

Internet Service Definition

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1. Executive Summary

The internet has evolved into the dominant medium for global commerce, communications and entertainment, driving sustained growth in traffic for residential, enterprise and carrier clients alike. To meet these demands, high-performing Internet Protocol (IP) services have evolved as well, offering greater flexibility and security to clients as IP networks provide the basis for everything from internet browsing to secure cloud ecosystems. This document is intended to provide a complete, detailed description of GTT's Internet service portfolio for clients.

1.1 Service Scope and Positioning

GTT's Internet portfolio includes IP Transit (IPT), Dedicated Internet Access (DIA) and Broadband. This service definition covers IPT and DIA only. These services are very similar from a technical perspective and differentiated mainly based on commercial considerations and conventions of the market. Contact your GTT account team for details on our Broadband service.

Choosing between IPT and DIA enables carriers and enterprises to choose their level of control over IP routing. GTT delivers Internet services with the highest network quality and greatest commercial flexibility. GTT's Tier 1 internet backbone status and extensive peering relationships ensure clients a quick and direct path across the internet to their destination of choice.

1.2 GTT's IP Network

GTT's IP network is built on the latest generation Juniper MPLS router platform, engineered to a common global standard and unified behind a single ASN 3257. GTT's MPLS backbone includes multiple diverse routes between core point of presence (PoP) locations – in many cases Nx100G capacity over GTT's own optical network facilities. GTT actively manages its backbone and ensures that proactive capacity upgrades prevent network congestion. GTT prioritizes internet traffic across its network core to ensure high availability and successful packet delivery. With nearly **one third of the entire IPv4 address pool announced by AS 3257** and over 1,900 downstream supported networks, GTT is among the elite global internet network services providers.

AS Rank ▲	AS Number ▼	Organization		cone size (ASes) ▼
1	3356	Level 3 Parent, LLC		36692
2	1299	Telia Company AB		31935
3	174	Cogent Communications		26641
4	3257	GTT Communications Inc.		20980
5	2914	NTT America, Inc.		20536

CAIDA, July 2020

Additionally, GTT's list of Tier 1 peering partners enables AS3257 to stand as one of the best-connected IP networks in existence. While there is no single agreed-upon standard for what constitutes a Tier 1 IP network, one common criterion in any definition is the ability to connect to the entire internet solely via settlement-free interconnection. As one of the top-ranking global Tier 1 networks, AS 3257 meets this standard (<https://www.peeringdb.com/asn/3257>). GTT's status among the top IP networks in the world allows us to enforce a restrictive peering policy (<https://www.gtt.net/peering/>). We carefully manage our



peering relationships to ensure we only peer with like networks and for mutual benefit. As a result, our peering policy does not allow us to accept peering requests from the majority of our potential clients.

2. Product Overview

2.1 Internet Services

GTT's Internet Services portfolio includes two options, IP Transit and Dedicated Internet Access (DIA), with the primary difference being the target market verticals (carriers and ISPs for IP Transit; enterprises for DIA), expected use cases (client is an ISP versus using GTT as their ISP) and level of operational support (NOC-to-NOC versus contacting GTT client support). From a technical perspective, the implementation is the same and in cases where enterprises require the same degree of control over their routing typical of a carrier client those tools are available to them via DIA.

2.2 IP Transit (IPT)

IP Transit provides carrier clients dedicated high-bandwidth and high-performance access to the global internet via GTT's Tier 1 network. Carrier clients, or carrier-like enterprises operating their own IP networks and running Border Gateway Protocol (BGP), enjoy direct access to nearly one third of all internet routes via our single global Autonomous System Number (ASN) 3257, with single-hop access to the remaining two thirds in most cases, and an array of tools to aid them in managing their IP routing.

