Cisco and Cloudphysician
taking critical care
to the grassroots

Unprecedented healthcare challenge

The global pandemic of 2020 brought to the fore, an unprecedented healthcare challenge. The lack of trained healthcare professionals and the need to extend their reach was felt on a never-seen-before scale, across the world. Even the most efficiently managed countries were pushed against the wall by the pandemic's sheer magnitude, which overwhelmed healthcare systems and pushed up mortality rates. The need for equitable critical care touched new highs. On one hand, healthcare experts and vaccine makers were trying to decipher a new virus, and the best medical brains were tasked with identifying ways to minimize its damage to mankind. On the other hand, existing healthcare models needed to be re-imagined overnight. Today, countries are at various stages of recovery from the pandemic. However, this new-age healthcare challenge is more pronounced in countries with a higher population density, such as India.

Urgent need to re-imagine patient care

With multiple waves of the pandemic wreaking havoc across the world, countries like India which barely recovered from the first wave had to dramatically ramp up critical care delivery. Subsequent waves brought with them additional challenges in the form of new variants of the virus, constantly evolving treatment protocols, and an exhausted healthcare workforce. In short, healthcare has been stretched to the limit. Enhancing traditional models of care with a cost-effective and scalable technological intervention is the only realistic way to mitigate this multi-pronged challenge. Cloudphysician is doing exactly this with help from Cisco.

Spearheading a critical care revolution

The brainchild of Cleveland, Ohio, US-trained intensivists and pulmonologists Dr. Dileep Raman and Dr. Dhruv Joshi, Cloudphysician is today seeking to solve the acute shortage of skilled intensivists in India. Intensivists can be best described as a group with a distinct subspeciality that focuses on the care of critically ill patients, specifically, the management of patients in the Intensive Care Unit (ICU).

Challenged by an industry estimate of 5,000 trained intensivists having to serve 300,000 ICU beds in India, Cloudphysician has designed a smart-ICU management system called RADAR™. It virtually amplifies the reach of intensivists to 5X the number of patients they could have managed with conventional models. Using a unique combination of telemedicine and digital management of workflows, the company has taken ICU care to the grassroots by enabling hospitals in tier-2 and tier-3 cities to have a virtual intensivist at the bedside.

Data from the spoke hospital ICU is being tracked at the Cloudphysician hub – a Command Center in Bangalore, where qualified nurses, intensivists, pharmacologists, and dietitians work 24x7

Image Courtesy -Cloudphysician

This revolutionary move is helping 40+ hospitals across 15 states serve the critically ill, better. The second wave of the pandemic between April and June of 2021 resulted in a surge of critically ill patients requiring advanced hospitalization. Cloudphysician partnered with the governments of Karnataka, Maharashtra, and Kerala, the biggest contributors to the second wave, to expand their reach and provide assistance to government hospitals. For instance, Cloudphysician enabled 42 ICU beds at the Kozhikode General Hospital, Kerala, 21 ICU beds at the Jayanagar Government Hospital, Bangalore, 30 beds at the Ulhasnagar Municipal Corporation Hospital in Thane, Maharashtra, among many others.

Across the country, around 450 ICU beds are enabled by Cloudphysician with state-of-the-art patient care, and more than 4000 critically ill pandemic patients have been treated.

Accelerated by Cisco LaunchPad, a deep-tech B2B start-up accelerator program with the vision of changing the world with new-age technologies, Cloudphysician uses Cisco networking and security solutions for seamless connectivity, to back tele-ICU solutions powered by Cloudphysician's proprietary SaaS platform, RADAR™.

Cisco LaunchPad is committed to empowering the innovation and entrepreneurial ecosystem by harnessing the changing dynamics of modern-day technology. The program essentially brings together Cisco technologists, start-ups, developers, and the partner community to deliver business-relevant, future-ready tech solutions. In the area of healthcare, Cisco LaunchPad collaborates with innovative solution providers like Cloudphysician who can leverage Cisco technologies to realize their life-changing goals.

