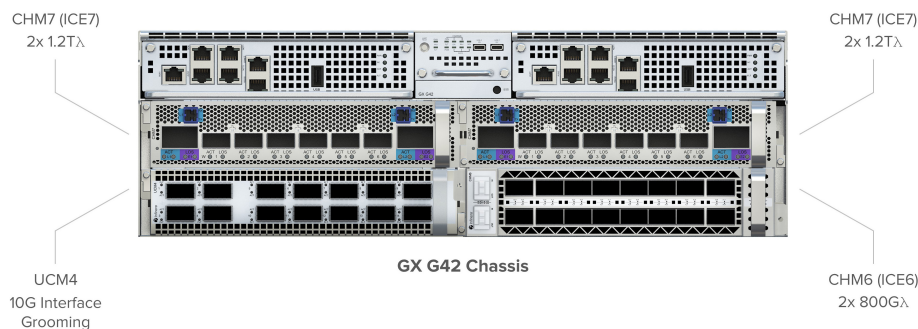# Infinera GX G42 – Compact Modular Optical Transport Solution

GX G42 is built upon leadership in vertical integration and superior optical performance to enable the lowest total cost of ownership and a rich end-user experience. Leveraging our U.S.-based optical semiconductor fab, Infinera has a distinguished history of delivering breakthrough innovation through multi-discipline opto-electronic research and development (R&D), including industry-leading high-performance optical engines, revolutionary point-to-multipoint coherent optics, and customized design and production.

Pioneered by Infinera through the introduction of the Cloud Xpress and Groove G30, compact modular platforms have repeatedly raised the bar of optical performance, operational flexibility, space and power efficiency, and automation. Compact modular platforms were originally built for internet content providers (ICPs) for point-to-point Ethernet transport in metro data center interconnect applications. Now, their compelling technical and economic value has resulted in fast and consistent market adoption by all types of network operators, including communication service providers (CSPs), cable/multiple-systems operators (MSOs), research and education network operators, and many others in a wide variety of applications.

Infinera's GX G42 leverages a sled-based architecture and an add-as-you-grow operational model to further accelerate the deployment of compact modular platforms and unleash their full potential in a wide scope of applications.

CHM7 (ICE7)
2x 1.2Tλ

CHM7 (ICE7)
2x 1.2Tλ

UCM4
10G Interface
Grooming

GX G42 Chassis

CHM6 (ICE6)
2x 800Gλ

Equipped with four service slots in a 3RU, 450-mm-deep form factor that fits in 600-mm ETSI-compliant racks, the carrier-grade G42 platform offers full NEBS Level 3 compliance, redundant controllers, multi-chassis management, and many other features. It offers high capacity and low power consumption in a compact footprint, leveraging Infinera's 1.6T (2 x 800G per wavelength) sixth-generation Infinite Capacity Engine (ICE6) and 2.4T (2 x 1.2T per wavelength) seventh-generation Infinite Capacity Engine (ICE7). The GX G42 supports 200G to 1.2T line transponders and 10G to 800G client interfaces, and is perfectly suited for CSPs, ICPs, and many other network operators that require high-capacity networking. GX G42 is also ready to support the next technology evolution in coherent transmission.

BENEFITS OF THE INFINERA GX G42

- **Decrease total cost of ownership** with more capacity at longer reaches, a compact footprint, and low power consumption

- **Add as you grow** by smoothly adding capacity when and how you want and eliminating the up-front cost of buying all the hardware on day one and the associated CapEx

- **Boost fiber capacity** with Super C- and Super L-band

- **Maximize ROI** with a sled-based architecture for a multi-generational optical engine

- **Optimize spectral efficiency** with continuously tunable baud rate

- **Seamlessly integrate** compact modular into your CSP network with numerous carrier-grade features

- **Avoid vendor lock-in** by building on third-party open line systems

- **Simplify turn-up and lifecycle management** with easy installation, quick service turn-up, and intuitive management