The primary characteristic of an IP Transit client is that they function as an ISP in their own right, with their own ASN and IP addresses, and running BGP to control their network routing. IP Transit clients may include carriers, wholesalers, and large enterprises operating their own IP networks. Carriers include both "eyeball" networks and content distributors. In both cases, the primary use case is to gain access to some portion of the global internet that the carrier client is unable to reach directly on their own, whether due to lack of network reach, economic considerations, or the inability to establish direct connectivity with one or more IP networks.

With over 1,900 downstream networks supported and a roster of peers including only the top Tier 1 networks, GTT's IP Transit offers a high-performance and flexible on-ramp to the global internet.

2.3 Dedicated Internet Access (DIA)

DIA provides enterprise clients cost-effective and reliable access to the global internet via GTT's Tier 1 network. Enterprise clients may use DIA for a variety of needs, including general internet browsing, IP-based voice or video communications, CPE-based VPNs or access to cloud platforms. GTT's unified global architecture and extensive peering interconnections ensure high reliability and performance, guaranteed by a set of competitive Service Level Agreements (SLAs).

The primary characteristic of a DIA client is that they are engaging GTT to function as their ISP; they do not have their own ASN and take IP addresses from within GTT's pool, and trust GTT to manage the requirements of inter-AS routing. Having said that, for larger carrier-like enterprises who wish to manage their IP environment, the same capabilities and tools are available as for IP Transit clients.

Any enterprise client with need for access to the internet, whatever the specific application demand, will benefit from the cost-efficiency, global reach, commercial flexibility and guaranteed quality of GTT's Dedicated Internet Access.

2.4 Service Features

2.4.1 Port Speeds

Clients may select from a wide range of port speed options, with Ethernet connectivity ranging from 100 Mbps to 100 Gbps (subject to availability). Clients can also shape usable capacity and control billable usage through the application of rate limits, commitment tiers and measurement of burstable traffic.

2.4.2 Global Availability

Clients may connect to GTT's AS 3257 via cross-connect, on-net backhaul or an array of local access options. GTT is constantly adding new PoP locations. Please contact your GTT representative for the latest information regarding availability.

2.4.3 IPv4/IPv6 Support

GTT's IP network is a dual-stack (IPv4 and IPv6) infrastructure, enabling clients to use IPv4 and/or IPv6 protocols natively across a single IP port without any encapsulation or other protocol conversion. This is of particular importance to clients in the public sector, research networks and other verticals where IPv6 compliance may be a requirement.

2.4.4 BGP Traffic Management

Clients running BGP may employ BGP Communities and other BGP routing configuration tools to manage their traffic flow across the GTT IP Network. Information on available BGP Communities resides at <https://www.gtt.net/us-en/services/internet/ip-transit/bgp-communities>. GTT supports BGP for both DIA and IPT.

2.4.5 Bursting

Bursting is allowed up to the physical limit of the port. However, we guarantee bursting up to two times the committed rate. For example, for 10Gbps commit on a 100G port, we guarantee burst up to 20Gbps. Traffic above that threshold is delivered on a best effort basis, which means that it might experience service quality issues if there is congestion in the network. It is worth repeating that we actively manage our backbone and ensure that proactive capacity upgrades prevent network congestion in order to deliver the best experience to our clients.

2.4.6 RPKI

GTT is among the first large global Tier 1 operators to apply Resource Public Key Infrastructure (RPKI), a mechanism to make internet routing more secure. RPKI enables an IP address space holder, authorized at the Regional Internet Registry (RIR) level, to create a Route Origin Authorization (ROA) record, which sets out which Autonomous System can originate their routing prefix. This, in turn, enables network operators such as GTT to perform route origin validation and decline any invalid routes.

GTT has deployed RPKI-based route origin validation filtering on all BGP sessions with both clients and peers throughout our global network footprint. Clients must create a ROA record for their IP routes with the respective RIR to benefit from this additional security. Their IP announcements will be secured from routing leaks or hijacks throughout the entire GTT global network.