A virtual huddle of specialists and care-givers

The best way to understand the impact of Cloudphysician is to look at its operational data flow. Once a hospital enables its ICU bed with RADAR™, multiple data streams start to flow into the Cloudphysician command center in Bangalore. These streams include high-definition videos of the patients' bedside devices and their physiological parameters, which are processed by a machine learning-based analytics platform to derive valuable insights.

For instance, the expertise of the remote intensivists allows them to interpret ventilator waveforms and visually correlate them with patients' breathing patterns to make the appropriate changes in real-time. In addition, specialist doctors can also oversee and guide the correct application of life-saving techniques such as cardiopulmonary resuscitation and ensure bedside staff follow appropriate protocols in real-time thereby optimizing patient outcomes.

In parallel, RADAR™ automates detailed doctor notes, captures patients' vital statistics, and pulls lab reports in a real-time and paperless manner. This data, managed at the command center, helps intensivists to guide the bedside nurse in changing treatment protocols, modifying ventilator settings, and tailoring patient-care plans collaboratively and dynamically, in real-time.

Going one step forward, experts at the command center are also able to overcome the common oversight of same-class medication, adverse reactions to medication, and even something as specific as the oxygen mask being too tight-fitting, affecting the optimum flow of oxygen.

A bedside provider ensures patient safety and comfort after undergoing intubation and prone ventilation therapy with real-time guidance from Cloudphysician's tele ICU team.

Image Courtesy: Cloudphysician

All of this encompasses a seamless two-way flow of critical, real-time patient data, by bringing on to a single virtual platform, doctors, technicians, nurses, pharmacists, and other healthcare specialists, who are working collaboratively on a mission to save lives.

Solving multi-pronged challenges

Healthcare challenges:

This virtual huddle of healthcare touchpoints could only be created after removing multiple roadblocks, some medical, and some technological. The entire operation rides on smooth connectivity. Since many Cloudphysician network hospitals are located in remote towns, consistent and stable internet connectivity proved to be a hassle.

Additionally, nurses and caregivers lacked awareness and exposure to virtual cloud-based healthcare, especially in critical ICU settings. This in turn led to a lack of confidence in a virtual, remote way of administering critical care. Most rural and even big-city hospitals still rely on paper-based workflows in the ICU.

With the command center requiring patient data in real-time, the challenge was to go paperless and virtual, while keeping patient data secure. Hospitals are also bound by robust regulations on the security of patient records, and Cloudphysician had to convince network hospitals that providing them access to Patient Health Information, came with multiple layers of security and safety. Finally, critical care is real-time and any network redundancy could cost lives.

Technology challenges:

Pure technology challenges of such a complex deployment had to be carefully thought out to ensure seamless and uninterrupted operations. Some of the key challenges were:

- The need to manage both static and dynamic IPs seamlessly
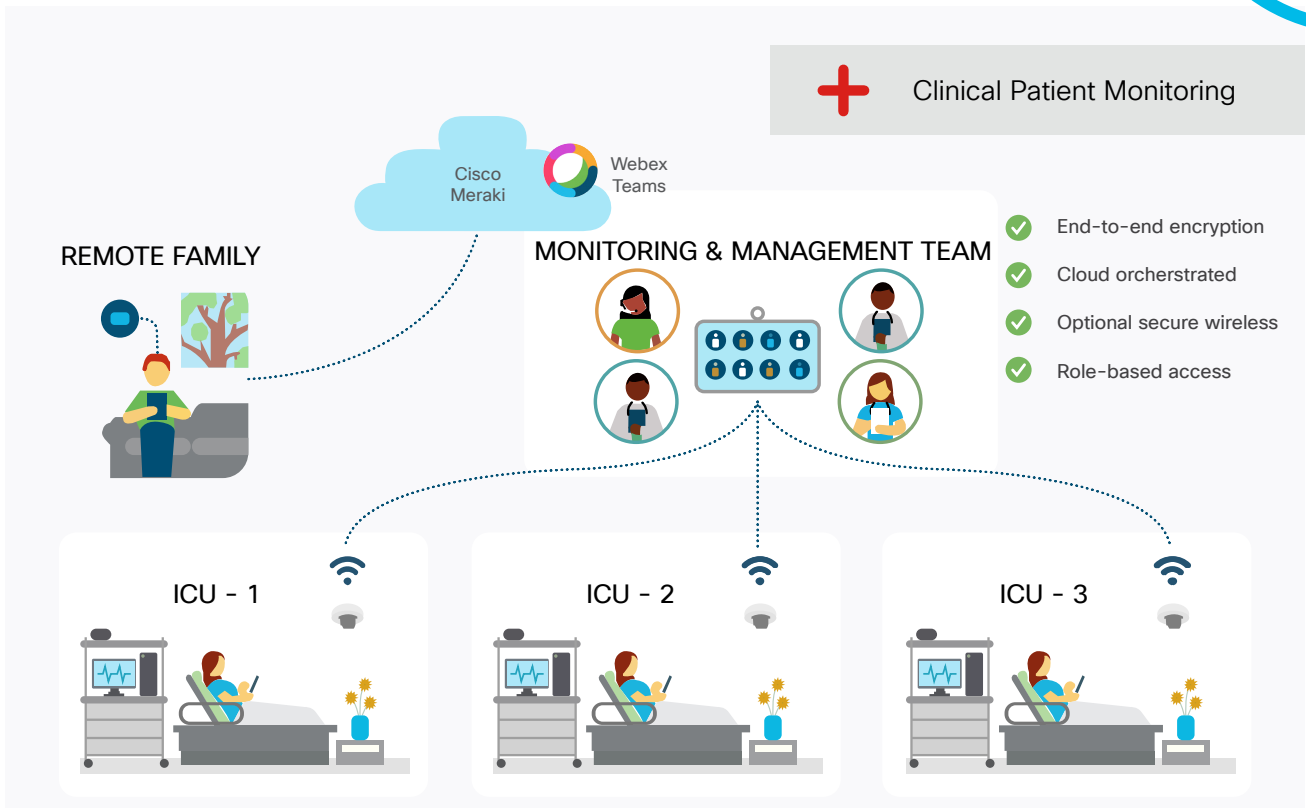- The need to individually configure Network Access Translation (NAT) for each camera

A single site could sometimes need around 15 cameras, and camera downtimes could lead to disruption in patient monitoring, and the inability to scale NAT cameras.

All of this mandated a solution that provides:

- Top-class network resiliency
- Unparalleled bandwidth efficiency
- Non-negotiable security

Cloudphysician, therefore, required a robust, centralized, cloud-based solution at the backend. Cisco Meraki was the answer.

Transforming cloud-managed networking with Cisco Meraki

Cisco Meraki is one of Cisco's marquee solutions, developed to transform IT network management. Its seamless cloud architecture creates secure, scalable, and easy-to-deploy networks that can be managed from anywhere. By using a combination of a web-based Meraki Dashboard and the Meraki mobile app, organizations can embark on the world's most secure and flexible network management platform.

Cisco Meraki provides network resiliency to Cloudphysician's critical care solutions. It also ensures reliability, flexibility, and redundancy, that rests over a robust and non-penetrable layer of security.

To realize its vision of providing real-time management of critically ill patients spread across different sites, Cloudphysician leveraged Cisco's expertise to ensure that its solution seamlessly integrated with the Meraki Client Virtual Private Network using Cisco's Software-Defined Wide Area Network (SD-WAN). Additionally, Cisco's bespoke security offering, Cisco Umbrella serves as a mini firewall that protects the hub and spoke ends of the network.

By deploying the Cisco Meraki suite of solutions, Cloudphysician has been able to achieve business continuity across 32 deployment sites, using an innovative combination of dual uplink ports, Long Term Evolution (LTE) failover, and branch routing. With SD-WAN providing active and passive redundancy, additional Universal Serial Bus (USB) modem support helps achieve internet resiliency with the option of switching over to a cellular SIM card.

Achieving tangible business benefits

Cisco Meraki provided a slew of business benefits in the day-to-day functioning of Cloudphysician. These include:

• Smooth client-side deployments

At the height of the pandemic, Cloudphysician could quickly scale up its services to numerous government hospitals across Karnataka, Maharashtra, Kerala, and even Leh.

• Speedy network integrations

Migrating network hospitals to the Meraki platform was smooth and fast.

