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AI for Converged Networks

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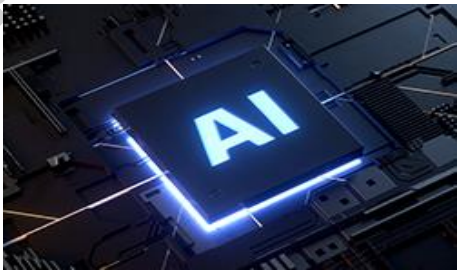

Demand on enterprise IT has experienced the kind of growth that would put any hockey stick graph to shame. This is because enterprise business is getting more complex and to keep business humming, they count on their IT resources to leverage technology at every available opportunity. Today, we have arrived at the point where IT is expected to not just support but to *drive* business value from their enterprise networks.

It is also true that for any enterprise, however, IT is still a support function at its core. For a widget-making enterprise, IT *helps* the company make a widget better, faster, cheaper. IT will never become a core function of making the actual widget, even if its support enables those core functions to perform more efficiently. This is all well and good, except that enterprises are also forced to make IT "leaner" even as they rely more heavily on their support to continue making those widgets better, faster, cheaper.

For the record, *lean* IT does not mean *weak* IT. Lean IT just means IT is expected to become smarter, such that a smaller IT footprint is still able to handle more. At this point, you may notice that the equation between IT resources and expectations doesn't seem to add up—or if it does, it's due to the intervention of an unseen influence not yet accounted for. This extra element that brings balance is AI—artificial intelligence.

To understand how AI brings demands and resources into balance, consider walking a mile in the shoes of an IT staffer. For the sake of conversation, let's limit our discussion to IT's role in managing multiple access networks. Lastly, let's put it into the context of an individual IT employee—a dedicated employee we'll call "Person X."

X's job is to keep the enterprise's wired and wireless networks running smoothly; it involves many different tasks to satisfy many different priorities, such as supporting the increasingly lofty expectations of end users, especially as new devices and applications proliferate to deliver value to line of business stakeholders. Person X, like most network administrators, uses numerous tools, consoles, and management systems to control and troubleshoot the network. There's nothing wrong with this approach—as long as X can keep up with it all.

Now consider for a moment: if you are Person X, *can* you keep up? If you aren't an IT professional, then ask your favorite IT person if they are generally able to keep up. You or your friend will likely conclude that, like X, the relentless demands are complicating a once-clear IT mission.

At the crack of dawn, X comes into the office and immediately starts reviewing the previous night's network activities. X and their IT team spend the next three hours playing detective. Using multiple systems and multiple monitors, they review logs, warnings, and alarms to search for any service-affecting incidents and determine the health of the network.

Once incidents have been identified, X depends on one bright person—let's call this individual Person Y, the star performer in their team—to prioritize these incidents based on importance and urgency. You probably see where this dependency is leading; the entire system relies on the presence, judgement, and dedication of Person Y. Suppose Y was hit by the proverbial bus or train? Or, more likely, what if Y decides to leave the team—or leave the enterprise entirely? What if Y just has a really bad day when the network is least able to sustain a lapse in judgment? Even without the bus and train scenarios, we've all seen the others play out—and when they do, the entire enterprise suffers.

With AI, this vulnerable link is removed from the chain and the process looks quite different. AI would not only identify incidents that are both important and urgent, but would also auto-prioritize and schedule every day with the same consistency. In other words, AI would display to X (and the team) which are the priority 1 incidents (P1), the priority 2 incidents (P2), and so on and so forth. Would you call this an IT game changer? It would be hard to describe it any other way.

Measuring the impact of AI is necessary to calculate its value to the IT organization. One key metric to evaluate is MTTI (mean time to identify an incident). With AI in the equation, MTTI goes down noticeably. With AI, IT saves precious subject matter expert (SME) time that otherwise would have been expended on identifying and prioritizing incidents.

Once prioritized, Person X would distribute those incidents among smaller teams of IT people based on their skills for them to perform root cause analysis (RCA) on those incidents and fix them—ideally before they become service-affecting. RCA is a fancy term for the process of finding out what caused the incident so that corrective action can be taken.