2.5 Optional Features

2.5.1 Aggregate CDR

GTT provides the option for an aggregate bandwidth commitment shared across multiple ports. The ports need to be in the same region. ACDR across different regions is only allowed for similarly priced regions.

Sales should always aim to provide Engineering with an estimate of capacity per port, especially for high port speeds.

2.5.2 IP Address Space

Clients may request IPv4 or IPv6 address blocks from GTT's pool of addresses. An IPv4 /30 (two usable IP addresses) comes standard with all DIA ports. Larger IP blocks are available at an additional charge. Anything larger than an IPv4 /24 (254 usable IP addresses) will be challenging to provide. GTT may provide IPv6 addresses in large blocks (/64-/48), consistent with the dramatically increased overall address space associated with the next-generation protocol.

2.5.3 Multi-Service Port

Clients may combine multiple GTT services onto a single port interface. Through the use of multiple Virtual Local Area Network (VLAN) instances, several different services, such as DIA, MPLS, VPLS and/or Ethernet may share the bandwidth of a single port. Although GTT allows port bandwidth to be shared in this manner, each service requires a separate CDR or Aggregate CDR (ACDR). Note that Ethernet does not support ACDR.

2.5.4 Load Sharing and Link Aggregation

GTT can support load sharing at different levels, as required by clients.

Clients may combine multiple physical ports into one larger logical port, providing physical redundancy. The GTT edge router treats the group of ports as one larger port. This option allows the client to aggregate multiple 10Gbps ports into a port channel (LACP). GTT allows the aggregation of up to eight 10Gb links per router, per client. Requests for a greater number of links and requests involving 100G ports require approval on an individual case basis.

We support eBGP multipath and multihop for BGP clients. Multipath is used to achieve load sharing across multiple interfaces to the same GTT PE router. Multihop is used for an eBGP session between routers that are not directly connected.

2.5.5 Jumbo Frames

GTT sets the Maximum Transmission Unit (MTU) frame size at 1,500 bytes but can support larger, "jumbo" MTU frame sizes up to 9,500 bytes when required by clients to optimize performance. This feature requires approval on an individual case basis.

2.5.6 Managed CPE

Clients may outsource their premises equipment to GTT via GTT's Managed Network Services (MNS). Contact your GTT account team for details on our MNS service options.

2.5.7 Bidirectional Forwarding Detection (BFD)

Bidirectional Forwarding Detection is an optional feature. It allows clients to improve the BGP's own keepalive mechanism for faster link failure detection and notification.

2.5.8 Automatic Prefix-List Update

Clients can take the option for GTT's inbound filters of client's prefixes to get updated based on prefix information registered with the Internet Routing Registry.

2.5.9 Null-Routing/Black Hole Filtering

Clients using BGP may employ a null-route or "black hole" capability to respond to Distributed Denial of Service (DDoS) attacks. To enable this capability, the client must either ask for it to be available at the time of install or make a request at a later time by contacting bgp-filters@gtt.net. When a client determines that a DDoS attack is underway, they can either apply the correct BGP community tag

(3257:2666) to the impacted IP address(es) themselves or send a request to bgp-filters@gtt.net to apply it on their behalf. When a client applies a specific BGP community setting to IP addresses impacted by a DDoS attack, GTT will drop all inbound traffic at the network edge, protecting the client's servers and keeping such traffic off the GTT core. This is a quick and effective means of negating a DDoS attack, however it stops legitimate traffic as well as the malicious. In order to resume traffic flow to the impacted IP address(es), the client must either remove the BGP community from their router(s) or once again contact bgp-filters@gtt.net to disable null routing. There is no additional charge for this capability.

