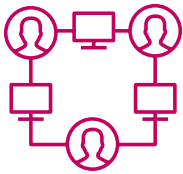


Using Cloud-Driven Technology to Help Establish a New Normal



Facilitating Agile
Work Environments



IoT Monitoring and
Robotics Automation



Contact Tracing
Enablement



Occupancy
Management Insights

The COVID Challenge

The current COVID pandemic has paralyzed large parts of our industry with significant movement limitations, occupancy restrictions, and in some cases complete shutdowns. Now, as the initial threat seems to be subsiding, governments and businesses must determine what is required to get back to some sense of normalcy. The biggest hurdles will be regulatory and/or safety-driven. Although the timelines and requirements for the easing of restrictions vary greatly, there are two common threads: limiting occupancy levels and contact tracing individuals who have tested positive for the virus.

The last 60 days has seen numerous technologies appear with potential solutions; however, all these solutions have a single common requirement: data, huge volumes of data. It's this data in its rawest form that provides the occupancy levels of a campus, building, or room, identifies typical traffic flows and provides this information in real-time or with historical views. This data, with some additional analytics applied can also identify movements of compromised individuals and provide insights to assist with identifying the areas and/or individuals they may have compromised in their daily activity.

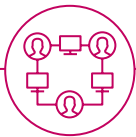
As mentioned earlier, the key component is gathering the data and surprisingly this technology is already ubiquitous across your enterprise, your Wi-Fi network. The same network that is already providing corporate communication and connectivity is also continually monitoring, gathering, and recording all client activity via Wi-Fi services.

But simply having some data is not enough, huge volumes are required to provide data veracity, the quality of the data, so it can be confidently used to provide the insights that allows us to reach the New Normal. It's not gigabytes or terabytes of data but petabytes of data. To grasp this number, consider that 3 1/2 years of 24/7 full HD video recording would be around 1 PB in size. Now multiply this by the 90 days, or more, worth of historical data storage required to have full visibility to be able to provide reliable and concise contact tracing. This huge volume of data can only be effectively

stored via cloud management, and in fact requires not just a cloud service but a 4th generation service that is able to provide the level of data durability to meet even the most rigorous regulatory requirements. This is the data leveraged by ExtremeCloud™ IQ's analytics to provide specific location and historical information, or it can be freely exported via APIs into developing 3rd party applications to provide additional levels of network visibility, access control solutions, etc.

With all this data being collected security also becomes a serious concern for solution providers and end users. To address this Extreme embeds networks security solutions across our entire product portfolio, providing network security, from the edge, to the core, to the data center, to the cloud. Specific to the New Normal and cloud security, our ExtremeCloud IQ platform is the Industry's only ISO27001 certified cloud, supporting both GDPR and CCPA protections. Allowing us to provide protection from the client to the cloud, to ensure the highest levels of regulation, compliance, data privacy with the ability for the end user to not only easily delete all client information but also provide an audit trail.

The New Normal will be built on even more distributed connectivity which demands even better centralized management. Done correctly it will provide the data to enable the 4 key metrics required to get us back to work; Agile Work Environments, IoT Monitoring/Robotics, Occupancy Management and Contact Tracing. We will delve into each in the following sections:

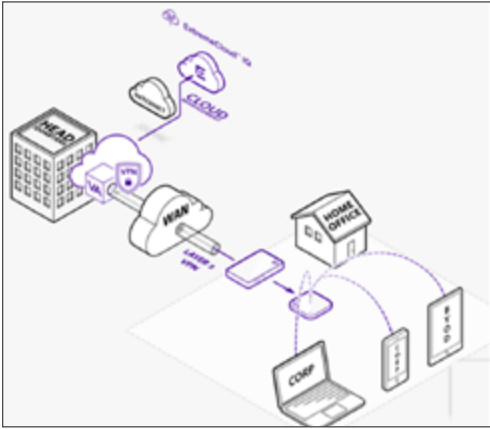


Facilitating Agile Work Environments

Contact/call centers, enabling remote teaching/healthcare/triage tents, remote offices, datacenter - helping people who are outside manage what is inside.

The current situation has changed the way many businesses have organized their operations, and, in many cases, we may never return to the way we were before. CEOs and CFOs are realizing the value and ROI of embracing the distributed staffing model and its now incumbent on the CIOs to provide the systems and services to enable the new 'work from anywhere' requirement. This requires a new look at IT hardware, security, services, and total visibility and control of a vastly distributed enterprise from a centralized management system.

