SEPTEMBER 2025

Universal Observability as the Key to Successful SAP Migration

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Abstract: SAP's 2027 support deadline for ECC creates both urgency and opportunity. While migration to S/4HANA is inevitable, organizations can use this transition to achieve business results that were previously limited by technical constraints: transforming overnight batch reports into real-time operational decisions, lowering IT maintenance costs through simplified architectures, speeding up time to market with modern integration capabilities, and enabling data-driven innovation via embedded analytics and machine learning.

Successful migrations require three integrated components: a modern business platform, enterprise-grade cloud infrastructure with SAP certification, and comprehensive observability. This analysis explores how combining S/4HANA, Microsoft Azure's SAP-certified infrastructure, and Splunk's unified observability platform forms a solution that addresses the main cloud migration challenges identified by Enterprise Strategy Group research, including security concerns (38%), cost management (35%), system complexity (26%), and performance issues (21%).[1]

Figure 1. Top 10 Cloud-native Challenges

Source: Enterprise Strategy Group, now part of Omdia

[1] Source: Enterprise Strategy Group Research Report, *Application Modernization and the Role of Platform Engineering*, October 2024.

Organizations face two different migration paths. Those using observability tools locally must decide how to maintain visibility during the migration of SAP workloads to the cloud. Those already operating SAP in the cloud need to assess whether their current monitoring offers enough visibility for S/4HANA's distributed architecture. Both scenarios benefit from unified observability that covers application and infrastructure layers.

This paper discusses how comprehensive observability platforms deliver the cross-system visibility and predictive intelligence needed to manage risk and reduce costs throughout the SAP migration process.

The Stakes Are High: Two Paths to Modern SAP Operations

The 2027 support deadline forces every SAP customer into a transformation decision, but organizations approach this challenge from fundamentally different starting points. Understanding these distinct scenarios is critical for planning a successful migration strategy.

Path One: Organizations With On-premises SAP and Observability

Many enterprises currently run SAP ECC on-premises, often with sophisticated, specialized monitoring through platforms like Splunk that they have refined over years of operation. These organizations have built extensive operational knowledge: custom dashboards tailored to their business processes, alert thresholds tuned to their workload patterns, and runbooks that encode institutional expertise.

For these organizations, migration presents a dual challenge. They must not only move SAP workloads to S/4HANA and cloud infrastructure but also determine how to preserve their observability investments. The risk of losing operational visibility during migration—precisely when they need it most—creates additional project complexity.

The opportunity lies in modernizing both layers simultaneously. By migrating SAP to S/4HANA on Azure while moving Splunk to Azure's cloud infrastructure, organizations can maintain continuity of operations while gaining cloud benefits. Teams retain their familiar tools and processes, historical baselines remain accessible for performance validation, and the unified cloud architecture eliminates the complexity of monitoring across hybrid boundaries.

Path Two: SAP Already on Azure, Adding Comprehensive Observability

Organizations that have already migrated SAP to Azure face a different challenge when they operate with basic monitoring capabilities. These companies often rely on native tools that provide infrastructure metrics but lack application context, or they have assembled multiple point solutions that require manual correlation during incidents.

For these organizations, the S/4HANA migration often reveals existing visibility gaps. The increased complexity of S/4HANA's real-time processing, its deeper integration needs, and its distributed architecture challenge monitoring methods that were barely sufficient for simpler ECC deployments.

The opportunity here is to implement comprehensive observability without the constraints of legacy infrastructure. Adding Splunk to existing Azure SAP environments provides immediate visibility improvements: unified dashboards that correlate infrastructure and application metrics, machine learning models that establish baselines and detect anomalies, and prebuilt content that accelerates deployment.

The Time Is Now

Organizations face a critical decision: proactively migrate to S/4HANA or absorb escalating costs for extended ECC maintenance. SAP's pricing structure for extended support makes delay increasingly expensive, with maintenance fees rising significantly after 2027.

Beyond direct financial penalties, organizations that delay migration risk competitive disadvantages. Early adopters are able to leverage S/4HANA capabilities, including dynamic pricing based on real-time analytics, faster financial closing cycles, integrated customer experiences across channels, and data-driven decision-making that accelerates responses to market changes.