2.5.10 Distributed Denial of Service (DDoS) Mitigation

GTT's DDoS Mitigation service offers IPT or DIA clients a more refined means of mitigating DDoS attacks, leveraging the [Corero](#) SmartWall Threat Defense System to filter malicious traffic out while allowing safe traffic to proceed. This is done by re-directing inbound traffic to scrubbing centers in the GTT network for inspection (continuously in the case of always-on; reactively in the case of on-demand) and only allowing approved traffic through to the client. Clients using always-on do not need to take any action once traffic profiles are set; as all incoming traffic is continuously examined, the service automatically and near-instantaneously responds to any malicious activity. Clients using the on-demand service will need to enable the mitigation process, similarly to null-routing, by notifying GTT and applying the DDoS Mitigation BGP community (3257:1000) to impacted IP addresses.

To enable this capability, the client must order GTT's DDoS service. The client can purchase the service at the same time as Internet services or order it at a later time. Based on past experience or the anticipated level of mitigation activity, clients may opt for always-on or on-demand implementations, with variables including:

- Number of ports and protected prefixes
- Monthly included hours of mitigation (on-demand only)

In both always-on and on-demand models, there are several profiles corresponding to expected level of activity that will ultimately determine service rates. There are additional charges for this capability which are based on the variables indicated above.

2.6 Pricing

GTT's pricing philosophy is to provide high-quality service at competitive market rates.

2.6.1 Pricing Strategy

GTT prices Internet services based on the level of commitment, calculated based on Mbps of throughput and represented to clients as a monthly charge labeled Monthly Recurring Rate (MRR). GTT defines Internet rates based on the service region (North America, Europe, Asia Pacific, Latin America) and the service term (12, 24, 36 months).

2.6.2 Fixed and Burstable Billing Models

Clients may choose among several commitment and billing options: full-port, partial port Committed Data Rate (CDR) with rate-limit, partial port CDR plus burst and multi-port Aggregated CDR (ACDR). The level of commitment has a direct impact on the pricing for both committed and burst traffic. GTT offers the following bursting options to both IPT and DIA clients.

- Full-Port – Client commits to the full bandwidth of the port and may use up to the full line-rate of the port as needed. GTT bills the client a flat monthly rate regardless of the actual usage.

- CDR with Rate-Limit – Client commits to a bandwidth below the full port speed and available bandwidth is capped or rate-limited to that amount. GTT bills the client a flat monthly rate regardless of the actual usage, which may not exceed the rate limit.
- CDR with Burst – Client commits to a bandwidth below the full port speed, with the full line-rate of the port available via bursting (network conditions permitting). GTT bills the client a flat monthly rate for the CDR and burst usage charges for any overage that may occur.
- ACDR – Client commits to a utilization level across multiple ports, consolidating them into one large virtual port. GTT determines traffic bursting as defined above, however the calculation combines statistics from all ports associated with the ACDR for the determination of burst, which allows higher-usage ports to offset ports with lower traffic. GTT bills the client a flat monthly rate for the ACDR and burst usage charges for any overage that may occur. The client *may not* combine ACDRs across differently priced regions.

2.6.3 Burst Usage Rate

GTT bills any burst usage at the same per-Mbps rate used to generate the committed service MRR.

Clients may burst beyond their Committed Data Rate (CDR) to a multiple of their bandwidth commitment, potentially up to full port line rate, dependent on level of commitment. GTT determines burst usage using the industry standard 95th percentile model (also known as P95 or 95/5), whereby the router takes measurements of usage every five minutes for both inbound and outbound traffic and at the end of the month GTT sorts the results from highest to lowest. The analysis discards the top five percent in either direction and compares the highest of the remaining two figures to the CDR to determine any overage, which GTT then bills as burst usage.

2.6.4 IP Address Pricing

Clients requesting IP address space from GTT will receive an IPv4 /30 block (two usable IPs). If the client requests a larger block, they must complete an IP justification form and pay a one-time fee (NRR). This charge covers the cost of registering IP addresses with the regional registries. Clients may also request IPv6 address blocks, which are available at a one-time charge (NRR) as well.

