Global Mobile Data Drivers

Mobile Momentum Metrics

By 2022

2017

- More Mobile Users: 5.0 Billion
- More Mobile Connections: 8.6 Billion
- Faster Mobile Speeds: 8.7 Mbps
- More Mobile Video: 59% of Traffic

2022

- More Mobile Users: 5.7 Billion
- More Mobile Connections: 12.3 Billion
- Faster Mobile Speeds: 28.5 Mbps
- More Mobile Video: 79% of Traffic

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Asia Pacific Mobile Data Drivers

Mobile Momentum Metrics

By 2022

2017

More Mobile Users: 2.6 Billion
More Mobile Connections: 4.6 Billion
Faster Mobile Speeds: 10.6 Mbps
More Mobile Video: 59% of Traffic

2022

More Mobile Users: 3.1 Billion
More Mobile Connections: 6.3 Billion
Faster Mobile Speeds: 28.8 Mbps
More Mobile Video: 79% of Traffic

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Approaching the Mobile Zettabyte Era
By 2022, annual global mobile data will nearly reach the zettabyte milestone

By 2022, global mobile data traffic will reach an annual run rate of 930 exabytes per year

What is a zettabyte?
- One trillion gigabytes
- Approximately $10^{21}$ bytes

930 exabytes is equal to:
- Nearly 113X more than mobile traffic generated in 2012 (8.2 exabytes)
- All movies ever made crossing global mobile networks every 5 minutes

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Mobile Data Traffic Growth
Global mobile data traffic will increase 7-fold from 2017 to 2022

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022

46% CAGR
2017–2022

Exabytes per Month

<table>
<thead>
<tr>
<th>Year</th>
<th>Exabytes per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>12</td>
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<tr>
<td>2018</td>
<td>19</td>
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<td>2019</td>
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<tr>
<td>2020</td>
<td>41</td>
</tr>
<tr>
<td>2021</td>
<td>57</td>
</tr>
<tr>
<td>2022</td>
<td>77</td>
</tr>
</tbody>
</table>

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Global Mobile Data Traffic Forecast Accuracy
Actual growth has been within ±10% of projected growth

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Mobile Data Traffic Growth by Region

MEA has the highest growth rate (56%) from 2017 to 2022
APAC will generate 56% of all mobile data traffic by 2022

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Average Mobile User and Connection
Cellular Traffic per Month

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Traffic</td>
<td>2.3 GB per month</td>
<td>13.3 GB per month</td>
</tr>
<tr>
<td>per User</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Traffic</td>
<td>1.3 GB per month</td>
<td>6.3 GB per month</td>
</tr>
<tr>
<td>per Connection</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
# Asia Pacific Average Mobile User and Connection Cellular Traffic per Month

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average Traffic per User</strong></td>
<td>2.2 GB per month</td>
<td>13.9 GB per month</td>
</tr>
<tr>
<td><strong>Average Traffic per Connection</strong></td>
<td>1.3 GB per month</td>
<td>6.9 GB per month</td>
</tr>
</tbody>
</table>

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Top Trends
VNI Mobile Forecast Update, 2017–2022
Top Mobile Networking Trends

1. Evolving Toward Smarter Multimedia Mobile Devices
3. Measuring Mobile IoT Adoption—M2M and Emerging Wearables
4. Identifying New Mobile Applications and Requirements
5. Comparing Mobile Network Speed Improvements
6. Analyzing the Expanding Role and Coverage of Wi-Fi
7. Reviewing Tiered Pricing—Unlimited Data and Shared Plans

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Mobile Device Growth

By 2022, smartphones* will exceed 50% share of total mobile devices/connections

7% CAGR
2017–2022

Billions of Devices

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022

* Smartphone category including phablets
* Figures (n) refer to 2017, 2022 device share
Asia Pacific Mobile Device Growth

By 2022, smartphones* will exceed 50% share of total mobile devices/connections

6% CAGR
2017–2022

By 2022, smartphones* will exceed 50% share of total mobile devices/connections

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022

* Figures (n) refer to 2017, 2022 device share
* Smartphone category including phablets
### Global Average Cellular Traffic Per Mobile Device

