



CROSS-BORDER DATA TRANSFERS & TELECOMMUNICATION AND NETWORK TECHNOLOGIES

Telecommunication and information technology (IT) networks, which include terrestrial and submarine cables, as well as satellite, cellular, and other wireless technologies, enable cross-border data transfers to connect people, as well as schools, hospitals, factories, and organizations of all types and sizes. As the basis for global communications and medium for cross-border data transfers, these ubiquitous networks bring [development](#), [innovation](#), [health](#), [productivity](#), [trade](#), and [security](#) benefits to global populations.

CROSS-BORDER DATA TRANSFERS AND DIGITAL CONNECTIVITY

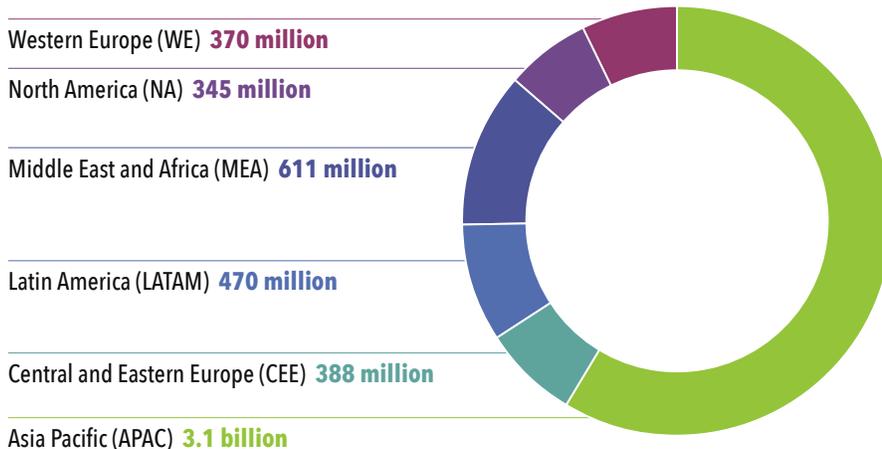
Digital connectivity, supported by cross-border data transfers, is increasing with new infrastructure investment and innovation in telecom and IT networks, such as:

- **Cross-border terrestrial and submarine cabling systems.** Information networks are supported by more than 1.3 million kilometers of terrestrial and submarine cabling¹ that allows data to move across borders.
- **Cross-border wide area networks.** These networks encompass new cellular technologies (such as 5G, discussed below) and updates to technologies (such as 4G LTE) that can connect devices globally.
- **Cross-border low-power wide area networks (LPWAN).** LPWAN innovations include narrowband Internet of Things (IoT) and LTE-M technologies, which enable long-distance IoT data transmissions at a lower cost and lower power consumption than 4G and 5G networks of smartphones and similar computing devices.

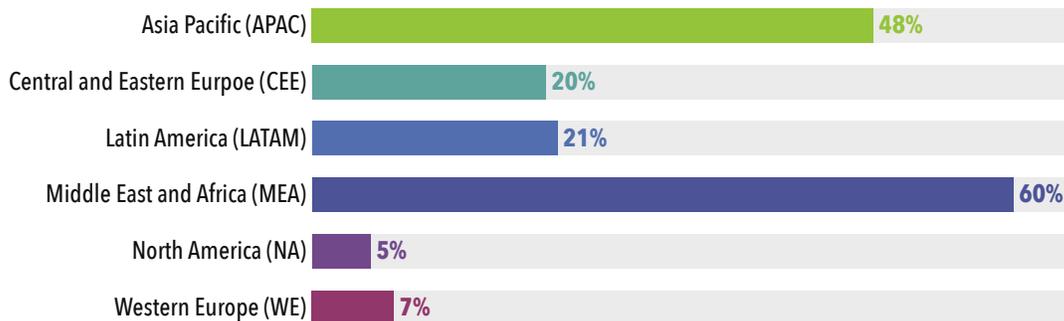
Technologies that promote digital connectivity and transformation—which can help promote education, science, growth, and sustainability—can only reach their full potential when they are not impeded by unnecessary cross-border data restrictions or localization mandates.

Global Populations Are Increasingly Connected, Including Across Borders

Internet-Connected Population (by Region, 2023 estimate)



Increase in Internet-Connected Population (by Region, 2018–2023)



Cisco, *Annual Internet Report 2018–2023* (2020), <https://www.cisco.com/c/en/us/solutions/collateral/executive-perspectives/annual-internet-report/white-paper-c11-741490.pdf>.

CROSS-BORDER DATA TRANSFERS AND IOT

Expected to grow to more than 200 billion devices by 2023,² IoT is an inherently cross-border technology.

- **Cross-border industrial IoT.** In manufacturing, cross-border data transfers are critical to sensor-driven industrial IoT equipment (e.g., robotics) whose performance is remotely analyzed and optimized.
- **Cross-border logistics.** In logistics, cross-border data transfers enable real-time tracking of cargo as it is shipped from the factory to its final destination. With 75 percent of supply chain leaders calling for improved end-to-end visibility across international transport modes, cross-border connectivity is the driving imperative.³
- **Cross-border transportation connectivity.** In connected transportation, data transfers facilitate navigation, detecting traffic and safety conditions, fuel efficiency, and forecasting repair needs. Data transfers can be important to the safe and fully enabled movement of connected transportation assets in many operational contexts.
- **Cross-border enabled edge computing.** Edge computing promises to reduce end-to-end latency by performing certain processing close to the data source (the network edge), conserving server resources elsewhere in the cross-border Core Network.

Data Localization Mandates and IoT Technologies

In IoT, the risks from data localization measures are significant. For example, in Brazil, Indonesia, and South Africa, IoT data transfer restrictions could result in:

Loss of
59–68 percent
of these technologies'
potential productivity
and revenue gains.

