

Do Legacy Technologies Still Have a Place IN TODAY'S CRITICAL INFRASTRUCTURE WORLD?



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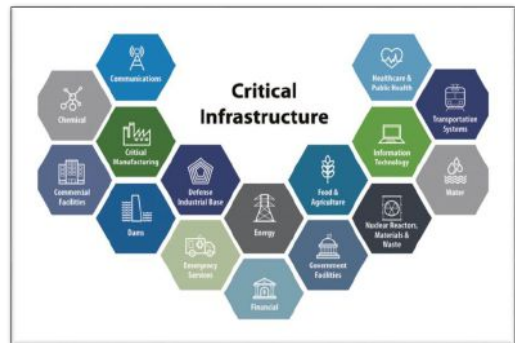
Legacy Ecosystem

Before answering that question, we need to define the Legacy Ecosystem. The term Legacy Ecosystem refers to both the legacy equipment (e.g., multiplexer, modem) and the legacy technologies that the equipment uses (e.g., Time Division Multiplexing (TDM), analog phone line). We will consider both the equipment and the technologies separately in this article as the keys to managing the Legacy Ecosystem. Critical infrastructure plays a pivotal role in ensuring the functioning and security of societies. However, many critical infrastructure facilities continue to rely on legacy technologies, which pose unique challenges in terms of maintenance, security, and operational efficiency. This article examines why legacy technologies and legacy equipment in critical infrastructure industries remain in service. It explores the benefits, risks, and strategies of managing and integrating the components of the Legacy Ecosystem into new technology environments.



Critical infrastructure sectors, such as energy, transportation, healthcare, and communications, are the backbone of our economy. Many of these sectors continue to depend on legacy technologies, implemented using legacy hardware, software, and communication protocols. We will review the reasons for this reliance, the challenges, and potential solutions to leveraging legacy technologies effectively in today's critical infrastructure environments.

Critical infrastructure sectors, such as energy, transportation, healthcare, and communications, are the backbone of our economy.



Legacy technologies continue to have a significant role in today's critical infrastructure. They are deeply ingrained in operations, and their replacement can be complex and costly.

Electric, gas and water utilities still rely heavily on legacy technologies to control and manage electricity generation, transmission, and distribution. Legacy supervisory control and data acquisition (SCADA) systems and older generation assets remain crucial for grid stability and reliability, with the utility industry being just one of the sectors reliant on legacy technologies.

Many critical infrastructure industries, such as oil, gas, and water treatment also rely on legacy industrial control systems (ICS) to manage processes and operations. These systems control critical processes and machinery; their replacement can involve significant downtime and costs. Many water

and wastewater treatment facilities still rely on legacy systems to control and monitor critical functions. These systems have often been customized to suit specific infrastructure requirements.

So why do legacy technologies and equipment persist?

Several factors contribute to the persistence of Legacy Ecosystems in critical infrastructure:

- **Life Cycle Management:** Critical infrastructure components have typically been designed to operate for extended periods, often spanning several decades. This longevity creates a natural tendency to keep using legacy systems.
- **Cost Constraints:** Upgrading infrastructure can be prohibitively expensive, especially for essential systems with high switching costs and integration complexities.
- **Unique Features:** Legacy systems often have customized interfaces and protocols that support critical applications. Often, these functions are incompatible with the latest technologies and must be maintained and supported to ensure business continuity.

Hence, it comes as no surprise, that legacy systems in critical infrastructure industries pose several challenges:

- **Security Vulnerabilities:** Older systems may lack modern security features, making them susceptible to cyber-attacks and data breaches.
- **Reliability Concerns:** As hardware and software age, their reliability may degrade, leading to increased downtime and potential disruptions.
- **Performance Limitations:** Legacy systems might not meet the performance demands of today's data-intensive applications and real-time analytics.
- **Maintainability Difficulties:** Finding spare parts and qualified personnel to maintain and repair legacy systems can become increasingly challenging.

Nonetheless, despite constant pressures to adopt the latest technologies, working with trusted vendors on updating and maintaining legacy technologies can offer significant advantages in critical infrastructure environments:

- **Proven Stability:** Legacy technologies have proven their reliability in critical operations.
- **Minimal Disruption:** Integrating newer technologies alongside legacy technologies can provide a gradual and less disruptive transition.

The safety, security and reliability of utility operations depends on making smart decisions when managing the Legacy Ecosystem.

- **Preserved Investments:** Extending the life of legacy technologies allows organizations to maximize their past investments while planning for future upgrades.
- **Secure communications:** Old school communications such as TDM and especially dial-up offer some of the simplest and most secure methods of transmitting data and allowing controlled access to remote systems.