<table>
<thead>
<tr>
<th>Device</th>
<th>2017</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-smartphone</td>
<td>50 MBs per Month</td>
<td>224 MBs per Month</td>
</tr>
<tr>
<td>M2M Module</td>
<td>216 MBs per Month</td>
<td>448 MBs per Month</td>
</tr>
<tr>
<td>Smartphone</td>
<td>2,336 MBs per Month</td>
<td>10,697 MBs per Month</td>
</tr>
<tr>
<td>Tablet</td>
<td>3,023 MBs per Month</td>
<td>6,777 MBs per Month</td>
</tr>
<tr>
<td>Laptop/PC</td>
<td>3,648 MBs per Month</td>
<td>6,904 MBs per Month</td>
</tr>
</tbody>
</table>

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
# APAC Average Cellular Traffic Per Mobile Device

<table>
<thead>
<tr>
<th>Device</th>
<th>2017 (MBs per Month)</th>
<th>2022 (MBs per Month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-smartphone</td>
<td>62</td>
<td>232</td>
</tr>
<tr>
<td>M2M Module</td>
<td>197</td>
<td>434</td>
</tr>
<tr>
<td>Smartphone</td>
<td>2,240</td>
<td>11,390</td>
</tr>
<tr>
<td>Tablet</td>
<td>2,920</td>
<td>6,430</td>
</tr>
<tr>
<td>Laptop/PC</td>
<td>3,470</td>
<td>7,270</td>
</tr>
</tbody>
</table>

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Mobile Traffic Growth by Device
By 2022, smartphones will exceed 90% share of total mobile data traffic

46% CAGR
2017–2022

Exabytes per Month

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022

* Figures (n) refer to 2017, 2022 traffic share
By 2022, smartphones will exceed 90% share of total mobile data traffic

Exabytes per Month

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022

* Figures (n) refer to 2017, 2022 traffic share
Asia Pacific Mobile Traffic Growth by Device
By 2022, smartphones will exceed 90% share of total mobile data traffic

49% CAGR
2017–2022

Exabytes per Month

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022

* Figures (n) refer to 2017, 2022 traffic share
Global Growth of Smart Devices and Connections
By 2022, nearly three-fourths of total devices and connections will be smart

7% CAGR
2017–2022

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
# Smart Devices and Connections
Percent share of total mobile devices and connections (excluding LPWA)

<table>
<thead>
<tr>
<th>% Share</th>
<th>2017</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GLOBAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global</td>
<td>54</td>
<td>85</td>
</tr>
<tr>
<td><strong>BY REGION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North America</td>
<td>87</td>
<td>99</td>
</tr>
<tr>
<td>Western Europe</td>
<td>73</td>
<td>95</td>
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<tr>
<td>Central and Eastern Europe</td>
<td>63</td>
<td>93</td>
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<tr>
<td>Asia Pacific</td>
<td>54</td>
<td>82</td>
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<tr>
<td>Latin America</td>
<td>53</td>
<td>86</td>
</tr>
<tr>
<td>Middle East &amp; Africa</td>
<td>27</td>
<td>77</td>
</tr>
</tbody>
</table>

*Excludes LPWA

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Globally, in 2017, a smart device generated 10 times more traffic than a non-smart device.

* Smart devices have advanced multimedia/computing capabilities and a minimum of 3G connectivity

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Growth of Smart Traffic
By 2022, smart devices and connections will have 99% share of traffic

Exabytes per Month

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
## Smart Devices and Connections Traffic
### Percent share of total mobile data traffic

<table>
<thead>
<tr>
<th>% Share</th>
<th>2017</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GLOBAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global</td>
<td>92.3</td>
<td>98.8</td>
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<tr>
<td><strong>BY REGION</strong></td>
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<tr>
<td>North America</td>
<td>99.6</td>
<td>100</td>
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<tr>
<td>Western Europe</td>
<td>97.5</td>
<td>99.8</td>
</tr>
<tr>
<td>Central and Eastern Europe</td>
<td>95.3</td>
<td>99.6</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>91.8</td>
<td>98.5</td>
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<td>Latin America</td>
<td>94.6</td>
<td>99.2</td>
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<tr>
<td>Middle East &amp; Africa</td>
<td>78.3</td>
<td>96.1</td>
</tr>
</tbody>
</table>

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global IPv6-Capable Smartphones and Tablets
By 2022, 94% of mobile smartphones and tablets will be IPv6-capable

15% CAGR
2017–2022

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
APAC IPv6-Capable Smartphones and Tablets
By 2022, 93% of mobile smartphones and tablets will be IPv6-capable

