The Future of Legacy in Next-Generation Industrial Networks

As industrial networks transition to converged-IP communications, there is much residual value in legacy technologies that can–and should–be leveraged.

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Introduction

Industrial operations – such as manufacturing, oil and gas production, mining, and others – have much to gain from the convergence of voice and data communications. With powerful new ease-of-use features for all users–from field operators to executive management– the next-generation industrial-automation network promises long-term cost savings from consolidated hardware and streamlined operations.

But has state-of-the-art IP technology rendered legacy technologies entirely useless? Or does it make sense to evaluate the cost-benefit of older technologies? Is immediate migration to converged-IP imperative? For many applications a stepwise transition to Ethernet/IP is wanted. For others, conversion rather than wholesale replacement for may be the best answer–if not the only answer.

What is the cost--in terms of new hardware, disrupted operations, and downtime--of purchasing, installing and turning up IP-enabled alternatives to existing async devices?

What's worth keeping?

Asynchronous devices. Vast numbers of meters, flow-monitors, PLCs, EFMs, RTUs, etc.–are deployed and operating in industrial networks. These work-horses offer proven reliability, employing such protocols as EIA-232/V.24, EIA-422/V.11, EIA-449/V.36, and EIA-530 to transmit low-overhead, low-speed (e.g. 115.2 kbps) data streams. Is ripping them out in the name of progress really a good idea? What is the cost--in terms of new hardware, disrupted operations, and downtime–of purchasing, installing and turning up IP-enabled alternatives? Are Ethernet-ready replacements even available?

With most asynchronous devices, conversion–not replacement–is the most cost-effective strategy.

By encapsulating asynchronous protocols for Ethernet/IP transport, protocol converters offer the best of both worlds by:

- Connecting async devices to the next-generation IP network.
- Preserving stable systems while avoiding costly replacement.

Sync-serial transport technologies are well understood and widely deployed over ubiquitous copper twisted-pair infrastructures. Is it cost-effective to rip it all out to install CAT5 cables, Ethernet switches, and IP routers? When embedded in structural materials (steel, concrete, etc.) copper wiring is expensive or impractical to replace. Oftentimes replacement is simply not an option.

Statistical multiplexers are often employed to combine asynchronous outputs for transmission across a synchronous-serial V.35, X.21, T1, or E1 composite link (over twisted-pair). An Ethernet-enabled statmux that also supports these legacy protocols delivers the best of both worlds by:

- Preserving legacy infrastructure while providing migration to next-generation networks.
- Future-proofing asynchronous devices with Ethernet/IP connectivity.

Patton's IpStatMux™ Model 3038 transparently transmits multiple asynchronous EIA-232/V.24 datastreams over dual Ethernet/IP and synch-serial composite links. This unique combination of interfaces and functions offers immediate or future migration to all-IP networking–at half the cost of a traditional statmux.

Where Ethernet falls short

While transitioning to converged-IP networks, we must also consider the shortcomings of Ethernet in industrial environments:

- While RS-422 supports data transmission up to 4000 feet at 100 kbps, the 100-meter distance limitation of standard Ethernet is often insufficient.

While transitioning to converged-IP networks, we must also consider the shortcomings of Ethernet in industrial environments.

- Implementing standard Ethernet is costly; purchasing and installing CAT5 or CAT5e cabling may not be practical or possible.
- Designed for climate-controlled offices or data-centers, most Ethernet equipment is not hardened for industrial installations.

By extending standard Ethernet up to five miles over installed twisted pair, ***Ethernet extenders*** address the shortcomings of Ethernet for industrial deployment. Available auto-rate adaptation achieves reliable connections against electromagnetic interference with maximum speeds across maximum distances.

Enclosed in a ruggedized metal enclosure with available conformal coating for protection against condensing humidity, Patton's CopperLink™ Model 2157R withstands operating temperatures from -40 to 85°C.

Conclusion

As industrial automation transitions to converged-IP communications, there is much residual value in legacy network technologies that can – and should – be leveraged.

- ***Interface converters*** provide a cost-effective strategy that preserves investments in highly-reliable asynchronous devices while realizing the benefits of IP convergence.
- ***IP-enabled multiplexers*** provide similar best-of-both advantages by leveraging sync-serial transmission technologies that operate over existing twisted-pair infrastructure.
- ***Ethernet extenders*** solve the distance, cabling, and environmental shortcomings of standard Ethernet to enable deployment in industrial environments.

With over 25 years of experience designing and manufacturing network access and connectivity solutions, Patton Electronics specializes in solutions that leverage **state-of-the art** and **legacy** technologies to provide smooth migration to next-generation communications for industrial automation networks.

Patton's ***Industrial Solutions Guide*** is available as a free download. Go to:
www.patton.com/industrialsolutions

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