To support these organizations, Extreme Networks offers the ability to effortlessly and securely connect and support your organization, your network, and most importantly your people with cloud networking. For distributed environments, our cloud-driven solutions radically simplify remote deployments and operations of your wired and wireless infrastructure. Powered by machine learning and AI, we give you the analytics and tools needed to proactively monitor and optimize network health across every part of your organization, whether it be a fixed or temporary location.



Extreme Networks provides the following services:

- Extend reliable and secure networking services (switching, routing, Wi-Fi) from HQ, to branches and even home office.
- Zero touch, zero staging onboarding of remote access switches, APs and/or routers; just plug and play at remote sites without requiring IT intervention.
- Real-time WAN link status monitoring and dynamic path optimization based on user or application.
- Securely deliver corporate applications to remote and mobile workers
- Extend corporate network, application and security policies to the edge.
- Provide real-time as well as at least 90 days of historical location information of all Wi-Fi devices.
- RestFUL APIs enables network administrators to utilize custom-built and/or 3rd party applications or scripts to interface with ExtremeCloud IQ.



IoT Monitoring and Robotics

Powering simple, secure onboarding and management for connected devices to monitor environments, as well as reducing risk with robotic assistance to minimize staff exposure.

IoT technology has reached critical mass. Today, there are more than 10 billion IoT devices in use around the world. Approximately 127 new devices are connected every second, according to PYMNTS’ monthly Intelligence of Things Tracker report. That’s more than 2,000 new connections since you started reading this article.

While much of the IoT conversation focuses on the devices themselves, the true potential of IoT extends well beyond hardware. Instead, it’s in the data a device generates, the action it instigates and the ultimate value it delivers. For example, Covid-19 has accelerated the need for a much higher level of visibility and environmental monitoring, while at the same time limiting personal exposure. This is the perfect use case for IoT devices, being small, battery powered, mobile, and inexpensive allows them to be deployed rapidly and in large quantities. The only requirement is the need to quickly onboard devices without requiring technical staff or staging services.

Extreme Networks provides the following services:

- Reliable, secure, and complete Wi-Fi coverage of a building, facility, or campus.
- Zero touch, zero staging onboarding of devices without IT staff requirements.
- Support IoT device information uplink via Wi-Fi, Zigbee, 802.15.4, and other protocols.
- Provide correlation of device location and gathered data, with at least 90 days of historical data.
- Export data streams via API or Webhooks to ecosystem partners.



Ecosystem partners can provide the following services:

- Gather and process environmental data from sensors.
- Provide user friendly UI to display data in appropriate format.
- Automatically build tables/charts based on type of data.
- Initiate actions when threshold or trend line is triggered.
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 - Automatically generate alerts/emails to appropriate resources based on contents.
- RestFUL APIs enables network administrators to utilize custom-built and/or 3rd party applications or scripts to interface with ExtremeCloud IQ.



Contact Tracing Enablement

Enabling the apps and services required for government compliance and to drive your own actionable data.

Contact tracing is designed to, as unobtrusively as possible (no action required by users), collect the unique hardware address (aka MAC) and associated identities of attached smartphones, PCs and tablets, enabling easy identification and tracing of employees, guests, or residents. Once an individual has been identified as COVID positive via testing, Extreme can identify a users' trail or path through the network, and scope of exposure up to 90 days prior. The solution also enhances the efficacy of opt-in contact tracing apps such as those announced by Apple and Google by providing more concise tracking data. This allows individuals to self-identify as positive via a portal, and automatically alert only appropriate resources and systems.

Extreme Networks provides the following services:

- Reliable, secure, and complete Wi-Fi coverage of the building, facility or campus.
- Gather Wi-Fi client information from both authenticated and non-authenticated clients.
- With a single click on a live map, an administrator can see exactly where clients are located.
- Ability to identify movement information for a specific client, includes name, email address, phone number, etc. Provides ability to contact individuals while they are on your network or after they have left.
- When using BLE, an individual device or client can be tracked as it moves throughout a facility.
- Provide client trails of specific users based on MAC address or BLE identifier.
- Identify individuals who potentially had contact with specific user.
- Provide real-time as well as at least 90 days of historical location information of all Wi-Fi devices.
- RestFUL APIs enables network administrators to utilize custom-built and/or 3rd party applications or scripts to interface with ExtremeCloud IQ.