16% CAGR
2017–2022

Billions of Devices

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global IPv6-Capable Mobile Devices/Connections
By 2022, 76% of all mobile devices/connections will be IPv6-capable

Billions of Devices

18% CAGR
2017–2022

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
APAC IPv6-Capable Mobile Devices/Connections
By 2022, 70% of all mobile devices/connections will be IPv6-capable

18% CAGR
2017–2022

Billions of Devices

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global IPv6 Mobile Data Traffic
By 2022, IPv6 mobile traffic will generate 57% of the total mobile data traffic

92% CAGR
2017–2022

Exabytes per month

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
APAC IPv6 Mobile Data Traffic
By 2022, IPv6 mobile traffic will generate 56% of the total mobile data traffic

99% CAGR
2017–2022

Exabytes per month

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
VNI Mobile Forecast Update, 2017–2022
Top Mobile Networking Trends

1. Evolving Toward Smarter Multimedia Mobile Devices


3. Measuring Mobile IoT Adoption—M2M and Emerging Wearables

4. Identifying New Mobile Applications and Requirements

5. Comparing Mobile Network Speed Improvements

6. Analyzing the Expanding Role and Coverage of Wi-Fi

7. Reviewing Tiered Pricing—Unlimited Data and Shared Plans

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Mobile Connections by Network Type

By 2022, 5G impact starts to emerge

Note: This view includes M2M. LPWA includes cellular LPWA (e.g., NB-IoT) and non-cellular LPWA (e.g., LORA)

* Figures (n) refer to 2017, 2022 network connection type share

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
APAC Mobile Connections by Network Type

By 2022, 5G impact starts to emerge

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022

Note: This view includes M2M. LPWA includes cellular LPWA (e.g., NB-IOT) and non-cellular LPWA (e.g., LORA)

* Figures (n) refer to 2017, 2022 network connection type share
LPWA vs. 5G: Comparative IoT Capabilities

**LPWA**
A highly efficient narrowband solution, purpose-built for low-end IoT

- Power efficient
- Low device cost
- Small, intermittent amounts of data over long distances
- Latency tolerant

*Note: LPWA includes cellular LPWA (e.g., NB-IoT) and non-cellular LPWA (e.g., LORA)*

**5G**
A highly flexible broadband solution, suitable for low- and high-end IoT

- Power efficient
- Cost optimized
- Massive IoT connection density
- High bandwidth & ultra-low latency
- Dynamic resource allocation per app

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
5G IoT Applications by Category
Diverse scale, network requirements, experience and business value

- **Massive IoT**
  - Smart Cities
  - Smart Grid
  - Smart Metering

- **Critical Communications**
  - Autonomous Vehicles
  - Smart Grid
  - Factory Automation

- **Enhanced Mobile**
  - Broadband
  - Immersive Video
  - Augmented Reality
  - 3D Video

Source: GSMA
## Mobile Connections by Network Type

### 2022 - Regional share

<table>
<thead>
<tr>
<th>% Share</th>
<th>2G</th>
<th>3G</th>
<th>4G</th>
<th>5G</th>
<th>LPWA</th>
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</thead>
<tbody>
<tr>
<td><strong>GLOBAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global</td>
<td>8</td>
<td>20</td>
<td>54</td>
<td>3.4</td>
<td>14</td>
</tr>
<tr>
<td><strong>BY REGION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North America</td>
<td>0</td>
<td>2</td>
<td>51</td>
<td>8.9</td>
<td>37</td>
</tr>
<tr>
<td>Western Europe</td>
<td>3</td>
<td>5</td>
<td>58</td>
<td>6.4</td>
<td>27</td>
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<tr>
<td>Central and Eastern Europe</td>
<td>3</td>
<td>18</td>
<td>63</td>
<td>0.5</td>
<td>16</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>9</td>
<td>15</td>
<td>61</td>
<td>3.6</td>
<td>11</td>
</tr>
<tr>
<td>Latin America</td>
<td>8</td>
<td>27</td>
<td>58</td>
<td>1.0</td>
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<tr>
<td>Middle East &amp; Africa</td>
<td>20</td>
<td>54</td>
<td>23</td>
<td>0.2</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Mobile Traffic by Network Type
By 2022, 5G will carry 12% of mobile data traffic

Exabytes per Month

* Figures (n) refer to 2017, 2022 network type share of traffic
Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Asia Pacific Mobile Traffic by Network Type

By 2022, 5G will carry 12% of mobile data traffic

* Figures (n) refer to 2017, 2022 network type share of traffic

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
By 2022, 5G connections and devices will be 3% of global mobile devices and connections and will account for 12% (9.2 EBs/month) of mobile data traffic.