2.7 Service Level Agreement

GTT IP Transit and DIA services are both provided with Service Level Agreements (SLAs) governing four critical network performance criteria: service availability, latency, packet delivery and frame jitter. GTT measures these metrics monthly and clients can view them in GTT's EtherVision portal. Additionally, GTT includes Mean Time to Restore ("MTTR") and Chronic Outage thresholds within the service schedule.

2.7.1 Availability

- Service availability objective with diverse Ethernet loop protection is 99.999%.
- Service availability objective without single Ethernet loop is 99.9%.
- Service availability objective without access is 99.99%

2.7.2 Latency

- GTT's network latency is defined by region. The service schedule includes these metrics.

2.7.3 Packet Delivery

- GTT's packet delivery objective is 99.9% across the GTT IP network.

2.7.4 Mean Time to Restore

- GTT commits to a four-hour average restoration time for all service impacting incidents.

2.7.5 Service Credit

- GTT clients must submit credit requests in writing following the event that warrants a credit due to a failure in any of the service performance categories.

2.8 Acceptable Use Policy

As one of the leading global IP network providers, GTT places the highest priority on the quality and safety of the client experience. To preserve that experience, GTT enforces a strict [Acceptable Use Policy](#) (AUP) to which all clients agree to adhere. GTT takes violations of the AUP seriously and vigorously addresses them; in some cases, this includes the suspension or complete disconnect of an offending party.

3. Support and Service Monitoring

For any technical service issues, including performance degradation and outages, clients should contact GTT's Global Network Operations Center (GNOC). The Client Welcome Guide details support, fault reporting, contact information, escalation processes and resolution processes.

GTT's GNOC is staffed around the clock and located in Europe and North America. Clients can contact the GNOC to receive support on ticket creation, service status and management escalation.

Each GNOC location acts as a center of excellence for a particular GTT service type; however, all the locations work together quickly and efficiently to resolve issues related to any GTT service.

On a daily basis, the GTT GNOC proactively:

- Monitors operations of all backbone links and network devices.
- Ensures continuous operation of GTT's support servers and services.
- Troubleshoots all network-related problems.

When a fault is created, GTT's trouble ticketing system will automatically:

- Generate a unique ticket ID (example: GTT TT# 1234).
- Send an email with the ticket number to the originator or to the default contact on record.

When reporting a fault, please contact the GNOC and provide as much information as possible, including:

- GTT service ID
- Client name
- Client contact details
- Time of occurrence
- Nature of issue (e.g., exceeding latency SLA, service unavailable, packet loss)

The Client Welcome Guide documents GNOC contact information and the escalation process for Optical Transport.

4. EtherVision Client Portal

GTT provides clients with 24x7 access to our client portal, EtherVision, found on the GTT website. Once a client account is created, EtherVision provides access to all active services associated with the account.

The following features are available in EtherVision:

Features	Benefits
Proactive monitoring and alerting	<ul style="list-style-type: none">• Minimizes downtime and provides fast fault resolution• Issues a trouble ticket automatically, with an email notification sent to the originator or default contact
Ticket management	<ul style="list-style-type: none">• Allows the user to open a new trouble ticket and view trouble ticket reports, including other open tickets or tickets that have been closed
Real-time reporting	<ul style="list-style-type: none">• Provides real-time reporting of port usage, network status and SLA performance
Service inventory management	<ul style="list-style-type: none">• Displays existing active services, including account number, order number, circuit ID, service description, signed service order form, start of service letter and any pending or completed disconnects
New service quote management	<ul style="list-style-type: none">• Allows submission of a request for a new service quote
Open order management	<ul style="list-style-type: none">• Displays status of new orders and provides real-time updates
Account executive, NOC, escalation information	<ul style="list-style-type: none">• Displays contact information of client account executive and NOC as well as escalation information
Billing information	<ul style="list-style-type: none">• Provides a view of current and past invoices and summary and resolution of all billing disputes, as well as allowing the user to send a billing inquiry