• Uninterrupted access to the command center

A hospital in Bangalore used two internet leased lines. When one failed, there was a smooth changeover to the other.

- Crucial data on bandwidth utilization

The command center had access to real-time statistics on bandwidth utilization patterns, along with auto-generated reports.

- Red-flagging security breach incidents

Cloudphysician could avert a possible data breach at a network hospital, thanks to timely threat alerts.

- Zero downtime

Many Cloudphysician tele-ICU network hospitals across the country have been running non-stop for 365 days.

Cisco Meraki is committed to the vision of delivering a rapid, secure, and scalable patient monitoring solution. In its effort to transform global healthcare, Cisco Meraki offers a networking suite that allows for centralized and secure network management across health care facilities. Additionally, the built-in analytics engine provides aggregated data for ongoing situational management. The cloud-orchestrated solution ensures end-to-end data encryption and provides role-based access control.
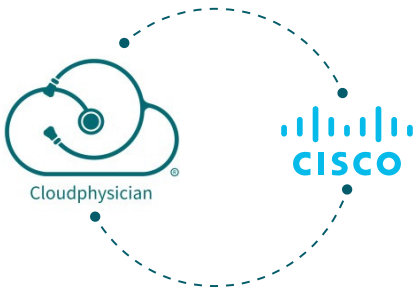
ICU = I See You, humanizing critical care

Historically, a patient admitted in an ICU setting was physically and emotionally disconnected from family and well-wishers. There was a complete lack of information on treatment protocols, the severity of infection, response to medication, or changes towards recovery. All of this made the ICU a dreaded corner of doom in every hospital – big or small.
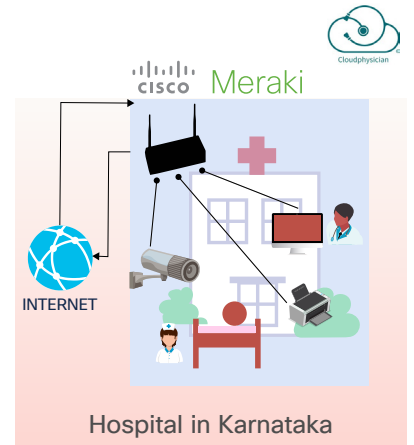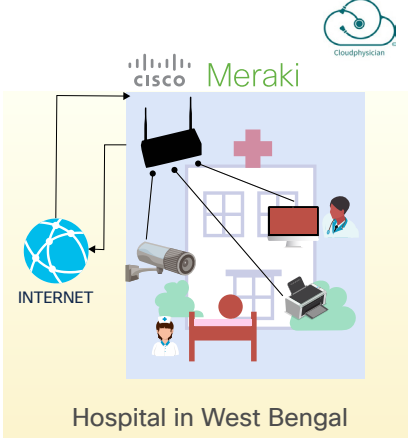
Cloudphysician is humanizing the ICU by unlocking a two-way communication channel between the patient and his/her family outside of the ICU setting. By enabling the family with visual assets and critical information, the ICU is being reshaped into a place of trust, hope, and recovery. This has been made possible by adopting future-ready technology solutions to power tele-ICU services supported by virtual networking from Cisco.