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Sustaining Legacy Equipment

For legacy equipment, once a particular Original Equipment Manufacturer (OEM) product has reached the End-Of-Life (EoL) stage, customers of the OEM who decide not to migrate to a new system do have an option. They can elect to partner with an EoL sustainment provider such as Onyx Spectrum Technology's Legacy Solutions Division – an independent company specializing in supporting and sustaining EoL products. A company such as Onyx can provide utilities with the support for legacy hardware and software products they require to extend the lifetime of their Legacy Ecosystem.

This type of relationship allows utilities to receive continued sustainment services (maintenance, repair, replacement, upgrades and Subject Matter Expert (SME) services) for their hardware and software to maintain their Legacy Ecosystems' safe, secure and reliable operation. Utilities can achieve this goal by partnering with an end-of-life sustainment provider like Onyx. Because Onyx has access to a reliable and secure supply chain and is capable of providing timely and competent maintenance and repair services, it also provides piece-of-mind for critical infrastructure system operators.

Customers of EoL Sustainment Solution providers can tailor their services according to their needs. As the successor OEM, such a solution provider can



manufacture legacy equipment while designing, implementing and manufacturing upgraded equipment solutions. Meanwhile, utilities can rest assured that Onyx fulfills the stringent requirements of critical infrastructure industries regarding cybersecurity capabilities and reliability through their qualified and certified in-house operations.

Maintaining a Legacy Ecosystem can seem like an overwhelming task. Concerns about reliability, availability and affordability can affect critical infrastructure systems' safe, secure and reliable operation. However, by working with an end-of-life sustainment provider, a customer can design and employ a strategy that assures the desired performance levels of the Legacy Ecosystem while carefully planning for a technology upgrade at a time of their choosing.

Onyx provides a complete sustainment solution by bringing together a diverse network of resources and its own manufacturing facility where it can maintain and build the legacy equipment because it has acquired the intellectual property (IP). Working with Onyx allows customers of EoL'd or soon-to-be EoL'd legacy equipment more certainty regarding future maintenance and equipment availability, in addition to a pathway towards eventual upgrades or replacement.

Three paths to sustaining a legacy product line with Onyx Spectrum Technology

- 1) An OEM that determines that they no longer wish to support their product and EoL the product, but recognizes that users will continue to need sustainment and has an interest in maintaining positive customer relationships will approach Onyx to develop a sustainment program and acquire the IP. Onyx Spectrum, for example, has successfully worked with Sonus Networks to acquire the NET Promina™ TDM product family and, most recently, with Industrial Defender to acquire the Teltone™ product line. Through these arrangements, Onyx Spectrum has become the exclusive end-of-life vendor for parts and support services for these EoL OEM equipment brands.
- 2) A customer whose OEM provider has notified them of an EoL event, reaches out to Onyx Spectrum Legacy Solutions to inquire about a sustainment program. An example of this was the Federal Aviation Administration (F.A.A.) and NATO, both of whom use

the same air traffic control equipment that was about to be EoL'd. Onyx stepped in to acquire the product line and continues to provide parts and repair service for the crucial ATC radar systems across the National Airspace System and NATO countries.

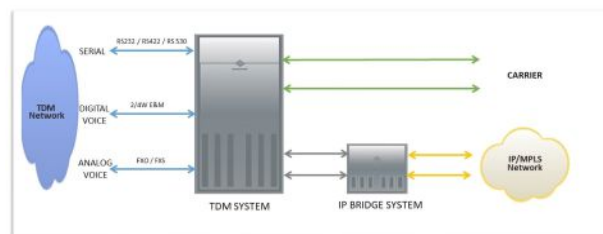
- 3) After an OEM notifies their customers that they will cease supporting products or services, the OEM might still sell down inventory, but the customers need to find a competent maintenance and support provider. In such a case, Onyx can step in and develop a customized legacy sustainment program.

Working with an EoL sustainment vendor ensures continued support and maintenance of the legacy equipment and enables the customer to work with the vendor to develop additional programs to address regulatory and business requirements such as implementing robust security measures to protect the legacy systems from cyber threats.

Legacy Integration

Onyx plays a key role in working with the customer to develop a legacy integration program. Such a program allows the integration of mission-critical services into a new technology environment to support the Legacy Ecosystem.

