

## Talking Tech with Cisco



### Fog Computing 101: A Quick Look at Life Out on the Edge

Posted by [Gary Pfitzer](#) in [Talking Tech with Cisco](#) on Nov 26, 2016 1:00:46 AM

So, by now, you've probably got a handle on cloud computing, and cloud's benefits of being able to access and run applications and programs through the Internet: higher compute power, increased operational agility and scalability, improved manageability, and less time and money spent on IT infrastructure.

But what about "fog computing"? It's actually a term often associated with Cisco. What is it and what are its benefits?

A good way to understand fog computing is to think about what fog is in the physical world: a type of cloud, if you will, but one that is closer to the ground. Similarly, in the world of computing, the fog brings the benefits of cloud closer to the data source.

Fog computing is also called edge computing because, in allowing data to be processed as close to its source as possible, it extends computing out to the periphery of the network, or its edge.

## The Fog: Deeply Permeating the Internet of Things

It is the vast outpouring of data generated by the Internet of Things (IoT) that has hastened the growth of fog computing. A Cisco white paper, "Fog Computing and the Internet of Things: Extend the Cloud to Where the Things Are," puts it this way: "Today's cloud models are not designed for the volume, variety, and velocity of data that the IoT generates. Billions of previously unconnected devices are generating more than two exabytes of data each day. ... Moving all data from these things to the cloud for analysis would require vast amounts of bandwidth."

And so, with the fog, processing can take place right at the devices, or fog nodes, close to where the data is being collected. These nodes can be industrial controllers, switches, routers, embedded servers, or video surveillance cameras.

The big advantage here is being able to analyze time-sensitive data much more quickly at the network's edge and thus respond more rapidly to events. Big beneficiaries of this sped-up data analysis are industries such as manufacturing, oil and gas, utilities, transportation, mining, and the public sector. Think vehicles, ships, factory floors, roadways, or railways, where thousands or millions of things might be generating data and it is necessary to analyze and act upon that data in less than a second.

It is in reduced latency where the fog, as compared to the traditional cloud, really comes to the rescue. Being able to analyze all of that IoT data out at the edge allows gigabytes of network traffic to be offloaded from the core network, while sensitive data can be kept inside the network. When the data can be triaged, latency is minimized and milliseconds are saved, and this can make the difference between avoiding disaster and a system failure.

## Seeing Clearly *in* the Fog

According to the Cisco white paper, here's how it works:

- Developers either port or write IoT applications for fog nodes at the network edge.
- The fog nodes closest to the network edge ingest the data from IoT devices, and the fog IoT application directs different types of data to the optimal place for analysis.
- The most time-sensitive data—that is, the data that requires a response time on the order of subseconds or milliseconds—is analyzed on the fog node closest to the things generating the data.
- Data that can wait seconds or minutes for action is passed along to an aggregation node for analysis and action.
- Data that is less time-sensitive is sent to the cloud for historical analysis, big-data analytics, and long-term storage.

The distributed, or decentralized, approach of fog computing, says the white paper, brings big benefits to business:

- **Greater agility:** Developers can create fog applications that program machines to operate in the precise way that a customer wants, deployed exactly where needed.
- **Better security:** Fog nodes can be protected with the same security and cybersecurity solutions in use in other parts of the IT environment.
- **Deeper insights:** You can analyze sensitive data locally instead of sending it to the cloud for analysis.
- **Lower operating expenses:** When you process data locally, rather than send it to the cloud, you conserve network bandwidth.

Now that you have this primer on fog computing, dig a bit deeper into the Cisco white paper, "[Fog Computing and the Internet of Things: Extend the Cloud to Where the Things Are](#)." It's only five or six pages, and builds easily on the concepts introduced here.

Let us know in the comments below whether fog computing has arrived at your place of employment and what type of business you are using it for. And, if the industrial space that can reap the benefits of fog computing intrigues you, check out our [CCNA Industrial certification](#) or our [Cisco Industrial Network Specialist certification](#).



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