- **Protect your client services** with SNCP protection, Y-cable protection, and Layer 0 restoration

- **Automate the network** to streamline operations and reduce sources of human error

- **Reduce carbon footprint** with power consumption as low as 0.12 W/bit with the latest coherent embedded optical engine, ICE7
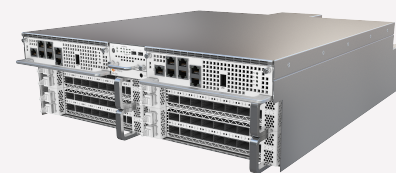
*The Infinera GX G42
Compact Modular Platform*

The GX product lines include environmental design features such as density efficiency, adaptive power mode, bucketized power allocation, and low energy consumption. We have completed a carbon footprint assessment (CFA), expanded communications on our take-back program, and achieved a total recyclable content rate on our new packages of 50% in 2023. With each successive iteration of our Infinite Capacity Engine (ICE), we have made significant improvements to energy efficiency and data transmission performance. Our latest ICE7 optical engines reduce power per bit by up to 35% compared to the previous generation, ICE6. The carbon footprint for manufacturing of the GX G42 chassis fully equipped with CHM6 modules that deliver 6.4 Tb/s line capacity including redundant controllers is 2,228.2 kg CO_2.

Kit	PON	Notes	Carbon Footprint (kg CO_2)
GX G42	G42	(chassis only)	138.3
	CHM6	(4 units)	1,087.7
	XMM4	(2 units)	183.3
	PEMs	(4 units, estimated)	330.0
	Air Filter		10.1
	Transport		478.8
		TOTAL	**2,228.2**

The Benefits of Infinera's GX G42 Compact Modular Platform

The significant business and operational benefits of Infinera's G42 can be summarized as follows:

- **Multi-generational pay-as-you-grow mode of operation**: The sled-based design allows network operators to eliminate the up-front cost of buying all the hardware on day one and the associated CapEx. Network operators can add capacity and change configuration through sleds when and how they want to, while scaling horizontally by adding new sleds and vertically through the addition of new chassis in a pay-as-you-grow operational model. Moreover, Infinera's game-changing consumption-based Instant Bandwidth capacity activation model enables the quick, easy, and remote addition or modification of capacity without truck rolls. Instant Bandwidth enables a perfect match between the timing of CapEx and service revenue, thus accelerating time to revenue from months to minutes, and reduces OpEx by streamlining operations and eliminating truck rolls. Moreover, the G42 platform is designed to support multiple generations of optical engines, thus maximizing network operators' return on investment.

- **Carrier-grade features**: The G42 is designed to be carrier-grade. Key features such as NEBS Level 3 compliance, hot-swappable redundant controllers, multi-chassis control, AC/DC power supplies, and the ability to fit into 600-mm ETSI racks allow seamless deployment and integration into CSP networks, thus widening the application scope in various parts of the network.

- **Significantly reduced transport costs**: Infinera builds upon the success of the sled-based architecture by offering a complete portfolio of compact modular platforms, including the G42, and leverages ICE6 and ICE7 to further decrease capital and operating costs with more capacity at longer reach, compact footprint, low power consumption, and better spectral efficiency. The ICE6 and ICE7 sled design reduces sparing costs, as the same module can be utilized in a wide variety of applications in data center interconnect, metro, regional, long-haul, and submarine networks. In addition, the G42 supports both C- and L-band with ICE6 technology and Super C- and Super L-band with ICE7 technology, thus enabling service providers to achieve maximum capacity from their fiber infrastructure.

- **Open and disaggregated principles**: The GX platform is built around the principles of hardware disaggregation, open standards (e.g., OpenDaylight, Open ROADM, OpenConfig, etc.), and open APIs with standard YANG models, which further facilitates multi-vendor interoperability and prevents vendor lock-in. Moreover, a next-generation microservices-based software framework allows network operators to selectively deploy the microservices (e.g., path computation engine, etc.) they need, thus accelerating feature development, speeding up software upgrades, improving software scalability, and significantly improving user experience.