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Globally, in 2017, a 4G connection generated 2.8 GB/month, nearly 3X more than a 3G connection (949 MB/month).

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
By 2022, a 5G connection will generate 22 GB/mo, nearly 3X more than a 4G connection (8.2 GB/month).

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
VNI Mobile Forecast Update, 2017–2022
Top Mobile Networking Trends

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7. Reviewing Tiered Pricing—Unlimited Data and Shared Plans

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global M2M Connections Growth
M2M Connections will grow 4-fold from 2017 to 2022

Billions of Connections

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022

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APAC M2M Connections Growth
M2M Connections will grow 4-fold from 2017 to 2022

31% CAGR
2017–2022

Billions of Connections

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Mobile M2M Connections Growth
North America has the highest growth rate (36%) from 2017 to 2022

32% CAGR
2017–2022

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Mobile M2M Traffic Growth

M2M traffic will grow 8-fold from 2017 to 2022.
Central & Eastern Europe will have the highest growth (10-fold)

52% CAGR 2017–2022

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
By 2022, **M2M modules** will be **31%** of total global mobile devices and connections and will account for **2% (1.7 EBs/month)** of mobile data traffic.

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
By 2022, M2M modules will be 27% of total Asia Pacific mobile devices and connections and will account for 2% (732 PBs/month) of mobile data traffic.

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Mobile M2M / IoT Growth by Vertical
By 2022, connected home largest, connected health fastest growth

32% CAGR
2017–2022

Billions of M2M Connections

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
APAC Mobile M2M / IoT Growth by Vertical

By 2022, connected home largest, connected work and mfg. & supply have fastest growth

31% CAGR 2017–2022

Billions of M2M Connections

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Connected Wearable Devices
Global connected wearables will grow 2-fold from 2017–2022; By 2022, nearly 10% of wearables will have embedded cellular connectivity

16% CAGR
2017–2022

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
APAC Connected Wearable Devices

APAC connected wearables will grow 2-fold from 2017–2022; By 2022, over 10% of wearables will have embedded cellular connectivity

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Regional Connected Wearables
North America will maintain the largest share

16% CAGR 2017–2022

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
By 2022, 10% of total wearables globally will have embedded cellular connectivity.

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
VNI Mobile Forecast Update, 2017–2022
Top Mobile Networking Trends

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5. Comparing Mobile Network Speed Improvements
6. Analyzing the Expanding Role and Coverage of Wi-Fi
7. Reviewing Tiered Pricing—Unlimited Data and Shared Plans

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
By 2022, mobile video will be 79% of mobile data traffic

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022

46% CAGR
2017–2022

Exabytes per Month

* Figures (n) refer to 2017 and 2022 mobile data traffic shares

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
APAC Mobile Data Traffic Growth / Apps
By 2022, mobile video will be 79% of mobile data traffic

49% CAGR
2017–2022

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Augmented and Virtual Reality Mobile Traffic

63% CAGR
2017–2022

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
By 2022, global mobile video traffic will be **79% (61 EBs/mo)** of the total mobile data traffic.

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
By 2022, Asia Pacific mobile video traffic will be 79% (34 EBs/mo) of the regional mobile data traffic.

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
VNI Mobile Forecast Update, 2017–2022
Top Mobile Networking Trends

1. Evolving Toward Smarter Multimedia Mobile Devices
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Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Average Cellular Speeds
Mobile/Cellular speeds will more than triple from 2017–2022

<table>
<thead>
<tr>
<th>Region</th>
<th>2017</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GLOBAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global</td>
<td>8.7</td>
<td>28.5</td>
</tr>
<tr>
<td><strong>BY REGION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>10.6</td>
<td>28.8</td>
</tr>
<tr>
<td>Latin America</td>
<td>4.9</td>
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<td>North America</td>
<td>16.3</td>
<td>42.0</td>
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<td>Western Europe</td>
<td>16.0</td>
<td>50.5</td>
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<td>Central and Eastern Europe</td>
<td>10.1</td>
<td>26.2</td>
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<tr>
<td>Middle East &amp; Africa</td>
<td>4.4</td>
<td>15.3</td>
</tr>
</tbody>
</table>