The technical debt accumulated in ECC environments compounds daily. Each new customization, workaround, and integration adds complexity that must eventually be resolved. Organizations that begin migration planning early can address this debt methodically, optimizing processes before migration rather than simply lifting and shifting problems to new platforms.

For organizations already using monitoring tools like Splunk, the convergence with Azure creates a unique timing opportunity. Rather than conducting separate infrastructure and monitoring migrations, organizations can modernize both layers simultaneously, reducing overall project risk and timeline. Similarly, companies already on Azure can implement comprehensive observability before their S/4HANA migration begins, establishing baselines and visibility that are key during the transformation process.

The Migration Complexity Reality

For most enterprises, SAP is the backbone driving critical business activities: financial transactions, partner-driven supply chains, customer interactions, and specialized industry processes. Over decades, companies have invested heavily in customized SAP environments—often building a large custom code base—to capture unique competitive advantages such as specialized pricing algorithms, country-specific regulatory compliance, and tailored manufacturing workflows.

While these customizations delivered substantial business value in ECC, migrating to S/4HANA's modern, streamlined architecture requires careful evaluation. Custom code optimized for row-based tables may need complete restructuring for columnar databases. Complex business logic embedded in custom code might conflict with S/4HANA's simplified processes. Industry-specific modifications that provided a competitive advantage must be preserved while adapting to new technical paradigms.

This accumulated complexity makes comprehensive visibility essential. Organizations need to understand not just what customizations exist, but how they behave, what dependencies they create, and how they'll perform in the new architecture.

Why Traditional Monitoring Falls Short

The complexity of modern SAP migrations exposes fundamental limitations in traditional monitoring approaches. These limitations are not simply inconveniences; they directly contribute to the migration challenges Enterprise Strategy Group research identified.

Traditional SAP monitoring tools operate within defined boundaries. SAP Solution Manager provides detailed insights into work processes, batch jobs, and transaction performance, but its visibility ends at the SAP system border. When an order-to-cash process involves external credit checks, tax calculations, or inventory systems, Solution Manager cannot track the complete transaction flow.

Similarly, Azure Monitor excels at infrastructure metrics—CPU utilization, network throughput, storage IOPS—but lacks the context to understand what these metrics mean for business operations. A spike in database connections

might indicate normal month-end processing or a runaway custom report. Without application context, infrastructure monitoring often generates noise rather than actionable insights.

This fragmentation creates operational inefficiencies that can compound during migration. Teams spend hours correlating timestamps across different tools, attempting to reconstruct what happened during an incident. Problems at integration boundaries—where most production issues occur—fall into the gaps between monitoring domains.

The operational cost of inadequate monitoring extends beyond extended resolution times. Organizations operating with fragmented tools experience increased incident frequency due to missed early warning signals, longer mean time to resolution as teams navigate multiple tools, higher operational overhead from maintaining multiple monitoring systems, and reduced migration confidence when teams cannot validate that new systems perform equivalently to legacy environments.

Modern SAP architectures amplify these monitoring challenges. S/4HANA's real-time processing depends on reliable integration performance across distributed components. A single business transaction might traverse a dozen systems, each a potential point of failure. Traditional monitoring approaches that treat each system independently cannot provide the end-to-end visibility required for troubleshooting and optimization.

The Three-Way Solution: S/4HANA, Azure, and Splunk

The convergence of S/4HANA's business capabilities, Azure's cloud infrastructure, and Splunk's observability platform addresses the fundamental gaps that traditional monitoring cannot bridge. This integration creates capabilities that none of the components could deliver independently.

S/4HANA provides the business platform with real-time processing capabilities, but without end-to-end visibility, organizations cannot optimize its performance or quickly resolve issues. Azure delivers the scalable infrastructure and managed services, but infrastructure metrics alone don't reveal business impact. Splunk provides comprehensive observability, but it needs deep integration with both the application and infrastructure layers to deliver its full value.

Splunk leverages Azure-native services for data ingestion, storage, and processing, while maintaining microsecond-precision correlation with infrastructure events. Splunk's prebuilt content for SAP understands transaction codes, ABAP statistics, and HANA metrics, translating technical telemetry into business-relevant insights. This unified architecture eliminates the latency, complexity, and blind spots that plague distributed monitoring approaches.