- **Simplified turn-up and lifecycle management**: With the goal of having traffic up and running within minutes, Infinera's GX compact modular platforms have been designed from the ground up to allow easy installation, quick service turn-up, and intuitive management, as well as proven, easy integration into third-party line systems.

- **Built for automation**: The GX supports numerous features and capabilities to automate tasks, streamline operations, and eliminate sources of human error. Such features include declarative configuration management, streaming telemetry (gRPC, gNMI), open APIs, and standards-based YANG models. Support for extensible NOS application agents enhances analytics while enabling better network-wide performance monitoring.

Wide Application Scope

With its sled-based architecture, carrier-grade features, and variety of chassis types, Infinera's G42 compact modular platform can be deployed by all types of network operators in a wide variety of applications. These include:

- Introducing cost-effective high-speed 100 GbE, 400 GbE, 800 GbE, OTU4, and low-speed (10 GbE/OTU2/OTU2e/OC192/STM64) services over third-party line systems

- Expanding network coverage and capacity of existing optical line systems (e.g., GX G30 Series OLS, FlexILS, and 7300 Series, etc.)

- Reducing the cost of optical transport in metro, regional, and long-haul networks

- Addressing any data center interconnect applications

- Upgrading metro/regional networks for 5G and DAA

- Doubling existing fiber capacity by using L-band

- Expanding into Super C- and Super L-band spectrum for more fiber capacity

- Maximizing spectral efficiency in long-haul and submarine networks for more capacity at longer distances

- Introducing new services and reducing transport costs of DTN-X installed base

- Delivering advanced photonic capabilities over open line systems across the entire network and overcoming any site complexity

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TECHNICAL SPECIFICATIONS*

Physical Dimensions
- 3RU: 133 mm (H) x 444 mm (W) x 450 mm (D)
- 3RU: 5.21 in (H) x 17.34 in (W) x 17.71 in (D)

Weight
- Common equipment: 20.4 kg/44.9 lbs
- Fully filled with double-width module: 38 kg/83.7 lbs

Shelf Capacity
- Four slots supporting up to four double-width modules and a max capacity of 9.6T line and 9.6T client per shelf

Client Capacity
- With 4 x CHM7:
  - up to 12 x QSFP-DD800 with 800 GbE clients
  - up to 24 x QSFP-DD with 400 GbE clients
  - up to 24 x QSFP-DD and 4 x SN connector for up to 96 100 GbE clients
- With 4 x CHM6:
  - up to 64 x QSFP28 with 100 GbE/OTU4 clients

- up to 8 x QSFP56 with 200 GbE clients
- up to 16 x QSFP-DD with 400 GbE clients
- With 4 x UCM4:
  - up to 160 x 10 GbE/OTU2/OTU2e/OC192/STM64

Line Capacity
- Line ports support 100 Gb/s - 1.2 Tb/s per wavelength
- Fiber spectrum support of 11.6 THz (Super C+L)
- Maximum capacity per fiber: 100 Tb/s
  - 55.2 Tb/s (Super C-band) and 49.2 Tb/s (Super L-band)

Common Equipment
- Redundant/field-replaceable controller
- Redundant/field-replaceable power supply
- Redundant/field-replaceable fan unit
- Power options: AC or DC power

Power
- AC PSU input power range:
  - 1.1 kW: input 90 V AC to 140 V AC
  - 2.2 kW: input 180 V AC to 264 V AC
- DC PSU: 2.2 kW: input -40 V DC to -72 V DC
- Power consumption (including client plugs): Four double-width modules: 1.6 kW

