

PLANNING FOR THE
FUTURE OF TODAY'S
STRAINED NETWORK

CTOS AND CNOS:
ANSWERING
THE CALL

THE THREE
COMPONENTS
OF A LIVING NETWORK

CONSULTING
AND
COLLABORATION

WIRED

BRAND LAB



What is a living network?

IBM EXPLORES A NETWORK THAT CAN THINK FOR ITSELF

PLANNING FOR THE FUTURE OF TODAY'S STRAINED NETWORK

Each time our brain processes a piece of information, it takes a number of neurons linked together to make the understanding of the information possible. This network of neurons carrying information is not unlike the internet: the neurons transmit information from one place to another until, ultimately, the information is delivered cohesively and seamlessly. The only difference is our brains have a set number of neurons that transmit information in a controlled manner. In short, the road that these neurons travel never gets congested.

The internet, however, is filled with digital neurons (read: data) that continue to increase every day at the hands of innovation. Because of this, congestion abounds in the delivery of information across the network.

“The web holds about a trillion pages. The human brain holds about a hundred billion neurons. Each biological neuron sprouts synaptic links to thousands of other neurons, while each web page on average links to 60 other pages,” explains futurist Kevin Kelly in his book *What Technology Wants*. “That adds up to a trillion ‘synapses’ between the static pages on the web. The human brain has about 100 times that number of links—but brains are not doubling in size every few years. The global machine is.”

And double it will (and then some): global internet traffic is growing by 22 percent each year, and is predicted to double by 2020. Further, IP traffic will triple by 2022. Much of that increase will come from mobile data traffic, which is projected to grow 45 percent annually until 2022. The simple reality is this: with the growth of trends like 4k video, the Internet of Things and big data in the enterprise, the network of today is getting clogged—making it more difficult for digital neurons to communicate at a speed users have come to expect and rely upon.





CTOS AND CNOS: ANSWERING THE CALL

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KEVIN KELLY
COFOUNDER, SENIOR
MAVERICK AT WIRED

With demands on the network growing so profoundly, how can a CTO or CNO respond? While one solution has been to build more pathways via bandwidth to solve for the growing number of digital neurons, this is merely a short-term solution.

“It currently takes longer to build infrastructure than it does to come up with applications to use up all that bandwidth,” says futurist Adrian Hon.

Many of the largest media companies have launched their own streaming services to compete with OTT streaming incumbents. One of the largest global media and entertainment companies recently announced it will pull all of its original content from other streaming providers and consolidate it onto its own streaming platform. The same company also plans to expand its reach by providing live sports streaming via their own leading sports network on the new platform as well.

Meanwhile, as traditional electronics like tablets and smartphones become increasingly connected, an entirely new class of devices is joining the network, including everything from connected solar panels to connected refrigerators. Cars are another major addition to this connected wave: In August 2017, top tech, telecom and automotive companies teamed up to form a consortium dedicated to gathering data from connected cars and building and leveraging that data to support better maps, driving assistance and other benefits for consumers.

Already, the rapid growth of all this data is outpacing the existing pathways—and will continue to do so as the network grows. While most current frameworks do have some bandwidth to spare, backfilling infrastructure is as time-consuming, as expensive and as labor-intensive as building new roads—requiring the weigh-in of engineers, physicists, and efficiency and regulatory experts. To avoid the cost, some large telecom companies are finding ways to cut corners: at the expense of customers. One of the nation’s top cellphone carriers announced it would begin throttling video streams to lower resolutions—despite promising otherwise during the initial rollout of its unlimited data plan in February of 2017.

But other, more affordable solutions do exist. Some CTOs and CNOs are turning to virtualization—the reactive ability to increase data access while tempering some of the costs associated with legacy hardware—as a way to cope with the massive strain on the network, but this solution is merely a starting point. Virtualization is just one piece of a broader approach needed to meet the ever-increasing user demands for bandwidth, reliability and scale.

This growing demand for connectivity requires a new type of network: one conceived and built by the CTO or CNO that is not static and inert, but, instead, learns, adapts and improves over time. That is a living network.

A living network isn't hype or buzz. It's not something that comes in a box, nor does it require laying cable or connecting routers. A living network is born from a combination of virtualization via the cloud, cognitive AI and collaboration with industry experts.

Living networks can keep pace with the rapidly growing number of connections. It can handle the ever-increasing demand for storage capacity and computing power. And, with cognitive and machine learning capabilities, a living network has the potential to optimize the running of the network itself.

In other words, a living network is responsive. It can adjust and thrive. It is the network of the future.

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ADRIAN HON
TECHNOLOGY WRITER

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THE THREE COMPONENTS OF A LIVING NETWORK

A recent report from Pew Research Center found that the median U.S. household contains 5 connected devices—representing the numerous data streams quietly running our day-to-day. What's more, as emerging technologies like AR and VR become mainstream, the strain on the network will only increase. Professional basketball teams, for example, are now offering fans a courtside seat via a partnership with a VR provider. As more sports organizations and media companies alike look to technology enhance the viewing experience for fans, the challenge of maintaining a seamless experience for the user grows. Virtualization via the cloud is key to meeting these demands on the network.



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VIRTUALIZATION

Virtualization offers a new kind of network: one that aims to be limitless. Virtualization in the cloud and software defined networking can vastly expand a network's agility and capacity: less buffering gives users freedom to stream their favorite shows, chat with loved ones or even have another endless conference call—all with mere millisecond lag and consistent clarity. And virtual infrastructure allows networks to nearly eliminate buffering (which leads to happier users) while removing bandwidth limitations, with agility across the network.

