WHITE PAPER:

acuity™

EDGE SOLUTION

TACTICAL EDGE MICRO DATA CENTER

Patent Pending

acuity™ EDGE SOLUTION
TACTICAL EDGE MICRO DATA CENTER *(Patent Pending)*

Large Scale Disasters Call for More Effective Tactical Edge Technology

In the aftermath of Hurricane Katrina, it took two months to provide stable, reliable communications to federal and local agencies across New Orleans. In 2017 Hurricane Irma damaged almost 54% of cell sites in the U.S. Virgin Islands, while more than 7 million cable and telecom subscribers lost service across Alabama, Florida, and Georgia.[1]
Delays in response time can significantly impact the delivery of critical services. In the event of natural disasters, acts of terrorism, and harsh operating environments, the standard operating procedures of federal agencies must be tuned to meet these challenges.

Currently it can take days or weeks to deploy, install, and configure emergency communications. In many cases agencies deploy 15 or more personnel per event. The technology required is difficult to mobilize, deploy, and redeploy. Even with heavy investment at the top, tactical teams are often still forced to work with antiquated and non-interoperable systems.

### A Portable, Capability-Rich Data Center

Introducing a new intelligent edge solution, designed for federal communication and engineering teams focused on the rapid deployment of mission-critical capabilities at the tactical edge. Acuity™ Micro Data Center delivers critical communications, applications, and information to deployed personnel, anywhere in the world.

Acuity combines best-in-class technology with mobility and efficiency to ensure readiness in a single form factor portable enough to fit in a commercial airline overhead storage compartment. Together, with leading technology partners, Acuity delivers mission-critical capabilities such as data security, voice, video, and messaging functionality.

Acuity is a next-generation micro data center ideal for environments where disrupted, intermittent, and limited communication (DIL) conditions persist and critical levels of mobility and survivability are required.

1 ArsTechnica. September 13, 2017. "Hurricane Irma took 7 million cable and wireline subscribers offline." By Jon Brodkin

A S.M.A.R.T choice for government agencies concerned with speed, efficiency, capability, and cost of field deployments
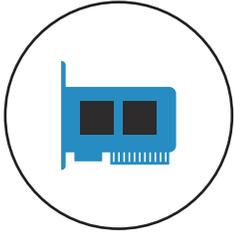
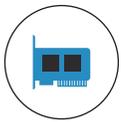**S**oftware Defined   **M**obile   **A**gile   **R**uggedized   **T**actical

Software-Defined for Every Tactical Edge Need

The Acuity edge solution is built from the ground up with software-defined architecture which utilizes an intelligent orchestration tool for centralized management that simplifies setup and operation of the mobile micro data center. Zero-touch, policy-based provisioning increases service agility and reduces network administration burden. Upon startup, the system will determine an optimal connection path and establish a secure tunnel back to the "host" data center or command and control center. If there is a lack of reliable connection or the connection is lost, the system will operate autonomously and provide essential communication services such as voice, video, and data locally. Once the connection link is restored, critical transactions automatically synchronize with the host system command and control assets. Acuity supports multi tenancy and hyper-segmentation, while reducing complexity and increasing security.

Mobile for Quick and Efficient Deployment and Results

Acuity is mobile because it is simple to transport. For example, the unit weighs 30 pounds fully loaded and can be placed in the overhead compartment of any commercial airline. Because just one unit replaces truckloads of equipment, Acuity can be setup in the field in minutes or hours versus days or weeks. This not only provides speed efficiency but also delivers substantial cost savings. One unit consists of 10 compute nodes and supports up to 50 users fully loaded. Units can be networked together for scalability and to support more than 50 users.

Mobility also means superior connectivity. With both WiFi and LTE capabilities available, each unit provides effortless mobile connections with backhaul communications. Physical IP connections on the device enable connectivity to IP ports on external satellite nodes for satellite linkages. Acuity is also equipped with a unified communications suite for superior voice, video, and messaging functionality.

Use Case: Deployment Time and Personnel Required for 50 Person Micro Data Center

	Personnel Required	Deployment Time
Traditional edge data center	12-15	288 Hours
Acuity Edge Solution	1	2 Hours

0 — 300
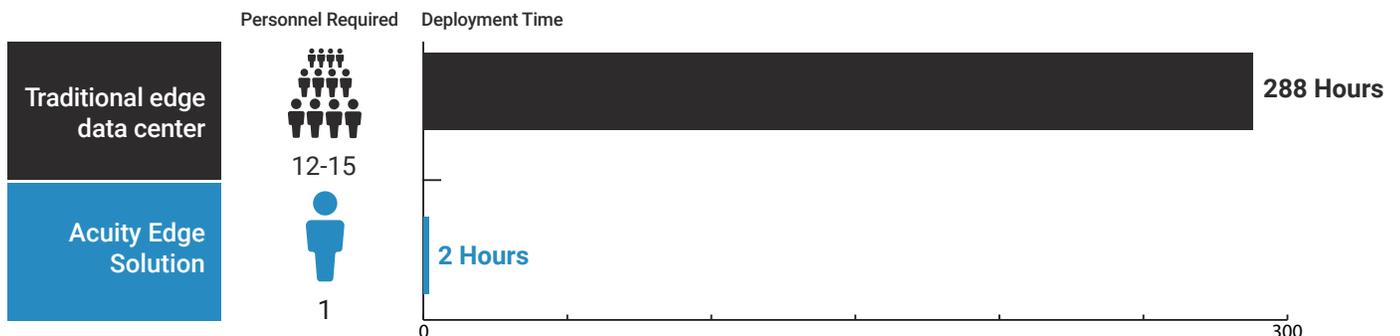
Agile for Swift Connectivity and Redeployment

The design of the Acuity edge solution ensures complete agility within the system. For example, critical components such as the cards, OS, application suite, kernel-based virtual machine (KVM), and SD-WAN are independent of the box on which they reside. Acuity uses the same compatible server cards that are water-proof and certified with FIPS 140-2. A card or blade from the unit can be moved to another unit and then function autonomously once authenticated. In the case of unexpected mission changes, simply pull the blades from one unit and go—leaving the chassis. This safeguards your data, leaving no critical information behind. Once a new unit is obtained, the blades can be plugged in and the unit will operate normally without reinstallation or reconfiguration.

Acuity is also agile in that it can be repurposed from an edge device to a command and control unit in the case of unexpected mission changes. It is a micro data center, meaning the unit's purpose may be modified to behave differently from the host data center if necessary. With Acuity, real-time command, control, communications, computers, and intelligence (C4I) for up to 50 users is available anywhere in the world.

Rugged for Reliability in the Field

Field conditions vary and can be tough on electronic components. Fortunately, Acuity can withstand adverse terrains such as extreme temperature, sand, sand dust. Additionally, the Acuity blades are waterproof. Every model supports worldwide commercial power auto-sensing. All equipment meets unified capabilities requirements (UCR2013) and are MIL-STD-810G certified.

Reliability is built in as the only moving parts are the LTE/WiFi collapsible antennas and fans to dissipate heat from the system. The system will operate in extreme cold and heat from -25 to 135 degrees Fahrenheit. Power is stabilized by providing a single AC and a single DC voltage input. The power operates in an active/standby state. Due to weight considerations, power battery backup is not included in the system. An external battery pack can be supplied or it can be plugged into a 9-14 VDC power source.

Tactical for Custom Configurations

The Acuity Micro Data Center is the ideal tactical system for government agencies. It reduces a significant amount of equipment by replacing data center pods, heavy gear, and expensive, legacy systems. Now, field teams can accomplish more, quickly and inexpensively, without sacrificing performance. Data collection, processing, and analysis can occur locally and expeditiously, empowering users to make well-informed, mission-critical decisions in real time.

With a wide array of connectivity options, Acuity provides greater tactical advantage in various field environments. For example, the unit supports satellite, 4/5G LTE, VSAT, and a number of different communications standards via USB and Ethernet ports.

Acuity is designed to work autonomously in DIL environments with auto scaling and software-defined routing and controls. Teams can define which applications and information are most important and decide in advance, or in the field, the priority of information flow, based upon available bandwidth. For example, there may be 50 mission applications that are needed in the

command and control (C2) environment. However, if limited to a 56K satellite uplink, data will have to be prioritized appropriately. Users can automate the most critical information first. Satellite fade is not an issue as Acuity constantly seeks to maximize backhaul capability and automatically routes traffic over pre- approved modes while ensuring data transmission security. Sync and re-sync are automatic because if there is a change in communication type due to a failure or decrease in bandwidth, the unit will adjust accordingly and failback to the preferred type of communication mode when it is available.

With multiple configuration options, each Acuity edge system can be custom designed for multiple deployment objectives to meet the needs of the organization's mission anywhere in the world.

BEST-OF-BREED TECHNOLOGY ᴘARTNERS AND CAᴘABILITIES

We have carefully selected leading-edge technology from elite manufacturers around the world to ensure the best solutions for virtualization, security, bandwidth, communications, and flexibility.

acuity™ INTEGRATED TECHNOLOGY PARTNERS

We have partnered with leading technology vendors to provide superior micro data center functionality. Some examples include:

Unified Communications (Voice and Video)
With an industry-leading collaboration tool that provides email, SMS, voicemail, phone service, and peer-to-peer video conferencing, tactical teams can turn on Acuity and immediately have communications working and connected back to the base or anywhere in the world. Agencies can pre-determine priority of communications using QoS to ensure bandwidth is available for the right mission-critical tasks. For example, phone calls can be prioritized over video streaming to ensure there is no latency or dropped calls in critical moments.

Identity Management
With time and field-tested identity management solutions, Acuity provides a centralized location for security policy enforcement, user authentication, and authorization to prevent unauthorized access to critical assets. Where applicable, an agency can seamlessly extend its footprint into cloud-based identity and access management solutions such as Microsoft Azure.