Investment losses
ranging from
\$4–5 billion.

Job losses ranging from
**182,000–
372,000 jobs.**

GSMA, *Cross-border Data Flows—The Impact of Localization on IoT* (2021), https://www.gsma.com/publicpolicy/wp-content/uploads/2021/01/Cross_border_data_flows_the_impact_of_data_localisation_on_IoT_Full_Report.pdf.

Sustainable investment in secure data infrastructure and capacity depends upon coherent policy frameworks that promote the cross-border transfer of data as well as strong standards of digital responsibility.

CROSS-BORDER DATA TRANSFERS AND GLOBAL NETWORKS

Global networks, whether terrestrial, submarine, satellite, wireless, or a combination of infrastructures, rely on effective and efficient network management to enable resilient global connectivity. In order to provide high-performing and advanced network connectivity, global network operators often rely on real-time cross-border data transfers to manage network traffic to optimize performance in response to a variety of possible disruptions, including to balance network traffic to reduce congestion by routing through different links. This management function is typically conducted through Network Operations Centers (NOC), which rely on centralized and integrated diagnostic and repair capabilities to help improve service, resilience, and security across the network. Restrictions on cross-border data transfers can compromise those capabilities.

CROSS-BORDER DATA TRANSFERS AND EMERGING NETWORK SOLUTIONS

Emerging network solutions also depend on cross-border data transfers. In countries that do not impede cross-border access, these innovations can improve connectivity and daily life for populations worldwide.

- **Cross-border 5G technologies.** Conceived and designed for a cross-border enabled environment, 5G technologies—which are transforming both data-intensive consumer and industrial connectivity—can only reach their full potential when they are not impeded by unnecessary cross-border data restrictions or localization mandates. What makes data transfers so critical to 5G networks compared to previous cellular technologies is the exponential amount of data—up to 10 TB/s/km²—they can carry for numerous simultaneous users across the globe.⁴
- **Cross-border 6G innovation.** Emerging plans for 6G technologies envision cross-border communication capability in the high GHz and THz bands and enhanced edge networking applications.⁵
- **Cross-border satellite connectivity.** Thousands of newly deployed low-earth orbit (LEO) satellites—small, low-orbit devices offering better latency and signal strength over legacy infrastructure—promise to improve cross-border connectivity for remote or underserved regions of the globe.⁶
- **Cross-border connectivity potential of photonics.** New photonics (optics)-based technologies can improve performance indicators in cross-border connectivity relative to current electronics-based technologies.⁷

Endnotes

- ¹ Telegeography, *Submarine Cable Frequently Asked Questions* (2021), <https://www2.telegeography.com/submarine-cable-faqs-frequently-asked-questions>.
- ² Intel, *A Guide to the Internet of Things*, <https://www.intel.com/content/dam/www/public/us/en/images/iot/guide-to-iot-infographic.png>.
- ³ DHL Trend Research, *Next-Generation Wireless in Logistics: A DHL Perspective on the Evolution of Wireless Networks and the Future of IoT in Logistics* (2021), <https://www.dhl.com/content/dam/dhl/global/core/documents/pdf/next-generation-wireless-in-logistics.pdf>.
- ⁴ Verizon, *We're Building Our Network to Deliver the Full Potential of 5G. Are You Ready?* <https://www.verizon.com/business/resources/5g/8-currencies-5g-network-performance/>.
- ⁵ ATIS, *Promoting U.S. Leadership on the Path to 6G* (2020), <https://www.atis.org/wp-content/uploads/2020/07/Promoting-US-Leadership-on-Path-to-6G.pdf>.
- ⁶ Starlink has launched more than 1,000 LEO satellites and has plans for thousands more. <https://www.starlink.com/>; Jon Brodtkin, *FCC Tells SpaceX It Can Deploy up to 11,943 Broadband Satellites*, *Ars Technica* (2018), <https://arstechnica.com/information-technology/2018/11/spacex-gets-fcc-approval-for-7500-more-broadband-satellites/>; OneWeb has plans for a 648 LEO satellite constellation by the end of 2022. See <https://www.oneworld.media-center/oneworld-secures-investment-from-softbank-and-hughes-network-systems>. Kuiper Systems has publicized plans to offer broadband internet access via more than 3,000 LEO satellites. See <https://spacenews.com/amazon-planning-3236-satellite-constellation-for-internet-connectivity/>. At least two Chinese operators have described plans for thousands of LEO satellites. See e.g., Larry Press, *Guowang, Renamed China SatNet, Will Be China's Global Broadband Provider*, <https://www.circleid.com/posts/20210329-guowang-starlink-will-be-chinas-global-broadband-provider/> and Dan Swinhoe, *China's Moves into Mega Satellite Constellations Could Add to Space Debris Problem*, <https://www.datacenterdynamics.com/en/analysis/chinas-moves-into-mega-satellite-constellations-could-add-to-space-debris-problem/>.
- ⁷ NTT Research & Development Website, *Innovative Optical and Wireless Network* (2021), <https://www.rd.ntt/e/iown/>.

About the Global Data Alliance

The Global Data Alliance (globaldataalliance.org) is a cross-industry coalition of companies that are committed to high standards of data responsibility and that rely on the ability to transfer data around the world to innovate and create jobs. The Alliance supports policies that help instill trust in the digital economy while safeguarding the ability to transfer data across borders and refraining from imposing data localization requirements that restrict trade. Alliance members are headquartered across the globe and are active in the advanced manufacturing, aerospace, automotive, electronics, energy, financial and payment services, health, consumer goods, supply chain, and telecommunications sectors, among others. BSA | The Software Alliance administers the Global Data Alliance.