet 50/10" product, all TERAGO Private Connectivity and Internet services are provisioned with a dedicated bandwidth. Dedicated bandwidth means that a customer's service is guaranteed a specific bandwidth or speed (in Mbps) through the TERAGO network. The customer's service is also capped at the dedicated bandwidth, meaning that the customer's service cannot exceed the dedicated bandwidth or speed through the TERAGO network.

1.2   Symmetrical Speeds

With the exception of DSL access, Cable access, the "TERAGO Internet 50/10" product, and the "TERAGO Internet 100/20" product, all TERAGO Internet and Private Connectivity services are symmetrical. Symmetrical means that the bandwidth or speed of the service (in Mbps) will be the same in both the Incoming and Outgoing directions.

DSL access, Cable access, the "TERAGO Internet 50/10" product, and the "TERAGO Internet 100/20" product are asymmetrical services (i.e., the Download and Upload bandwidth speeds are different).

1.3   Full Duplex Service

All TERAGO Internet and Private Line services are deployed as full duplex connections. Full-duplex services means that data can be transmitted in both incoming and outgoing directions at the same time. Customer network edge devices must be configured to auto-negotiate for optimal performance. TERAGO may provide a switch, at no additional cost, as the demarcation point for the service.

2   Private Connectivity Services

TERAGO Private Connectivity provides business customers with private network connections between their facilities and offices. Private network connectivity means that the customer's data is securely

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[1] Top cities based on population.

transported across TERAGO's network, separated from other customer's traffic and not exposed to public networks (e.g., the Internet).

2.1   WAN - Ethernet Services

TERAGO Ethernet Services allow business customers to connect sites together leveraging Layer 2, Ethernet connections. TERAGO can support point-to-point and bridged Ethernet topologies with dedicated bandwidth speeds up to 10Gbps. Ethernet Services provide secure, low latency connections - ideal for companies with multiple offices, large interoffice data requirements or connections to data centers. Ethernet Services are delivered across dedicated, symmetrical wireless connections or across 3rd party fiber connections.

2.2   Private Wireless Networks

TERAGO Private Wireless Networks are on-site or localized wireless networks managed by TERAGO. Private Wireless Networks are customized solutions that are deployed to connect multiple customer sites in a localized geographic area together, or are deployed to support wireless services within a specific customer facility. Private Wireless Networks can securely support dedicated bandwidth speeds up to 10 Gbps.

3   Internet Services

TERAGO provides scalable, business grade Internet services with speeds up to 10 Gbps.

3.1   TERAGO Unlimited Internet

TERAGO Unlimited Internet are wireless Internet connections with speeds up to 10Gbps. Unlimited Internet services are provisioned with dedicated, symmetrical bandwidths, no usage caps, no additional usage fees and are delivered with a static IP.

3.2   TERAGO Internet 100/20

TERAGO Internet 100/20 is an asymmetrical wireless Internet service with a 100 Mbps download speed (i.e., bandwidth from the Internet to the customer premise) and a 20 Mbps upload speed (i.e., bandwidth from the customer premise to the Internet). TERAGO Internet 100/20 services are provisioned with dedicated bandwidths, no usage caps, no additional usage fees and are delivered with a static IP.

3.3   TERAGO Internet 50/10

TERAGO Internet 50/10 is an asymmetrical wireless Internet service with a 50 Mbps download speed (i.e., bandwidth from the Internet to the customer premise) and a 10 Mbps upload speed (i.e., bandwidth from the customer premise to the Internet). TERAGO Internet 50/10 services are provisioned as best-effort services, no usage caps, no additional usage fees and are delivered with a static IP.

3.4   Fiber Internet Services

TERAGO will install, manage and maintain Fiber Internet services procured from 3rd party Service Providers. Fiber Internet services are available with speeds up 10Gbps. Fiber Internet services are

provisioned with dedicated, symmetrical bandwidths, no usage caps, no additional usage fees and are delivered with a static IP.

3.5   Broadband Internet Services

TERAGO will install, manage and maintain Broadband Internet services procured from 3rd party Service Providers as requested. Broadband Internet services can include cable, DSL and wireless access products. Broadband Internet services are generally provisioned as best-effort, asymmetrical bandwidth, DHCP Internet products with no usage caps and no additional usage fees.

