NEWS RELEASE

Cisco Global Cloud Index Projects Cloud Traffic to Quadruple by 2019

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Personal Cloud Storage, Public Cloud Services, Denser Private Cloud Workloads and Internet of Everything Among Key Drivers of Rapid Cloud Growth Worldwide

SAN JOSE, CA -- (Marketwired) -- 10/28/15 -- Cisco (NASDAQ: CSCO) -- The fifth annual Cisco® Global Cloud Index (2014-2019), released today, forecasts that global cloud traffic will more than quadruple by the end of 2019, from 2.1 to 8.6 zettabytes (ZB), outpacing the growth of total global data center traffic, which is forecast to triple during the same time frame (from 3.4 to 10.4 ZB). Several factors are driving cloud traffic's accelerating growth and the transition to cloud services, including the personal cloud demands of an increasing number of mobile devices; the rapid growth in popularity of public cloud services for business, and the increased degree of virtualization in private clouds which is increasing the density of those workloads. The growth of machine-to-machine (M2M) connections also has the potential to drive more cloud traffic in the future.

"The Global Cloud Index highlights the fact that cloud is moving well beyond a regional trend to becoming a mainstream solution globally, with cloud traffic expected to grow more than 30 percent in every worldwide region over the next five years," said Doug Webster, vice president of service provider marketing, Cisco. "Enterprise and government organizations are moving from test cloud environments to trusting clouds with their mission-critical workloads. At the same time, consumers continue to expect on-demand, anytime access to their content and services nearly everywhere. This creates a tremendous opportunity for cloud operators, which will play an increasingly relevant role in the communications industry ecosystem."

In addition to the rapid growth of cloud traffic, Cisco predicts that the Internet of Everything (IoE) -- the connection of people, processes, data and things -- could have a significant impact on data center and cloud traffic growth. A broad range of IoE applications are generating large volumes of data that could reach 507.5 ZB per year (42.3 ZB per month) by 2019. That's 49 times greater than the projected data center traffic for 2019 (10.4 ZB). Today, only a small portion of this content is stored in data centers, but that could change as the application demand and uses of big data analytics evolves (i.e., analyzing collected data to make tactical and strategic decisions).

Today, 73 percent of data stored on client devices resides on PCs. By 2019, the majority of stored data (51 percent) will move to non-PC devices (e.g., smartphones, tablets, M2M modules, et al.). With the volume of stored data increasing, Cisco predicts a greater demand and use for consumer cloud storage. By 2019, 55 percent of the residential Internet population will use personal cloud storage (up from 42 percent in 2014). As an example, the forecast estimates that by 2017, global smartphone traffic (201 EB per year) will exceed the amount of data stored (179 EB per year) on those devices -- necessitating the need for greater storage capabilities via the cloud.

Global Cloud Index Forecasted Highlights and Projections with Unit Measurement:

Global Data Center and Cloud Traffic

- Cloud traffic, a subset of data center traffic, is generated by cloud services accessible through the Internet from scalable, virtualized cloud data centers, whereas total data center traffic is comprised of all traffic traversing within and between data centers as well as to end users.
- Annual global data center IP traffic is projected to reach 10.4 ZB by the end of 2019, up from 3.4 ZB per year in 2014.
- Annual global cloud traffic is projected to quadruple, reaching 8.6 ZB (719 EB per month) by the end of 2019, up from 2.1 ZB per year (176 EB per month) in 2014, and is expected to account for more than four-fifths (83 percent) of total data center traffic by 2019.
- New technologies such as SDN and NFV are expected to streamline data center traffic flows such that the traffic volumes reaching the highest tier (core) of the data center may fall below 10.4 ZB per year and lower data center tiers could carry over 40 ZB of traffic per year.
- By region, North America will have the highest cloud traffic volume (3.6 ZB) by 2019; followed by Asia Pacific (2.3 ZB) and Western Europe (1.5 ZB).
- By region, North America will also have the highest data center traffic volume (4.5 ZB) by 2019; followed by Asia Pacific (2.7 ZB) and Western Europe (1.8 ZB).

To help put things in perspective, 10.4 ZB is equivalent to:

- ***144 trillion hours of streaming music***
  - *Equivalent to about 26 months of continuous music streaming for the world's population* in 2019*
- ***26 trillion hours of business web conferencing with a webcam***
  - *Equivalent to about 21 hours of daily web conferencing for the world's workforce in 2019*
- ***6.8 trillion hours of high-definition (HD) movies viewed online***
  - *Equivalent to about 2.4 hours of daily streamed HD movies for the world's population in 2019*
- ***1.2 trillion hours of ultra-high definition (UHD) video streaming***
  - *Equivalent to about 25 minutes of daily streamed UHD video for the world's population in 2019*
  - *Equivalent to about 1.4 hours of daily streamed UHD video per household in 2019 (2.2 billion WW households by 2019)*

** The world's projected population by 2019 will be 7.6 billion people (source: United Nations)*

Consumer Cloud Storage

- By 2019, 55 percent (more than 2 billion users) of the consumer Internet population will use personal cloud storage, up from 42 percent (1.1 billion users) in 2014.
- Globally, consumer cloud storage traffic per user will be 1.6 gigabytes per month by 2019, compared to 992 megabytes per month in 2014.
- In 2014, 73 percent of data stored on client devices resided on PCs. By 2019, the majority of

stored data (51 percent) will move to non-PC devices (e.g., smartphones, tablets, M2M modules, et al.).
- As the volume of stored data increases, Cisco predicts a greater demand for consumer cloud storage. For example, the forecast estimates that by 2017, global smartphone traffic (201 EB per year) will exceed the amount of data stored (179 EB per year) on those devices -- necessitating the need for greater storage capabilities via the cloud.