Onyx has provided integrated solutions for several critical infrastructure customers where existing TDM systems support critical applications that cannot be directly ported to an IP-based network. Onyx's SMEs, with intimate knowledge of TDM and application support systems, work with customers to develop a bridging platform that allows a controlled migration program while the critical applications are updated to operate over an IP-based network:

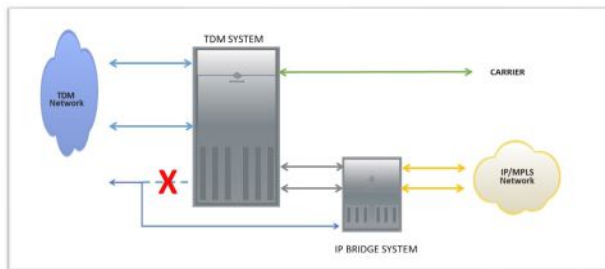


Phase 1 - Allows continued use of the TDM nodes to support the critical legacy applications running over the network while enabling the use of the growing and technologically advanced Ethernet/IP/MPLS networks to deliver new services. This approach provides a seamless experience for the end user, regardless of the technologies at the beginning or end of the connection.

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Phase 2 – Allows user-side services (serial, digital voice, analog voice) to be selectively moved from the TDM platform to the Bridge platform, allowing a controlled and closely managed migration of user services to the new IP-based platform as well as providing the user with new services through the advanced capabilities of the platform.

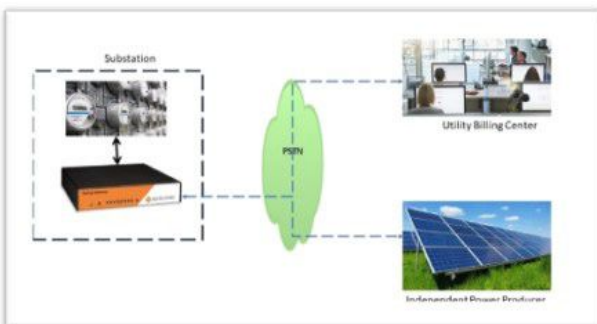
Eventually all TDM user-side services will need to be migrated to the new IP-based platform at the customers preferred pace.

Legacy Modernization

One of the most important benefits an EoL Sustainment provider can offer is "Legacy Modernization." Onyx recommends Legacy Modernization when the legacy technologies still offer a significant benefit to the utility and can be built into a new, upgraded equipment platform that addresses obsolescence issues with the legacy system components.

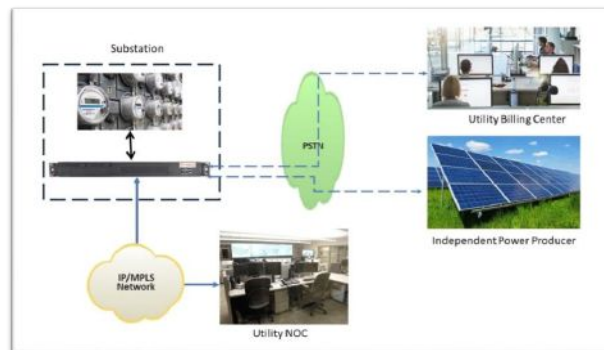
An excellent example of this is the Teltone™ dial-Up Gateway that Onyx acquired from Industrial Defender. The Gateway provides a simple but highly secure shared access to metering information between utility companies as well as between a utility and an Independent Power Producer (IPP) using dial-up connection that only allows access to the metering data.

The dial-up connection is a secure connection shared only between the metering parties, addressing NERC/CIP shared access constraints.



Because this legacy technology will remain in widespread use, Onyx Spectrum is developing a new hardware and software platform that provides the current Gateway capabilities and adds new capabilities such as remote management and monitoring via the utilities' IP-based

network infrastructure as well as enhanced security features that will allow separate, unique dial-in access codes. This new platform will also address component obsolescence with the current equipment.



Conclusion

The answer to the initial question is YES! Legacy technologies will continue to play a significant role in critical infrastructure industries. While there is no one-size-fits-all solution, understanding the benefits, risks, and opportunities offered by companies like Onyx Spectrum Technology's Legacy Solutions Division, allows utilities to make informed decisions on effectively utilizing their legacy technologies and sustaining their Legacy Ecosystems. The gain in operational certainty enables utility companies to carefully plan and prepare their networks for the desired technological changes at their own chosen pace. Whenever organizations evaluate implementing new technology solutions, reviewing the current state of their Legacy Ecosystem is imperative. That careful assessment might lead to surprising solutions and provide an avenue to extend the life of proven equipment. Reaching out to an expert EoL solutions provider can pay off in many ways. Onyx Spectrum Technology is happy to discuss your Legacy Ecosystem needs. ■



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