What is most heartening is that as a response to pandemic, Cloudphysician set up several remote ICUs across the country during the times when help and support were required the most. And Cisco donated Meraki gear to Cloudphysician to enable this in a streamlined and robust manner.
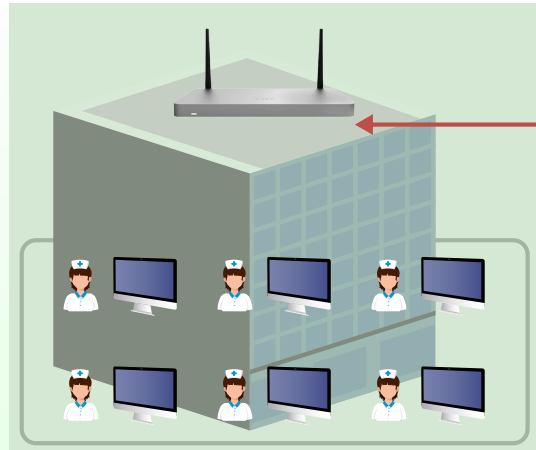
These technology interventions are truly taking critical care to the farthest corners of diverse countries like India. For instance, the only government hospital in Leh leveraged the power of technology by setting up RADAR™ at an altitude of 12,000 feet, overcoming the challenges of inconsistent connectivity, and lack of intensivists. Today, a patient in Leh, whether suffering from cardiac, renal, or lung-related disease can get medical help 24/7, which helps to bring down mortality rates and build trust in the healthcare system. As critical care becomes more humanized and efficient, the debilitating effect of many diseases can be curtailed in the days to come.
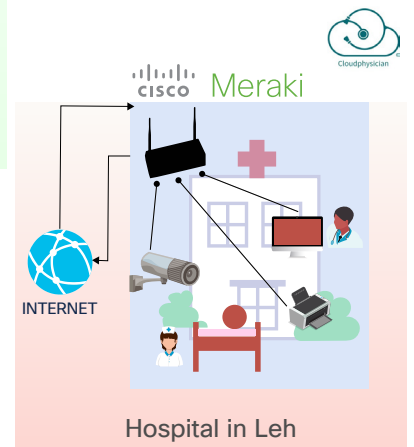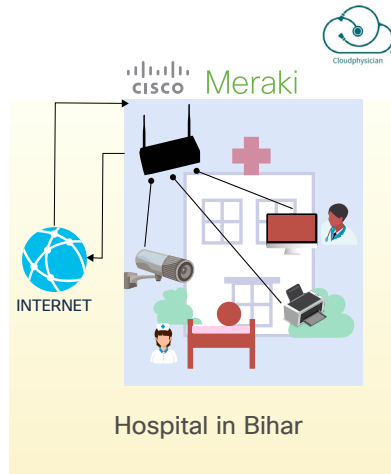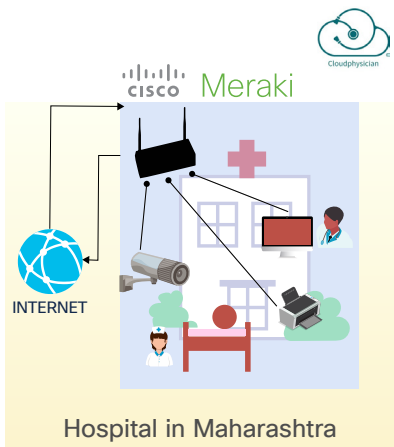
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Hospital in West Bengal

Meraki

INTERNET

Hospital in Karnataka

Meraki

Cloudphysician

ISP

Cloudphysician Command Center – Bangalore

Meraki

INTERNET

Hospital in Maharashtra

Meraki

INTERNET

Hospital in Bihar

Meraki

INTERNET

Hospital in Leh

CISCO

Quotes:

"With the operational flexibility of Cisco's SD-WAN solution, we have been able to quickly deploy and bring ICUs online, sometimes in under two weeks. We also felt we were investing in the peace of mind that comes from knowing our client ICUs enjoy a stable, secure, and seamless service."

Dr. Dileep Raman, Pulmonologist, Sleep Specialist, Intensivist and Co-founder of Cloudphysician

"We work as a combined unit with the highly specialized Cloudphysician giving our patients tech-enabled treatment that is at par with leading hospitals of India. The ICU is no longer restricted to just one or two PPE-wearing doctors. A comprehensive team of four other intensivists is virtually inside our ICU."

Dr. Tsering Morup, Senior Consultant Anaesthetist and Intensivist, SNM Government Hospital, Leh

"The Cisco Meraki suite of solutions is the best fit for Cloudphysician. Internet resilience is paramount for the client and since they operate in the healthcare sector, our solution had to be implemented with zero disruption to regular functioning of the ICU while ensuring that the solution could be used with minimal tech expertise. Cloudphysician is growing rapidly and our solution is able to help them scale up with consistent bandwidth and performance across multiple locations. Cisco Meraki is continually helping the client scale new heights in the field of critical patient care."

Shobhit Agarwal, Sr. Business Development Manager, Cisco Meraki, India & SAARC

References:

https://cloudphysician.net/

https://launchpad.cisco.com/