3.6   IP Addresses

All TERAGO Internet services are provisioned with a public /30 subnet (i.e., 1 static IP). TERAGO can allocate additional public IP addresses, subject to the customer meeting ARIN requirements. TERAGO will make reasonable efforts to allocate public IP addresses to customers on contiguous subnets, following standard IP subnet allocation methodologies. Customers may not allocate IP addresses to other parties or customers without TERAGO's written consent. Customers must complete and submit an IP Allocation Request Form if they require /28 or greater subnet (i.e., 16 or more public IPs).

Private IP addresses assigned by TERAGO cannot be viewed and are not routable outside the customer's Private network (i.e., they cannot be viewed and are not routable on the Internet, or on other Private networks). Private IP addresses may be allocated on subnets that are not contiguous with prior allocations. TERAGO will retain ownership of all Private IP addresses allocated to the customer.

Customers may not allocate IP addresses to other parties or customers without TERAGO's written consent.

4   Additional Connectivity Products

4.1   TERAGO Managed SD-WAN

TERAGO Managed SD-WAN is a virtualized Wide Area Network (WAN) that can be deployed over public and private network connections. TERAGO Managed SD-WAN seamlessly connects customer branch offices, datacenters and cloud services through a centralized, cloud-based management system.

Details on TERAGO's Managed SD-WAN service can be found at:

https://cdn.terago.ca/wp-content/uploads/2021/04/31181754/TERAGO-Managed-SD-WAN-Product-Schedule-v5.0.pdf

4.2   TERAGO Managed Network Services

TERAGO Managed Network Services allows business Customers to optimize their network performance and IT resources by leveraging TERAGO's advanced management systems and team of network experts to manage their network infrastructure.

Details on TERAGO's Managed Network Services service can be found at:

https://cdn.terago.ca/wp-content/uploads/2022/06/31155442/TeraGo-Managed-Network-Services-Product-Schedule-v3.0.pdf

4.3   TERAGO Cloud Connect

TERAGO Cloud Connect provides customers with secure, private connectivity to AWS Direct Connect and Microsoft Azure ExpressRoute. TERAGO Cloud Connect supports connections from customer-owned facilities, third-party facilities and data centers. TERAGO Cloud Connect is provided as a Layer 2, Ethernet connection with available bandwidths from 50Mbps to 10Gbps. TERAGO Cloud Connect from customer-owned or third-party facilities will only be supported across fiber or TERAGO provided wireless connectivity.

4.4   Distributed Denial of Services (DDoS)

TERAGO's DDoS Mitigation Services monitor all traffic entering the TERAGO network for large-volume flood and intrusion attacks, among other anomalies.

The service is composed of two key systems: a detection system and an attack mitigation system. The detection system is inserted in front of the TERAGO Gateways and is configured towards host detection. From there, it monitors traffic. Host detection can trigger an alert for an enabled misuse type. If excessive traffic is detected for multiple misuse types that are enabled, then a single alert is created instead of separate alerts for each misuse type. The alert includes each misuse type that had excessive traffic. This provides continuous threat detection against Volumetric and SYN Attacks. Once a threat is detected, and the traffic exceed high severity rate and latency period, then the attack mitigation system will automatically use local blackholing until the attack is ended. If the attack lasts longer than 15 minutes and his higher than 5Gbps, upstream blackholing is activated, until the attack ended. DDoS protected clients are identified by their IP address. Their traffic is protected and routed to clean their data. Those without DDoS protection may be quarantined.

TERAGO DDoS Mitigation Services is offered in a several packages.

	Attack Type Protection (Refer to table for exact types)	DDoS Reporting Available?	TERAGO Managed Service Included?
Bronze	Volumetric	None available	Yes - no report per customer
Silver	Bronze + Low and Slow, SIP Attacks, Memory attacks, DNS Query Floods, etc.	Yes, Generalized and not at a single IP	Yes
Gold	Bronze + Silver + Application-specific attacks, HTTP Get floods, Session attacks, concurrent connection attacks, etc.	Yes, individualized to the user	Yes