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Average Wi-Fi Speeds
Wi-Fi speeds will more than double from 2017–2022

<table>
<thead>
<tr>
<th>Region</th>
<th>2017</th>
<th>2022</th>
</tr>
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<tbody>
<tr>
<td><strong>GLOBAL</strong></td>
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<td>Global</td>
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<td>26.7</td>
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<td>Latin America</td>
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<td>Central and Eastern Europe</td>
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<td>32.8</td>
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<tr>
<td>Middle East &amp; Africa</td>
<td>6.2</td>
<td>11.2</td>
</tr>
</tbody>
</table>

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Mobile Average Speeds by Device Type

Tablet mobile speeds will be twice as fast as the average mobile speed by 2022.

Smartphone mobile speeds will be faster than average by 2022 (due to 5G).

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Asia Pacific Mobile Average Speeds by Device Type

Tablet mobile speeds nearly twice as fast as the average mobile speed by 2022

Smartphone mobile speeds will be faster than average by 2022 (due to 5G)

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Mobile Average Speeds by Network Type

- 5G speeds will reach 170 Mbps by 2022
- 4G speeds will be 1.5X higher than average by 2022

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Asia Pacific Mobile Average Speeds by Network Type

5G speeds will reach 180 Mbps by 2022
4G speeds will be 1.6X higher than average by 2022

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Globally, South Korea will have the highest 5G speeds by 2022 of 337 Mbps. *

* Based on 24 VNI countries
Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Mobile Speeds and Technology Evolution

New technology generations occur around every decade with more capabilities.

Launch:
- 1G (14.4 Kbps) 1980
- 2G (300 Kbps) 1990
- 3G (42 Mbps) 2000
- 4G (100+ Mbps) 2010
- 5G (>1 Gbps) 2020

Mobile Broadband:
- 10 years

Emails, Low-Res Video:
- 9 years

Texting:
- 10 years

Voice calls:
- Analog 9 years

Today:
- IoT
- Smart Cities
- Connected Car
- Telemedicine
- VR/AR
- AI/ML
- Cloud Gaming

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
VNI Mobile Forecast Update, 2017–2022
Top Mobile Networking Trends

1. Evolving Toward Smarter Multimedia Mobile Devices
3. Measuring Mobile IoT Adoption—M2M and Emerging Wearables
4. Identifying New Mobile Applications and Requirements
5. Comparing Mobile Network Speed Improvements
6. Analyzing the Expanding Role and Coverage of Wi-Fi
7. Reviewing Tiered Pricing—Unlimited Data and Shared Plans

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global IP Traffic by Local Access Technology
By 2022, 48% of total IP traffic will be driven by mobile*

By 2022, 48% of total IP traffic will be driven by mobile*

* Mobile driven traffic includes mobile/cellular traffic and Wi-Fi offload from mobile

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Asia Pacific IP Traffic by Local Access Technology
By 2022, 77% of total IP traffic will be driven by mobile*

32% CAGR
2017–2022

Exabytes per Month

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Mobile Data Traffic Offload to Wi-Fi*

59% of mobile traffic will be offloaded by 2022
54% of mobile traffic was offloaded in 2017

50% CAGR
2017–2022

Exabytes per Month

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022

*Offload includes traffic from dual-mode devices (i.e., supports cell & Wi-Fi, excl. PCs) over Wi-Fi/small cell networks
Asia Pacific Mobile Data Traffic Offload to Wi-Fi*

59% of mobile traffic will be offloaded by 2022
54% of mobile traffic was offloaded in 2017

53% CAGR 2017–2022

Exabytes per Month

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022

*Offload includes traffic from dual-mode devices (i.e., supports cell & Wi-Fi, excl. PCs) over Wi-Fi/small cell networks
Global Mobile Data Traffic and Offload Traffic, 2022

4G and 5G devices offload more traffic than 3G and 2G

Mobile and Offload Traffic from Mobile-Connected Devices

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022

*Offload includes traffic from dual-mode devices (i.e., supports cell & Wi-Fi, excl. PCs) over Wi-Fi/small cell networks.
By 2022, the amount of mobile traffic offloaded to Wi-Fi networks will reach 59% (111 EBs/mo).