CHM7 Transponder Module
- ICE7-based 2.4T (2 x 1.2 Tb/s) Super C-band and Super L-band double-width module
- Provides 6 client interfaces supporting:
  - 6 x QSFP-DD ports
    - 24 x 100 GbE LR1/FR1, DR1
    - 12 x 100 GbE LR4
  - 6 x QSFP-DD ports supporting 400 GbE
  - 3 x QSFP-DD800 supporting 800GbE
  For up to 2.4 Tb/s of client capacity
- Provides two programmable (200G to 1.2T wavelength) coherent line ports for up to 2.4 Tb/s of line capacity

CHM6 Transponder Module
- ICE6-based 1.6T (2 x 800 Gb/s) C-band and L-band double-width module
- Provides 16 client ports supporting:
  - 16 x QSFP28 ports supporting 100 GbE/OTU4
  - 8 x QSFP56 ports supporting 200 GbE
  - 4 x QSFP-DD ports supporting 400 GbE

  For up to 1.6 Tb/s of client capacity
- Provides two programmable (200G to 800G/wavelength) coherent line ports for up to 1.6 Tb/s of line capacity

UCM4 Aggregation Module
- Up to 400G of sub-rate aggregation capacity:
  - Supports 4 x QSFP28 uplinks:
    - OTU4 clients – SR4, LR4, AOC, DAC
  - 10 x QSFP+ client ports with 4 x QSFP28/QSFP+
  - QSFP+ clients:
    - 10 GbE/OTU2/OTU2e/OC192/STM64 payloads
    - LRL, SR4
    - Up to 40 x 10G client ports (QSFP+ breakouts)
  - QSFP28 clients:
    - LR4, CWDM4
- NEBS Level 3 compliant
- Optical and digital alarms, PMs, TCAs, TCE support
- Third-party TOM support for QSFP28 and QSFP+
- GCC support
- 10G client ODU encryption

Management and Automation
- CLI, TL1, SNMPv2c, SNMPv3, Syslog, WebGUI
- Infinera DNA, Transcend
- API: NETCONF, gRPC/gNMI, RESTCONF APIs based on OpenConfig/IETF YANG models in addition to Infinera open API models, streaming telemetry, declarative and imperative configuration models, CLI scripting, Python scripts hosted using the guest container and shell
- Automation: zero-touch provisioning (ZTP), LLDP, line-system integration and automation

Security
- Secure boot, IEEE 802.1AR iDevID, secure key store, secure memory wipe
- L3 ACL, IPsec, NTP authentication
- SSHv2, HTTPS/TLS1.2, AAA, TACACS+, RADIUS, MFA for SSH, SFTP, SCP
- AES-256-GCM wire-speed L1 bulk encryption (line side), IKEv2 with PSK or X.509 certificate option
- 10G client ODU encryption on the UCM4 module

Environmental Characteristics
- Normal operating temperature: -5°C to +55°C; 23°F to 131°F
- Operating humidity: 93% maximum
- Emissions: FCC Part 15 Class A, EN55032/CISPR Class A compliant
- EMC Emissions: CISPR 32/EN 55032 Class A, FCC-A, VCCI-A
- EMC Immunity: CISPR 35/EN 61000-4-2,3,4,5,6

- CE Laser Safety: ANSI Class 1M, IEC Class 1M, EN 60825-1/2, 21 CFR 1040 US FDA CDR, Class 1M
- RoHS-6 compliant and lead-free per Directive 2002/95/EC

Regulatory and Compliance
- NEBS Level 3
  - GR-63-CORE: Network Equipment Building Systems - Physical Protection
  - GR-1089-CORE: Electromagnetic Compatibility and Electrical Safety - Generic requirement for Network Telecommunications Equipment
- ETSI ETS 300 119-4
- ETS 300 386
- ETS 300 753
- ETSI EN 300 019 (environmental compliance)
- GR-78-CORE
- GR-3160-Core Generic Requirements for Telecommunications Data Center Equipment and Spaces
- GR-326-Core Generic Requirements for Single-Mode Optical Connectors and Jumper Assemblies
- Telcordia GR-1435-Core Generic Requirements for Multi-Fiber Optical Connectors

Product features and specifications are subject to change

Infinera®