How the Three-way Solution Delivers Value: Five Critical Capabilities

The integrated solution addresses the specific pain points identified in Enterprise Strategy Group Research through five key capabilities that transform migration challenges into managed processes.

1. Real-time Intelligence With Continuous Validation

S/4HANA enables real-time analytics through in-memory processing, transforming batch reports into instant insights. However, this capability depends entirely on reliable integration performance across systems. When synchronization fails or APIs throttle, real-time becomes "real-time with gaps." Organizations discover these issues only after business impact—oversold inventory, delayed orders, and incorrect pricing.

Splunk continuously monitors integration health, tracking API response times, message queue depths, and data synchronization status. Machine learning models detect degradation patterns before they impact real-time operations. When issues occur, distributed tracing pinpoints the exact failure point across SAP, Azure services, and external systems.

Figure 2. S/4HANA Enables Real-time Intelligence, but Integration Is Key

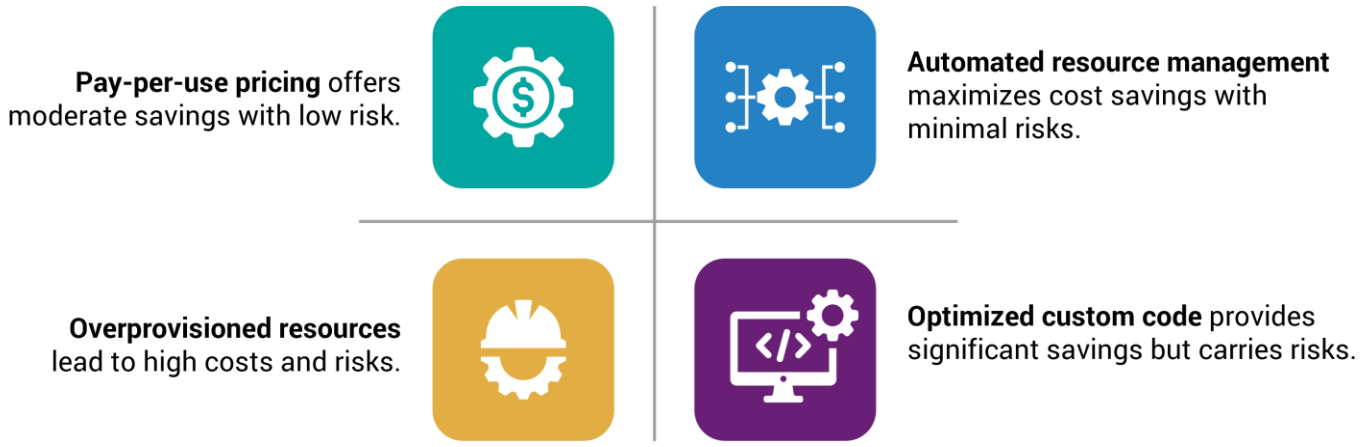
Source: Enterprise Strategy Group, now part of Omdia

2. Cloud Economics Through Intelligent Optimization

Azure's consumption model promises cost efficiency through pay-as-you-go pricing and elastic scaling. Yet without visibility into what drives consumption, organizations face unexpected costs. Custom ABAP code inefficiencies, overprovisioned resources, and poor batch job scheduling can eliminate expected savings.

Splunk correlates Azure billing data with SAP business process data, revealing true activity-based costs. Machine learning models then analyze historical patterns to forecast future costs and issue alerts in case of expected budget overruns.