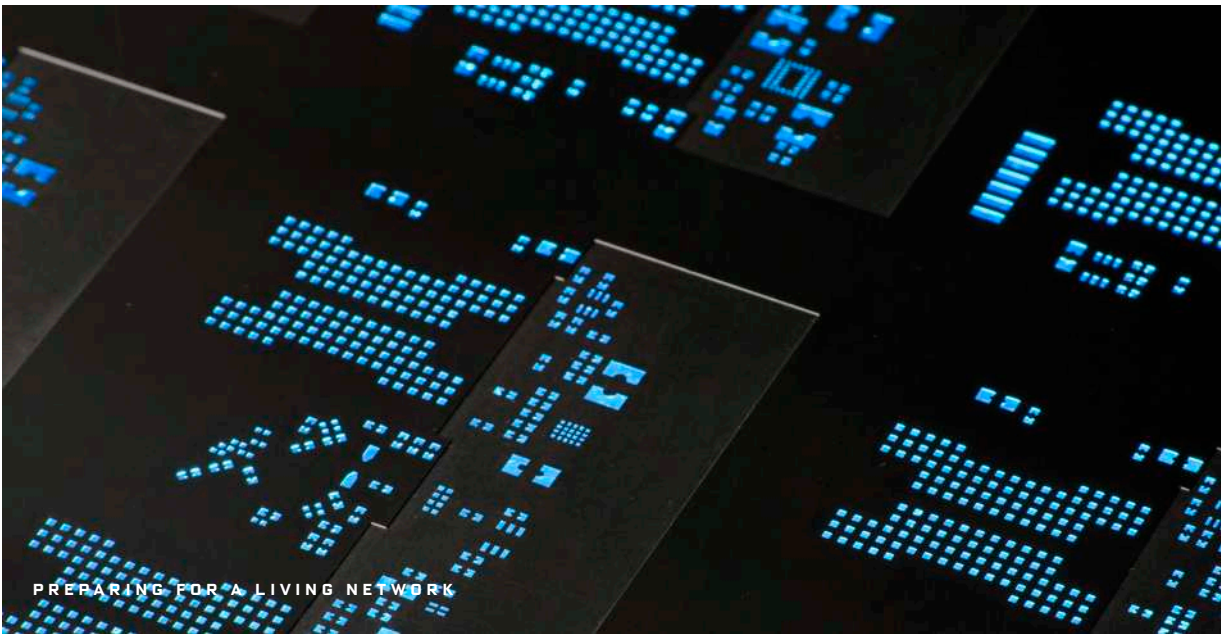
COGNITIVE SOLUTIONS

Personalization on the network has become an expectation. According to a study from Forrester, 77 percent of consumers have either recommended or paid more for a service that provides personalized experiences. Right now, personalization comes by way of streaming video recommendations or reminders to buy more paper towels. According to one of the top streaming services, recommendations drive 75 percent of viewing activity—and have lead to the company's increased efforts to hone their personalization engine. By leveraging cognitive solutions like AI, personalization and customer service can keep up with the growing expectations of consumers.

Cognitive solutions allow a living network to be smarter by sharing information about user habits and predicting their needs to create efficiency. With the potential to offer solutions through traffic modeling, bandwidth throttling, analytics and personalization, cognitive operations can teach the current network how to leverage the data it is moving. As the network of connected devices continues to grow, so too will the network of data points these solutions draw from: providing even better experiences and producing even happier customers.

“WE’RE ENGINEERING AND DESIGNING FOR ANOTHER 10X GROWTH IN VOLUME ACROSS THE NETWORK. IN FACT, VIDEO TRAFFIC GREW OVER 75% AND SMARTPHONES DROVE ALMOST 75% OF OUR DATA TRAFFIC IN 2016 ALONE. WE EXPECT VIDEO TRAFFIC TO CONTINUE BEING A MAJOR DRIVER OF GROWTH.”

SAL LIPARI
SENIOR VICE PRESIDENT,
AT&T INTEGRATOR SOLUTIONS



CONSULTING AND COLLABORATION

With access to a living network, CTOs and CNOs will have the freedom to innovate and iterate without the limitations they wrestled with before—something that's paramount to survival in today's business climate.

Since 2000, the names of more than half of all Fortune 500 companies have disappeared. Perhaps more sobering, according to a report from the World Economic Forum, "we are only at the beginning." That brings us to today's burning question: How to stave off disruption?

With the right team of industry, process and IT experts, companies can build off of the momentum and freedom of a living network to apply both breakthrough thinking and breakthrough technology to their offerings. By anticipating changing expectations and adapting accordingly with the help of experienced industry professionals, companies can evolve alongside customers—establishing



a trustworthy and reliable reputation even as the market fluctuates and new technologies emerge.

True transformation is an ongoing process. Yes, there is the need for a quality network, but the CTO's and CNO's real victory goes beyond this: towards a living network. A network that can continuously evolve and can be leveraged for new customer uses and experiences at every turn.



LEARN MORE ABOUT THE SOLUTIONS THAT CAN HELP YOU ENABLE YOUR OWN LIVING NETWORK.

DID YOU KNOW?

49%

of all videos watched get paused by buffering.

870%

Increase in mobile video over the next five years.

300%

Increase in connected devices by 2020.

1/5

of all videos watched get paused by buffering.

10x

Growth of digital universe from 2015 to 2020. From 4.4 zettabytes to 44 zettabytes.

6.2 BILLION

Estimated number of smartphones globally by 2021.