Attack Protections by Package

Bronze	Zero Minute Volumetric / Reflection Attacks	Full behavioral dynamic protection	No
Bronze	Zero Minute Flood Attacks	Full behavioral dynamic protection	No
Bronze	TCP Syn Floods	Full behavioral dynamic protection	No
Bronze	TCP SYN+ ACK Floods	Full behavioral dynamic protection	No
Bronze	TCP Reset Floods	Full behavioral dynamic protection	No
Bronze	TCP Fin floods	Full behavioral dynamic protection	No
Bronze	TCP Fragment Floods	Full behavioral dynamic protection	No
Bronze	ICMP Floods	Full behavioral dynamic protection	No
Bronze	UDP Floods	Full behavioral dynamic protection	No
Bronze	UDP Fragmented Floods	Full behavioral dynamic protection	No
Bronze	IGMP Floods	Full behavioral dynamic protection	No
Bronze	L3 / L4 Black Listing	On-demand (only during event if needed)	No
Bronze	RFC Violation Attacks / Packet Anomaly	Yes. (limited to 15 most common violations and best effort on demand)	No
Silver	Low and Slow attacks	Yes; known attack tools like LOIC and HOIC	High level shared report
Silver	TCP Stack Resource Floods	Limited (to known one fragmented stateless attack and best effort on demand)	High level shared report
Silver	DoS Vulnerability Attacks	Yes. (limited to 32 most common violations and best effort)	High level shared report
Silver	Memory Allocation Attacks	Limited (only 3 know stateless buffer overflow type of attacks and best effort on demand)	High level shared report
Silver	SIP Attacks	Limited (Limited to 10 known stateless SIP attacks and best effort on demand)	High level shared report
Silver	DNS Query Floods	Included (very small query floods will not be covered)	High level shared report
Silver	ACK Floods	On-demand (only during event if needed. Rate limit only)	High level shared report
Gold	Zero Minute Volumetric / Reflection Attacks	Included, full behavioral dynamic protection	Detailed Reporting
Gold	Zero Minute Flood Attacks	Included, full behavioral dynamic protection	Detailed Reporting

Gold	TCP Syn Floods	Included, full behavioral dynamic protection	Detailed Reporting
Gold	TCP SYN+ ACK Floods	Included, full behavioral dynamic protection	Detailed Reporting
Gold	TCP Reset Floods	Included, full behavioral dynamic protection	Detailed Reporting
Gold	TCP Fin floods	Included, full behavioral dynamic protection	Detailed Reporting
Gold	TCP Fragment Floods	Included, full behavioral dynamic protection	Detailed Reporting
Gold	ICMP Floods	Included, full behavioral dynamic protection	Detailed Reporting
Gold	UDP Floods	Included, full behavioral dynamic protection	Detailed Reporting
Gold	UDP Fragmented Floods	Included, full behavioral dynamic protection	Detailed Reporting
Gold	IGMP Floods	Included, full behavioral dynamic protection	Detailed Reporting
Gold	L3 / L4 Black Listing	Always on	Detailed Reporting
Gold	RFC Violation Attacks / Packet Anomaly	Full coverage (1000's signatures plus custom signatures)	Detailed Reporting
Gold	Low and Slow attacks	Full coverage (1000's signatures plus custom signatures)	Detailed Reporting
Gold	TCP Stack Resource Floods	Full coverage (1000's signatures plus custom signatures)	Detailed Reporting
Gold	DoS Vulnerability Attacks	Full coverage (1000's signatures plus custom signatures)	Detailed Reporting
Gold	Memory Allocation Attacks	Full coverage (1000's signatures plus custom signatures)	Detailed Reporting
Gold	SIP Attacks	Full coverage (1000's signatures plus custom signatures)	Detailed Reporting
Gold	DNS Query Floods	Full coverage including small query floods of all types	Detailed Reporting
Gold	ACK Floods	Always on, full coverage	Detailed Reporting
Gold	Concurrent Connection Attacks	Full coverage including connection-limiting and signatures	Detailed Reporting
Gold	TCP Out of State Floods	Full coverage	Detailed Reporting
Gold	Stateful Protection Challenge Response	Full coverage, including L4/L7 challenges	Detailed Reporting

5 Terms, Conditions & Service Level Objectives

Service level objectives related to TERAGO's connectivity products and services can be found in TERAGO's Service Level Agreement. Terms and conditions related to TERAGO's connectivity products and services can be found in TERAGO's Master Services Agreement. TERAGO's Service Level Agreement and TERAGO's Master Services Agreement are available on TERAGO's web site:

https://terago.ca/legal/