Figure 3. Azure Cost Management Strategies



Source: Enterprise Strategy Group, now part of Omdia

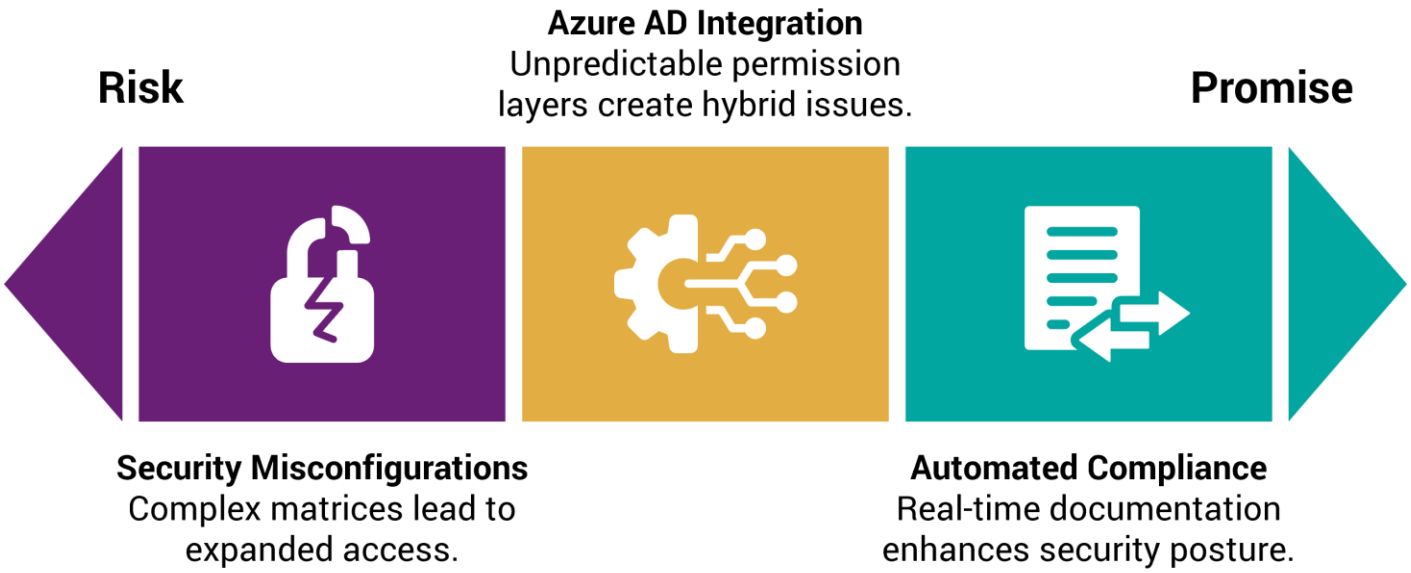
3. Security and Compliance Through Unified Visibility

S/4HANA and Azure provide robust security frameworks with role-based access controls, encryption at rest and in transit, and comprehensive audit capabilities. However, migration often introduces configuration complexities that create unintended vulnerabilities.

Simplifying ECC's authorization schemes, which may include thousands of roles with complex inheritance patterns, risks creating permission gaps or overlaps. Azure Active Directory integration can inadvertently grant broader access than intended when group memberships combine with SAP authorizations. Compliance violations might go undetected until audit findings surface months later.

Splunk Enterprise Security creates a unified security operations center across SAP and Azure. It correlates authorization events from SAP's Security Audit Log with Azure AD sign-ins, network flows, and database access patterns. Behavioral analytics establish normal access patterns for each user, then detect deviations that indicate potential compromise, such as accessing sensitive financial data outside normal hours or from unusual locations.

Figure 4. Security Posture Shifts From Risk to Promise in S/4HANA Migration



Source: Enterprise Strategy Group, now part of Omdia

4. Performance at Scale With Predictive Analytics

Azure's elastic infrastructure enables S/4HANA to scale dynamically based on demand. Yet post-migration performance issues remain common, particularly when custom code has not been optimized for columnar databases. Legacy ABAP code that performed acceptably against ECC's row-based tables can cause severe performance degradation with HANA's columnar structure.

Splunk IT Service Intelligence (ITSI) establishes performance baselines during normal operations and then uses machine learning to identify degradation patterns before users experience any impact. The platform provides deep visibility into application and infrastructure performance, helping teams pinpoint areas that may require optimization. Predictive models trained on organization-specific patterns forecast when current trends will surpass thresholds, enabling proactive intervention.