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
# Global Wi-Fi Hotspot Coverage and Availability

<table>
<thead>
<tr>
<th>Existing</th>
<th>Growth</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pay-as-you-go</td>
<td>• Cellular offload (carrier driven)</td>
<td>• Wi-Fi Capacity trading</td>
</tr>
<tr>
<td>• Free access promoting other services (Retail free Wi-Fi)</td>
<td>• Community Wi-Fi/ homespots</td>
<td>• Transaction platform</td>
</tr>
<tr>
<td>• Managed services (venues and outdoor)</td>
<td>• Carrier-grade VoWiFi</td>
<td>• Internet of things</td>
</tr>
<tr>
<td>• Cellular offload (user promoted)</td>
<td>• TV everywhere</td>
<td>• Context awareness</td>
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<tr>
<td>• Added value for broadband subscription</td>
<td>• Large events</td>
<td>• HetNet Wi-Fi + mobile</td>
</tr>
<tr>
<td>• Advertising &amp; sponsorship</td>
<td>• Big data analytics</td>
<td>• Connected car (in-car Wi-Fi)</td>
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<td></td>
<td>• Public transportation Wi-Fi</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Public WLAN + Community Hotspots</th>
<th>2017</th>
<th>2022</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>124 M</td>
<td>549 M</td>
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</table>

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Global Public Wi-Fi Hotspots
Asia Pacific leads with 261 million (47%) hotspots by 2022

35% CAGR
2017–2022

Millions of Hotspots

2017 2018 2019 2020 2021 2022
124
23% 549 45% 4% 9% 17% 23% 549 57% 26% 17% 17% 26% 9%

* Middle East and Africa represents 1% of global public Wi-Fi hotspots by 2022

Source: Maravedis, Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
By 2022, China will have 34% of global hotspots, the most number of hotspots (185 million) in the world.

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
VNI Mobile Forecast Update, 2017–2022
Top Mobile Networking Trends

1. Evolving Toward Smarter Multimedia Mobile Devices
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7. Reviewing Tiered Pricing—Unlimited Data and Shared Plans

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Top Mobile User Profiles
Top 1% of mobile users generated 6% of mobile traffic in August 2018

* Study based on North American Tier 1 and Tier 2 operators
Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Top Mobile User Profiles
Top 20% users consume majority (62%) of monthly traffic

* Study based on North American Tier 1 and Tier 2 operators
Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Top Mobile User Profiles
Top 20% users consume nearly 33 gigabytes per month*

* Study based on North American Tier 1 and Tier 2 operators
Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Top Mobile User Profiles
31% of mobile users consume 10 GB per month
77% of mobile users consume over 2 GB per month *

* Study based on North American Tier 1 and Tier 2 operators
Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Unlimited Plans Outnumber Tiered/Data Caps Plans

Unlimited plans continue to lead in data consumption, 4-fold higher *

* Study based on to North American Tier 1 and Tier 2 operators
Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Data Consumption by Number of Lines per Plan/Subscription*

Average mobile data consumption per line consistent whether on shared or individual plan

* Study based on North American Tier 1 and Tier 2 operators

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Mobile Shared Data Plans Average Data Usage
Number of mobile shared data plans now a majority (76%)

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</thead>
<tbody>
<tr>
<td>Gigabytes per month</td>
<td>7.5</td>
<td>7.5</td>
<td>8.2</td>
<td>8.9</td>
<td>9.3</td>
<td>9.8</td>
<td>10.5</td>
<td>11.2</td>
<td>12.9</td>
</tr>
<tr>
<td>Number of Lines per Plan</td>
<td>5.9</td>
<td>5.9</td>
<td>6.4</td>
<td>7.1</td>
<td>7.7</td>
<td>8.7</td>
<td>8.7</td>
<td>8.0</td>
<td>9.8</td>
</tr>
</tbody>
</table>

* Study based on North American Tier 1 and Tier 2 operators
Source: Cisco VNI Global Mobile Data Traffic Forecast, 2017–2022
Conclusion
Cisco VNI Mobile Forecast: 2017–2022
Use our tools & resources @ www.cisco.com/go/vni

Mobile Visual Networking Index (VNI) Forecast

In February 2019, we released the Cisco Mobile VNI Forecast, 2017–2022. Highlights from the updated study include the following projections for 2022:

5.7B Global mobile users
White paper: Mobile VNI Forecast and Trends, 2017–2022

12.3B Mobile-ready devices and connections
Infographic: Mobile VNI Forecast, 2017–2022

930 EB Annual run rate of mobile data traffic (in exabytes / EB)
Online: Mobile VNI Highlights Tool

Submit questions/comments via our public VNI community page: