

SOFTWARE DEFINED CAMPUS INFRASTRUCTURE

Introduction

Enterprises are at a critical juncture, facing unprecedented challenges in modernizing campus infrastructure to meet the dynamic demands of today's missions. Traditional, domain-specific approaches lack the agility, adaptability, and operational efficiency needed to maintain pace with the rigors of mission delivery. Legacy management systems are strained, exposing security vulnerabilities, and struggling to support advanced technologies beyond basic service deliveries such as Ethernet, LMR, LiFi, and LTE. Additionally, the need to expand into other critical infrastructure elements—such as heating, lighting, physical security, and utility distribution—further complicates modernization efforts. The urgency for a **comprehensive modernization strategy**—one that integrates cutting-edge automation and streamlined workflow processes throughout all enterprise systems—is paramount. This approach ensures **resilience, security, and rapid adaptability** in evolving operational landscapes.

Tyto Software-Defined Campus Infrastructure

- **Change Management Process Improvement** – Through software-driven techniques, accelerating the pace of change delivers measurable improvements in mission agility.
- **System Integration** – Enables agile, effective collaboration between divisions and missions, enhancing situational awareness and improving decision-making capabilities.
- **Unified Management** – A single, unified oversight platform reduces vendor-specific training requirements, lowers cost, and increases productivity.

This brief highlights the urgent need for a strategic approach to enterprise software-defined automation. It integrates global campus installations across various infrastructure domains and presents business solutions to address key challenges, such as keeping pace with mission changes, optimizing system integration for enhanced situational awareness, and achieving unified management to overcome productivity and cost obstacles.

This approach is a **strategic imperative** for all enterprises, both public and private. Tyto Athene fosters a collaborative partnership, working shoulder-to-shoulder with our customers through this transformation. With our proven expertise in software-driven orchestration and automation, we deliver solutions that enable a **self-sustaining system**, otherwise known as an **autonomic infrastructure ecosystem**.

Highlights

In today's rapidly evolving landscape, enterprise leaders, mission planners, and IT decision-makers—whether in government, defense, or the private sector—must recognize that their infrastructure is at a breaking point. This white paper is crafted specifically for those navigating the complexities of modernizing campus infrastructure to meet advanced operational demands.

Current Challenge:

- Traditional, domain-specific approaches lack the necessary agility and adaptability
- Infrastructure limitations are becoming increasingly apparent and unsustainable

Solution:

Adopt a comprehensive software-defined automation campus infrastructure strategy.

- Enhance resilience, security, and adaptability
- Align with the strategic necessities of modern enterprises

Benefits:

- Ensures mission readiness, efficiency, and security
- Integrates disparate systems
- Enforces Zero Trust security
- Optimizes operations at scale

Tyto Athene's proven expertise in software-driven orchestration and automation delivers significant enhancements in security, agility, and operational efficiency. This white paper is essential reading for organizations committed to ensuring their enterprise infrastructure remains robust enough to meet current and future challenges head-on.

Autonomic systems are inspired by the human autonomic nervous system, which regulates body functions without conscious effort. Autonomic IT systems aim to manage technology resources with nominal human intervention. This accelerates IT modernization, enhancing security, agility, and operational efficiency. The time for a transformative shift toward an autonomic campus network infrastructure is now.

Current State Perspective

The current global deployment of enterprise systems in both the public and private sector reveals a complex and fragmented infrastructure characterized by limited situational awareness, management system sprawl, and siloed operational domains. This environment resulted in disjointed modernization efforts, delaying technology refresh cycles, and hampering strategic alignment between management systems and mission objectives. Disparate management systems—ranging from communications and cybersecurity to building management and manufacturing

controls—operate independently, creating inefficiencies and leading to suboptimal use of enterprise resources. This fragmentation reduces situational awareness and impedes mission readiness. A centralized, software-defined approach streamlines processes, enhances situational visibility, and optimizes resource deployment across an agency's global footprint. Modernizing campus infrastructure through automation is not just an upgrade—it's a strategic advancement in how people, processes, and technology deliver and support campus-wide services.

Key Risks Impacting The Mission

The risks identified below compound over time, threatening agency success and jeopardizing critical missions daily. Tyto Athene brings a proven track record of managing and mitigating operational risks in critical environments, consistently integrating innovative solutions that drive mission success and resilience. Our approach ensures that systemic advancements are seamlessly incorporated, safeguarding operations and enabling organizations to thrive even in the most challenging conditions. Rather than managing segregated, autonomous systems, we empower the enterprises to operate more effectively as a complete, integrated system.

Change Management. Process inconsistencies between infrastructure management domains increase costs, disrupt daily operations, and create inefficiencies in resource allocation. Existing campus infrastructure is often managed by multiple teams operating independently, leading to a lack of cohesion that impedes mission success. These inefficiencies trigger a domino effect of problems, placing mission objectives at risk. Change mismanagement in independent processes can have downstream ramifications across multiple interdependent systems. Implementing effective processes drive desired outcomes, enhances operational efficiency, and strengthens mission success.

A Fragmented, Siloed Enterprise. When independent teams operate in isolation, situational awareness suffers, hindering effective communication and collaboration. This lack of cohesion can result in incomplete data, leading to flawed decision-making and hindering mission success. Moreover, decisions that benefit one part of the organization may inadvertently obstruct progress in another, creating inefficiencies and impeding overall organizational effectiveness.

Disparate, Legacy Infrastructures. Legacy infrastructures often cannot share telemetry or system data due to architectural gaps and configuration constraints. The absence of integrated, standardized communications between systems creates logistical challenges and exacerbates situational awareness gaps. As a result, organizations must manage multiple systems independently, lacking a single pane of glass for comprehensive situational awareness. This fragmentation complicates system upgrades and hinders integration efforts.

In an era where the pace of change is relentless, organizations that prioritize automated change management position themselves for resilience and innovation towards in an autonomic network infrastructure. By streamlining and orchestrating workflows, organizations can seamlessly integrate new systems, enhance operational efficiency, and reduce migration risks migration. This proactive approach accelerates strategic initiatives and ensures organizations capitalize on new opportunities. Effective change management drives not only immediate results but long-term mission success in an ever-evolving landscape. Automating unified systems across divisions fosters proactive modernization and integration, enabling cohesive collaboration in operations for faster mission success.

Software-Defined Campus Infrastructure Optimizes Mission Success

Tyto Athene's approach to building a Software-Defined Campus Infrastructure (SDCI) integrates advanced technologies to create an intelligent, autonomic network infrastructure. This includes the following key components:



Comprehensive Monitoring and Reporting

Provides continuous monitoring and detailed reporting to maintain transparent situational awareness and ensure control over infrastructure operations.



AI-Driven Analytics

Incorporates artificial intelligence (AI) and machine learning (ML) to analyze network data and events, predicting potential issues before they occur.



Automated Network Management

Implements automation tools to manage network operations, reducing human error and increasing efficiency.



Real-Time Adaptability

Enables the network to dynamically adjust to changing conditions and demands, ensuring continuous optimal performance.



Enhanced Security Measures

Incorporates advanced security protocols and real-time threat detection to safeguard the network through enterprise Zero Trust security.

ROI and Business Benefits



Increased Agility And Resilience

Addresses the content, structure, relationships, and business data rules that enterprises must retain permanently. Data and intelligence required for missions must be both secure and accessible. By adopting software-defined practices, organizations ensure mission success by balancing security and accessibility.



Cost Reduction

Integrates mission-specific software applications and IT management platforms to improve efficiency. Like the underlying data, applications must be easily accessible and secure. While mission data provides critical insights, users in the field require immediate access to extract its full value.



Enhanced Security

A robust security framework is essential to protecting mission-critical operations. The hardware, system software, communication components, and development tools required for new systems and projects are seamlessly integrated to create a comprehensive technology stack. This ensures that servers, databases and analysis tools operate efficiently while being supported by network switching, routing, firewall and authentication solutions, delivering a secure and resilient infrastructure.

This autonomic approach to infrastructure modernization delivers significant benefits, including operational efficiency, agility, and cost savings. The Tyto Athene SDCI approach emphasizes automation and orchestration, streamlining processes through a dynamic service catalog based on on-demand service provisioning. This model aligns with key Department of Defense (DoD) and federal agency initiatives, supporting Zero Trust architecture standards following OMB M-22-09 while integrating with AI, ML, cloud hosting, and enhanced security.

Tyto Athene's Approach to Software-Defined Campus Infrastructure

Tyto Athene recognizes the complex and evolving demands faced by federal agencies, particularly those managing multi-domain operations, legacy systems, and inconsistent change management processes. Our SDCI approach provides a comprehensive solution to address key challenges related to operational efficiency, situational awareness, and security.

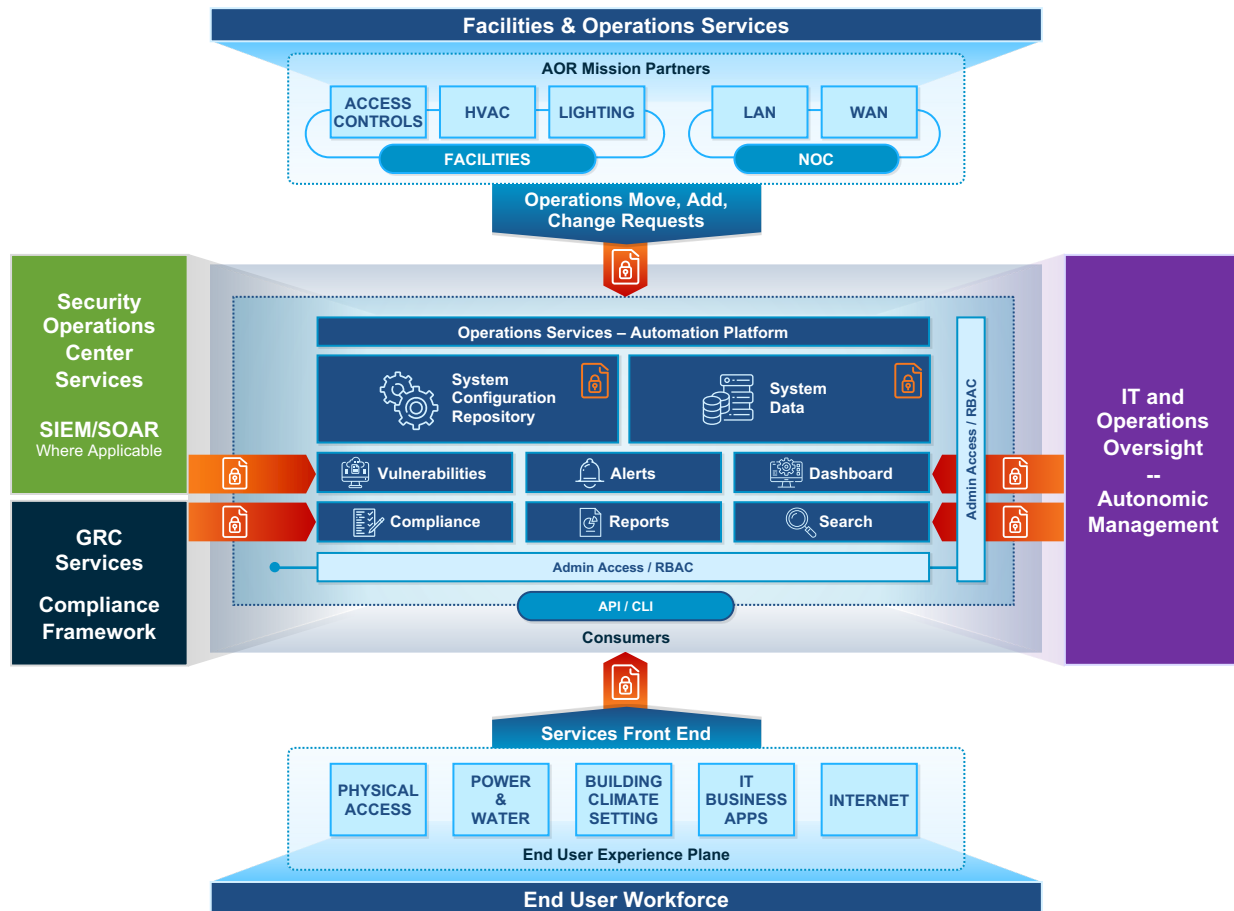


Figure 1. Tyto's Software Defined Campus Infrastructure (SDCI)

Addressing Change Management Process Inconsistencies

Tyto Athene's SDCI solution centralizes infrastructure management under a unified control plane, enabling seamless and automated change management processes. As shown in the Concept of Operations (CONOPS) in Figure 1, all infrastructure elements—compute, storage, network, and the autonomic management platform—are managed as code, significantly reducing manual

intervention while enhancing consistency across all domains. Automation tools and policy-based management enabler controlled and efficient rollouts, mitigating risks associated with siloed change processes. This cohesive approach ensures consistency, minimizes downtime, and accelerates mission success.

Breaking Down Silos for Improved Collaboration

Tyto Athene's SDCI solution unifies disparate teams and resources into a single, cohesive framework. By enabling real-time data sharing, centralized management, and enhanced collaboration through integrated dashboards, SDCI improves cross-team visibility and facilitates more effective decision-making. This integrated approach provides a holistic view of infrastructure operations, leading to faster issue resolution and reduced inter-team friction. Enhanced collaboration across ensures that decisions

benefit the entire enterprise, rather than creating conflicting outcomes. To further strengthen security and interoperability, this collaborative framework aligns with OMB M-22-09 standards for Zero Trust, ensuring comprehensive security. As network intelligence gathers richer insights, the infrastructure learns how to better manage itself, reducing the need for manual intervention and multi-group management.

Legacy Infrastructure Integration and Modernization

Our approach enables the virtualization and abstraction of legacy infrastructures, allowing systems to interoperate within a unified framework, regardless of underlying hardware or architecture. By leveraging modern technologies such as network overlays, software-defined networking (SDN), and API-driven integration, we bridge communication gaps between previously siloed systems. This eliminates air gaps and configuration constraints, improving data flow and situational awareness. Additionally, by integrating centralized software-controlled Zero Trust policies and embedding security throughout the enterprise, we create a highly resilient infrastructure that enhances security, shields data, maintains compliance, and optimizes operational efficiency while reducing costs.

Software-Defined Practices and Automation

Software-defined practices have transformed campus services by automating infrastructure management, significantly reducing manual labor and errors. This comprehensive approach, illustrated in Figure 1, lowers costs, accelerates infrastructure changes, and enhances capabilities. **Software-driven automation** is key to modernizing infrastructure, consolidating systems, and streamlining processes—leading to greater agility, resilience, and efficiency.

By enabling the network to adapt in real-time to varying conditions and demands, we ensure continuous optimal performance and resilience. In short, we deliver agility. The network can respond automatically to congestion, environmental changes, and resource demands, ensuring appropriate service levels amid constantly changing conditions.

Phased Legacy System Integration

Tyto Athene’s **hybrid integration model** allows legacy systems to gradually integrate with software-defined automation solution. Using middleware or custom APIs, we ensure compatibility with older systems without requiring a complete overhaul. This phased approach minimizes disruption, ensuring a smooth transition while extending the life of legacy systems, improving security, and providing visibility into the software supply chain.

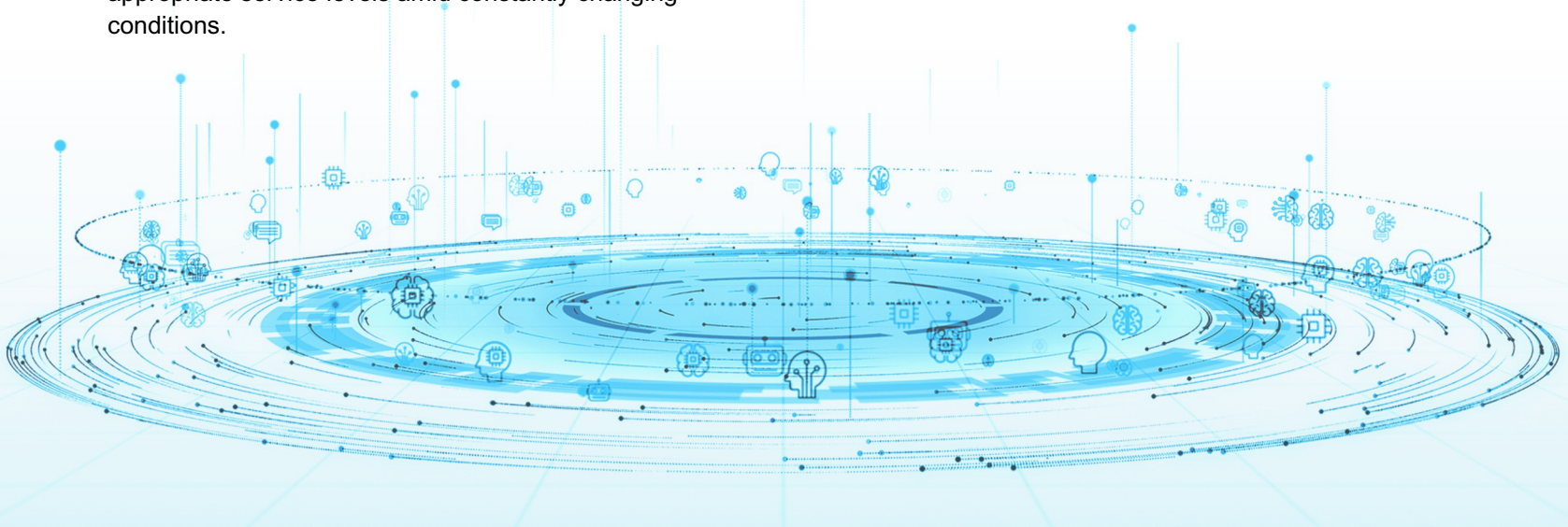
Unified Change Management and Agency Collaboration

Our solution supports change management optimization, inter-divisional collaboration, and seamless integration of legacy infrastructure with software-defined automation. The architecture is modular, microservices-based, and cloud-ready, enabling flexibility, scalability, rich analytics, and real-time tracking and visibility. Continuous feedback loops and user-driven customization ensure alignment with agency needs.

We also integrate **AI and ML** to predict potential changes in requirements, automate responses, and enhance service delivery speed. This tailored solution can handle the data volumes and scalability required by federal agencies, ensuring real-time visibility and efficient resource management.

Scalability and Flexibility for Federal Agencies

Tyto Athene’s SDCI approach empowers federal agencies to manage vast and complex infrastructures more effectively. This results in improved operational efficiency, reduced risks, and greater adaptability to evolving challenges. Our scalable and flexible solution ensures long-term mission success by enabling real-time responses to dynamic mission landscapes.