Figure 5. Azure Migration Performance Analysis

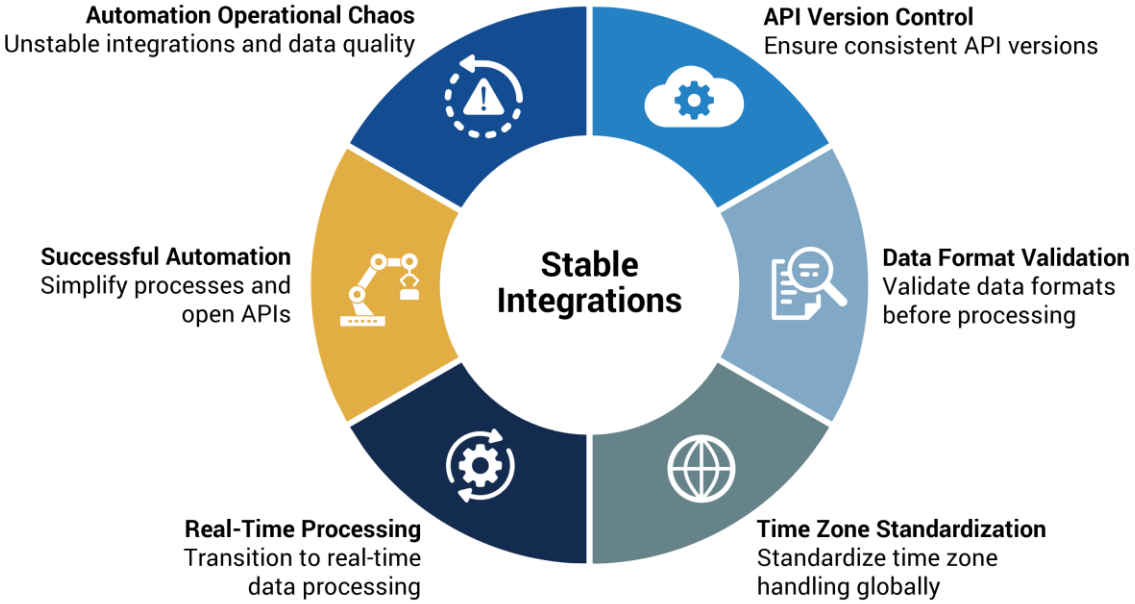
Source: Enterprise Strategy Group, now part of Omdia

5. Process Innovation Through Observable Automation

S/4HANA's simplified processes and open APIs enable automation opportunities through robotic process automation, IoT integration, and machine learning-driven workflows. However, automation is fragile without proper monitoring, and minor disruptions can cascade into major operational issues.

Splunk monitors automated processes end to end, tracking success rates, execution times, and data quality metrics. Real-time monitoring detects anomalies in automated workflows, triggering alerts or circuit breakers before errors propagate. This safety net gives organizations confidence to pursue ambitious automation strategies, knowing they have both visibility and control.

Figure 6. Achieving Automation Success With S/4HANA



Source: Enterprise Strategy Group, now part of Omdia

Observability Architecture for Hybrid SAP Environments

Making the three-way solution work requires specific technical capabilities that traditional monitoring approaches cannot provide. These architectural components work together to deliver the comprehensive visibility organizations need throughout their migration and beyond.

Distributed Transaction Tracing

Modern SAP environments involve transactions that span multiple systems and protocols. A single order might flow through web portals, API gateways, SAP Gateway services, core S/4HANA modules, HANA database operations, middleware platforms, and external services.

Splunk implements distributed tracing by correlating transaction IDs at origin, then propagating these identifiers across every touchpoint. Splunk understands both SAP-specific protocols (RFC, IDoc, BAPI) and modern standards (REST, gRPC, GraphQL).

Cost Analytics and Attribution

Understanding cloud costs requires more than viewing Azure billing reports. Organizations need to correlate infrastructure consumption with specific business activities to make informed optimization decisions.

Splunk ingests Azure Cost Management APIs and correlates consumption data with SAP workload statistics, transaction codes, and user sessions. This reveals the true cost of business operations—not just that compute costs increased 30% but that a specific custom inventory report generates 10,000 unnecessary database queries, consuming $5,000 monthly.