Session Migration
When it comes to serve and protect, the difference of a few seconds can mean life and death. Acuity monitors the state of network communication and gracefully migrates traffic to a more secure and reliable link should the primary one be disrupted or become unavailable. For instance video streaming continues to play automatically during circuit failover.

Load Balancing and Failover
Multiple circuits are often procured for redundancy but only one is active while the other remains dormant, costing organizations money. Acuity makes use of all available circuits and load balances traffic between them so that the network works more efficiently. In the event one circuit fails, all communications automatically migrate over to ensure business continuity.

Secure Vector Routing (SVR)
Acuity saves at least 30% of organizational band- width by inspecting all traffic. When the system notices that traffic is already encrypted, it will not waste cycles by double encrypting the same packet again. It simply forwards it through the secure tunnel.
SVR technology also leverages existing infrastructure, such as MPLS and the Internet, and works with VSAT, LTE, and broadband connections. Therefore, expensive circuits or VPN solutions are not needed.

Hyper-Segmentation and Virtual Network Function (VNF)
With hyper-segmentation, teams no longer have to go through cumbersome processes of procurement, configuration, and installation when setting up new equipment. Similar to Virtual LAN (VLAN) setup, the entire network infrastructure can be scripted in template language and deployed within seconds using Acuity and VNF.

Open Standard/Architecture

In recent years, the federal government has embraced open architecture and standards to foster more commonality across IT systems. As a result, Acuity uses open-source and non-proprietary hardware and software whenever possible. Open architecture is utilized to make installation, operations, upgrades, and information exchange easier. This also allows developers to create new features that are secure, reliable, and effective in furthering operational objectives. Security is still of paramount importance to ensure the Acuity edge platform protects data exchange within the solution regardless of the architecture used.

Private Cloud

While the public cloud provides convenience, it does not offer the security and performance of the private cloud—which is critical for government agencies. Fortunately, Acuity can be integrated with private cloud vendors such as Red Hat OpenStack to ensure enhanced performance and security. It also offers a cost reduction for certain workloads.

Professional Services

Acuity is an a la carte edge solution that can be outfitted for various applications and operating systems. The key is that application delivery is predefined by the mission leaders for each environment.

Acuity professional services are ready to assist in all areas—from defining requirements, to system configuration, and providing on the ground support.

The first step is to determine the number of users that require compute power, unified communications services, storage, and bandwidth. Next, security parameters need to be defined as Acuity supports multi-tenancy. For example, we will assist to define the type of users, their required access rights, then determine the connectivity type (satellite, 4/5G LTE, VSAT, etc.). The final step is to provision a secure tunnel via the SD-WAN application. This is to ensure all data traversing through the public cloud is encrypted.

Our philosophy is to have multiple redundant chassis as opposed to having fully redundant systems that are military grade. If the situation requires military standard, we can also provide the necessary hardware to meet that requirement.

ACUITY MICRO DATA CENTER SOLUTION SPECIFICATIONS

Hardware and software specifications and performance subject to change

Users
50

Cards
10 x PC10-16-128
2 Core Intel Sky Lake i7
128 GB SSD (1.2 TB total)
16 GB RAM DDR

Configurations
Mini-DisplayPort (HDMI)
Scalable SD-WAN Routing

Storage
Unlimited external (expansion)

Monitor
9"x7" VGA

Power
DC 9-14 VDC
AC 120-240 VAC
External battery pack (optional)

Operating Temperature
-25 to 135 degrees Fahrenheit

Size
16.54" length x 13.03" width x 6.84" depth

Weight
30 Lbs fully loaded

Connections	Mobile Connectivity Options
2x10 GE SFP+	
1x1 GE SWMGT	WiFi
1x1 GE AUX	4/5G LTE
1x1 GE PWR MGT	Satellite/VSAT (external/optional)
12x1 GB POE	

Services	Ongoing Support Options
Consulting	7x24 Technical Support
Configuration Management	Software Assurance and Licensing
Integration	
Installation	Capability As A Service (36 month technical refresh)
Training	
Maintenance	Repair and Return
NOC Support	Re-Configuration and Configuration Management
Professional Services	
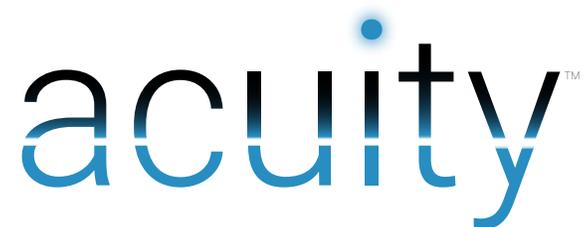
About Tyto Athene, LLC

Tyto Athene is a full service systems integrator focused on helping clients accelerate their ability to make decisions by providing ubiquitous and secure access to enterprise information throughout their operating environment. Tyto uses a myriad of technologies, innovative thinking, and proven processes to deliver successful outcomes for it's clients worldwide. To learn more about Tyto please visit www.GoTyto.com.