Conclusion

Tyto Athene's SDCI solution directly addresses the critical challenges of modernizing and integrating federal IT environments. By harmonizing change management, unifying siloed operations, and enabling legacy system interoperability, our SDCI approach delivers the agility, scalability, and operational insight required for mission success. Our commitment to innovation and operational excellence ensures that federal agencies can confidently transition to a more flexible, secure, and cost-effective infrastructure. Automating repetitive tasks increases enterprise efficiency, reducing

IT staff workload and operational cost. Reducing manual workload not only enhances efficiency but also minimizes human error through tested, automated processes. With orchestration, agencies can seamlessly manage resources and services across the network technology stack. By integrating diagnostics and self-healing mechanisms, our solution enables autonomic detection and resolution of issues, enhancing network reliability while reducing operational costs.

Next steps

1

Begin your modernization journey with a strategic infrastructure overhaul to enhance agility, security, and operational efficiency.

2

Leverage software automation and orchestration to build a future-ready infrastructure that adapts to evolving mission demands.

3

Partner with Tyto Athene's expert team to explore tailored solutions that align with your specific operational goals.

4

Schedule a tactical assessment, detailed consultation, or technical workshop to gain deeper insights into your network modernization strategy.

5

Collaborate with us to drive your network modernization forward and achieve long-term mission success.

Tyto Delivered at Camp Butler and Camp Pendleton

Tyto's SDN deployments at Marine Corps Base Camp Butler and Camp Pendleton demonstrate the effectiveness and impact of our solutions.

Camp Butler

- Implemented a Cisco-centric SD-Access solution, integrating existing Layer 2 and Layer 3 networks with new DNA-Center fabrics.
- Completed the project 12% under budget and within nine months.
- Enhanced the user experience for over 2,300 personnel while strengthening Zero Trust security through micro-segmentation.

Camp Pendleton

- Increased network efficiency by 30% and accelerated service deployment by 40% with our SDN solution.
- Significantly enhanced Zero Trust capabilities, improving security and access control.
- Transformed every edge port into a virtual firewall, reinforcing network protection.

The Tyto Athene Advantage

Tyto Athene is a federal systems integrator specializing in secure and efficient access to enterprise information and campus infrastructure. With demonstrated expertise in designing, deploying, and managing software-defined solutions, we address the unique requirements of the DoD and government agencies. Our deep understanding of military network needs, combined with technical proficiency, makes us a trusted partner for your modernization efforts.

Our commitment to seamless integration ensures that legacy systems merged effectively with new technologies, minimizing operation disruptions and maintaining mission readiness. This integration strategy is crucial for adapting to evolving infrastructure demands while preserving essential mission functionalities.

Beyond integration, we prioritize robust cybersecurity by embedding Zero Trust architectures align with OMB M-22-09, end-to-end encryption, and continuous monitoring at every stage of network modernization. Our solutions adhere to the latest DoD standards, safeguarding mission-critical information from emerging threats. We focus on efficient modernization by targeting high-impact areas, reducing labor requirements, and leveraging existing resources. Our phased implementations and automation tools help lower long-term costs and enhance operational efficiency.



About Tyto Athene

Tyto Athene, LLC, a large portfolio company of Arlington Capital Partners, was established as an IT services and solutions providers specializing in mission-focused digital transformation. Our goal is to enhance client experience and drive successful outcomes through innovative technology solutions.

As a full-service systems integrator, Tyto Athene empowers clients with the ability to make informed, timely decisions by providing secure and ubiquitous access to enterprise information across their operating environments. We leverage cutting-edge technologies, strategic innovation, and proven methodologies to deliver successful results for clients worldwide. With a full spectrum of industry-leading capabilities, substantial scale, and extensive resources, we are equipped to meet the increasingly complex demands U.S. government agencies. Supporting the rapidly evolving mission requirements of federal clients remains our top priority.

Our combination of experience and forward-thinking technology solutions gives Tyto Athene customers a distinct strategic advantage. Our primary objective is to deliver the best solutions and services available in the market to our trusted partners and clients. Tyto Athene remains committed to providing our high-quality products, superior service, and world-class technical support.



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For more information about our digital transformation services,
please email bd@gotyto.com