Ecosystem partners can provide the following services:

- Build user friendly UI to display client trail, identify path and dwell times.
- Automatically build table of potential individuals who had contact with identified individual.
 - Automatically alert individuals via email, SMS, app, other.
- Display areas and trends based on client density.
- Display occupancy information and alerts via user friendly UI.
- Export data to 3rd party systems, via APIs.
- Provide customer loyalty or employee apps to provide better identification, alerting, and information distribution.
- Initiate actions when threshold or trend line is triggered.
- *Optional: Interface with carrier providers cellular based tracking systems to provide a seamless contact tracing including inbuilding Wi-Fi and cellular roaming services.*

Trigger-based actions:

- Allow users confirmed COVID positive to 'OPT IN' to system to alert corporate HR.
- Allows HR to activate historical activity tracing, identify locations visited and potential contacts.
- Automatically direct cleaning staff to primary locations, high capacity visited areas, and potentially footfall paths.
- Retail- if shopper app has been used. Identify infected person, link to most recent visit/and purchases, alert retail staff to immediately clean those specific areas.



Occupancy Management

Powering risk reduction via safe social distancing enablement for facilities, HR and legal.

Occupancy management is composed of presence analytics, location monitoring, building monitoring and RTLS/indoor positioning services, used in conjunction with defined policies to monitor the number of users in a specific area and generate triggers based on exceeded thresholds or in some cases trending that shows a threshold may be breached. Triggers can be set based on excessive levels of congregation, volume of traffic over time, no go zones, violating directional flows, or other parameters.

Note: Monitoring is Wi-Fi detection based and includes the ability to identify associated clients, non- associated clients (via probes), or even operate in conjunction with appropriate apps to provide real-time and historical visibility

Extreme Networks provides the following services:

- Reliable, secure, and complete Wi-Fi coverage of the building, facility, or campus.
- Identify and track total visitors and gather client information per location – even those that don't connect to your network.

- Single screen allows administrator to identify APs with highest utilization by clients. Provide real-time as well as at least 90 days of historical location information.
- Via a single click, an administrator can see exactly who is currently connected to that AP.
- Visual time lapse display of AP load and client density within a building or floor. The AP 'blooms' when more users are connected at any given time.
- RestFUL APIs enables network administrators to utilize custom-built and/or 3rd party applications or scripts to interface with ExtremeCloud IQ.

Ecosystem partners can provide the following services:

- Compare areas and alerts when defined threshold is reached.
- Monitor areas and identify trends based on client density.
- Display occupancy information and alerts via user- friendly UI.
- Export data to 3rd party systems, via APIs.
- Provide customer loyalty or employee apps to provide better identification, alerting, and information distribution.
- Initiate actions when threshold or trend line is triggered.

Trigger-based actions:

Once an event is triggered, based on preset thresholds, alerts can be generated in multiple ways: Extreme access points and cloud management services, direct or via APIs, enable the triggers to commence a communication or operational workflow via UCaaS, SaaS, and/or mass notification messaging platforms.



Event examples may include, but are not limited to the following:

- Automated alert to management/security/facilities management/receptionist/alarm systems.
- Automated alert to residents or users via SMS or private apps on phones.
- Engage 3rd party systems to activate digital signage at ingress or egress points.
- Leverage integrated APIs/Webhooks to export data to 3rd party systems optimized to analyze and display systems charts, graphs, and mapping.
- Tie into 3rd party systems leveraging access kiosks (PPSK type authentication) to automatically manage access and queuing. System then provides access based on thresholds settings and/or arrival times. (think capacity limitations, 1 out, 1 in, etc.)
- Define 'hazard zones', use wayfinding services to enable residents to avoid potentially hazardous areas, identify safe areas (no identified cases or recently cleaned) and identify approved routes through a facility. This could include directing to hallways based on social distancing requirements, direction of travel, and avoiding large groups. Potentially recommend stairs vs elevator if possible. Corporate apps can identify hot zones, low population areas, or alternate routes.
- Automatically direct cleaning staff or automated UV robots to areas of high concentrations for cleaning.
- Graphically identify 'hotspots', identify potentially contaminated areas, auto inform and block access via SMS, email, and signage.
- Graphically show approved paths.
- The New Normal will be built on data and the ability to use ML and AI technology to deliver the insights required for business not only to open back up, but just as importantly to continually monitor the environment to protect employees and visitors. Extreme believes networking is the foundation to gather, store, analyze and provide this data. Extreme leverages this data to provide the insights list above and defined in even greater depth in the document Extreme Enables the New Normal (add hyper link when published). Additionally, ExtremeCloud IQ's RestFUL APIs enables network administrators to take advantage of 3rd party applications or scripts to provide additional insights base on data gathers and stored in the Extreme cloud.



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