Once again, we have hit a point of process vulnerability that is heavily human-dependent; RCA is only as effective as the people who perform it. With AI, the variables are removed from the equation. A well-trained AI engine can serve up RCAwith speed and precision that are second to none. There are real-world benefits associated with this, such as reducing the amount of time your SME IT spends on RCA. Going back once more to Person X's day, we find that the final act in this sequence is IT fixing the incident (again, before it becomes service-affecting). With AI in the mix, these teams have guidance taking them through the necessary steps to fix it, rather than just doing it manually. This brings us to another key metric of AI efficacy in the IT sphere, and that's MTTR (mean time to resolve/resolution). As with MTTI, the inclusion of AI in the chain drives down MTTR almost by definition.

Now, let us focus on something that is on the mind of every IT person–including Person X, but somehow never seems to get done—and that is optimizing a network that's already working. The reality is that IT is reluctant to tinker with a functioning network because of the risk of introducing new problems. Because of this reluctance, IT gives up opportunities to make their networks better; but here again, AI changes the equation to the benefit of the enterprise.

AI can perform 24x7x365 CT scans of the entire network, constantly monitoring its configuration and analyzing network data to find opportunities to make your network more efficient and performant. What if AI provided Person X with insightful options to optimize the network by offering details on

what changes are possible, the estimated benefits these changes would deliver and even offer a one-click option to implement that change. I can easily believe that Person X would eagerly take advantage of such guidance.

Lastly, let us consider AI's role in core Wi-Fi. To do so, we need to understand radio resource management (RRM). RRM is responsible for efficiently allocating and managing radio resources in Wi-Fi networks. It is crucial for optimizing network performance and ensuring that end users receive consistent quality of service (QoS). Traditional RRM methods have their own challenges, however; among these are interference, channel congestion, inability to handle dynamic environments, lack of coordination, load balancing among neighboring Wi-Fi access points, and others. Traditional, non-AI RRM solutions base their decisions on fixed thresholds and rules that can't always account for changing network conditions degrading performance and increasing operational costs.

To illustrate these limitations, let us take a look at one example. In 2.4 GHz Wi-Fi, there are only three channels that have non-overlapping frequency space. You do not have to be a professional wireless engineer to get your channel planning right when you're only working with three channels.

Now, if we look at 6 GHz Wi-Fi, that all changes. With channels that are 59 at 20 MHz wide, and with six channel width options, it's soon obvious that manual optimization of channel and channel width parameters necessary for a finely tuned Wi-Fi network become ridiculously complicated, even for the most experienced wireless engineers.

Once again, AI rebalances the equation. AI-driven cloud RRM technology would combine the power of AI and cloud computing to optimize the allocation and management of radio resources in advanced wireless communication networks. It would leverage machine learning (ML) algorithms to analyze vast amounts of data and make informed decisions on how to allocate radio resources, increase capacity, and reduce interference. Its cloud-based infrastructure would be scalable, resilient, and cost-effective.

In spite of this, one should note that AI doesn't eliminate the valuable work of human intuition. Person X and the team have a great many years' experience and may want to test a hunch about the effect of a particular network change. Testing these hunches involves risk that seasoned professionals are reluctant to take on, and potentially important improvements go undiscovered for fear of the sudden wrath of an overwhelmed help desk. Even here, AI can support the network by monitoring and analyzing IT hardware and software changes, along with their impact on network KPIs.

Multi-access converged networks also require Person X and team to manage and monitor network health on a variety of different panels and dashboards, with each one providing just a part of the larger picture of their wired and wireless networks. In the best-case scenario, they may have a unified management console, but even this cannot compare to what's possible from AI management; it has the capacity to integrate all information into a single interface that can use simple English. Person X can simply ask it, "How is the network today?" or "What are the top applications?" or even, "Is my network meeting expectations?" AI tools can not only reply in straightforward terms, but also guide Person X to the correct menus to perform actions, rather than requiring them to hunt them down.

In summary, AI's growing role in managing converged enterprise networks brings intelligence and automation to network operations, leading to improved reliability and scalability. It provides relief for overtaxed IT resources and extra reliability for enterprise networks. It can even unlock the full potential of the most advanced Wi-Fi technologies. As AI technology continues to advance, its role in network management will become even more critical in the future. As the newest player on the IT team, AI is poised to be every bit the game-changer it's expected to be.