Data center virtualization

- Overall data center workloads will more than double from 2014 to 2019; however, cloud workloads will more than triple over the same period.
- The workload density (that is, workloads per physical server) for cloud data centers was 5.1 in 2014 and will grow to 8.4 by 2019. Comparatively, for traditional data centers, workload density was 2.0 in 2014 and will grow to 3.2 by 2019.

IoE-Generated Data

- Globally, the data created by IoE connections will reach 507.5 zettabytes per year (42.3 zettabytes per month) by 2019, up from 134.5 zettabytes per year (11.2 ZB per month) in 2014.
- A smart city of 1 million will generate 180 million gigabytes of data per day by 2019.

Private vs. Public Cloud Growth
Public cloud, in which services are rendered over a network that is open for public use, is growing faster than private cloud, which includes cloud infrastructure operated for a single organization, in terms of workloads. However, throughout the five-year forecast, private cloud will continue to outpace public cloud in its degree of virtualization. With businesses increasingly assessing the cost associated with IT dedicated resources and demanding for more agility, public cloud adoption will rise. The Cisco Cloud Index projects:

- Public cloud workloads are going to grow at a 44-percent Compound Annual Growth Rate (CAGR) from 2014 to 2019 and private cloud workloads will grow at a slower pace (16-percent CAGR) from 2014 to 2019.
- By 2019, 56 percent of the cloud workloads will be in public cloud data centers, up from 30 percent in 2014. (CAGR of 44 percent from 2014 to 2019.)
- By 2019, 44 percent of the cloud workloads will be in private cloud data centers, down from 70 percent in 2014. (CAGR of 16 percent from 2014 to 2019.)

Global Cloud Workloads
SaaS will be the most popular and adopted service model for public and private cloud workloads, respectively, by 2019.

- By 2019, 59 percent of the total cloud workloads will be Software-as-a-Service (SaaS) workloads, up from 45 percent in 2014.
- By 2019, 30 percent of the total cloud workloads will be Infrastructure-as-a-Service (IaaS) workloads, down from 42 percent in 2014.
- By 2019, 11 percent of the total cloud workloads will be Platform-as-a-Service (PaaS) workloads, down from 13 percent in 2014.

Global Cloud Readiness
To assess cloud readiness, Cisco analyzes the average and median upload/download speeds and latencies of fixed and mobile networks for more than 150 countries.

- This year, 81 countries met the single advanced application readiness criteria for mobile networks; a significant increase from last year's 21 countries.

- This year, 119 countries, met the single advanced application criteria for fixed networks; up from 109 countries last year.
- Basic Cloud Application Requirements: Download Speed up to 750 kbps; Upload Speed up to 250 kbps; Latency above 160 ms.
- Intermediate Cloud Application Requirements:
  Download Speed: 751-2,500 kbps; Upload Speed: 251-1,000 kbps; Latency: 159-100 ms.
- Advanced Cloud Applications Requirements:
  Download Speed: > 2,500 kbps; Upload Speed: Higher than 1,000 kbps; Latency: < 100 ms.

Index Overview:

- The Cisco® Global Cloud Index (2014-2019) was developed to estimate global data center and cloud-based traffic growth and trends. The report serves as a complementary resource to existing Internet Protocol (IP) network traffic studies such as the Cisco Visual Networking Index™, providing new insights and visibility into emerging trends affecting data centers and cloud architectures. The forecast becomes increasingly important as the network and data center become more intrinsically linked in offering cloud services.
- The Global Cloud Index is generated by modeling and analysis of various primary and secondary sources (complete methodology details are provided in the report). The forecast also includes a supplement on Cloud Readiness Regional Details, which examines the fixed and mobile network abilities of each global region (from more than 150 countries) to support business and consumer cloud-computing applications and services.

Embedded Infographic:

- View our infographic: Growth in the Cloud.

Supporting Resources:

- Visit the Cisco Global Cloud Index webpage.
- Read the Cisco Global Cloud Index, Forecast and Methodology, 2014-2019 White Paper.
- Explore the Cisco Global Cloud Index Highlights Tool.
- Explore the Cisco Cloud Readiness Tool.
- Review the Cisco Global Cloud Index Supplement: Cloud Readiness Regional Details.
- Get your questions answered through the Cisco Global Cloud Index Q&A.
- Register to view the webcast.
- Forecast your specific market in cloud, mobile or video services with Cisco's Monetization and Optimization Index (MOI).
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Tags/Keywords:

- Cisco, Global Cloud Index, Data Center Traffic, Cloud Traffic, Cloud, Cloud Computing, Data Center, Virtualization, Service Provider, Telecom, Enterprise, Consumer, Zettabytes

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