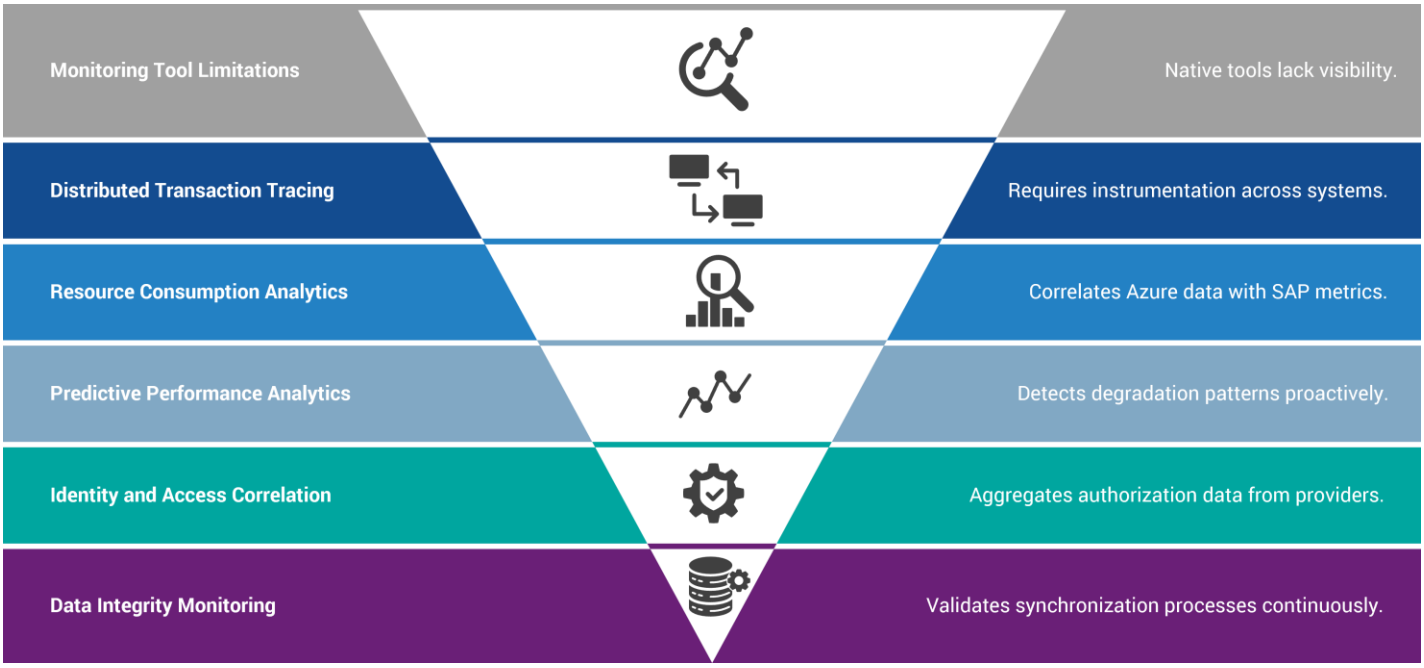
Predictive Performance Analytics

Splunk ITSI establishes dynamic baselines by analyzing thousands of metrics across SAP application servers, HANA databases, Azure infrastructure, and integrated systems. Machine learning algorithms distinguish between normal variations, such as increased load during month-end closing, and genuine anomalies requiring intervention.

Identity and Access Correlation

Splunk Enterprise Security aggregates authorization data from SAP Security Audit Logs, Azure Active Directory, database access controls, and application-specific permissions into a unified security model. Graph analytics visualize authorization paths, revealing how combinations of technically valid permissions create prohibited access.

Figure 7. Hybrid SAP Landscapes Observability Challenges



Source: Enterprise Strategy Group, now part of Omdia

Implementing Observability Throughout the Migration Lifecycle

Successful S/4HANA migrations treat observability as a parallel workstream that begins before migration planning and continues through post-production optimization.

Pre-migration: Building the Foundation

Before migration begins, Splunk establishes comprehensive baselines that become critical reference points. Dependency discovery automatically maps application dependencies by analyzing network traffic, API calls, and database connections. This discovery reveals both documented integrations and shadow IT connections, typically uncovering many more integration points than documented.

Performance baselines capture granular metrics—transaction response times, database query patterns, batch job durations, and infrastructure utilization. These baselines validate that post-migration performance meets or exceeds current state, while identifying optimization opportunities to address during migration.

Migration Execution: Real-time Validation

During migration phases, Splunk provides continuous visibility, enabling rapid issue detection. Cutover verification automates testing by comparing behavior signatures between legacy and new environments. This goes beyond basic smoke tests: Splunk validates that business processes produce identical outcomes even when technical implementation differs.

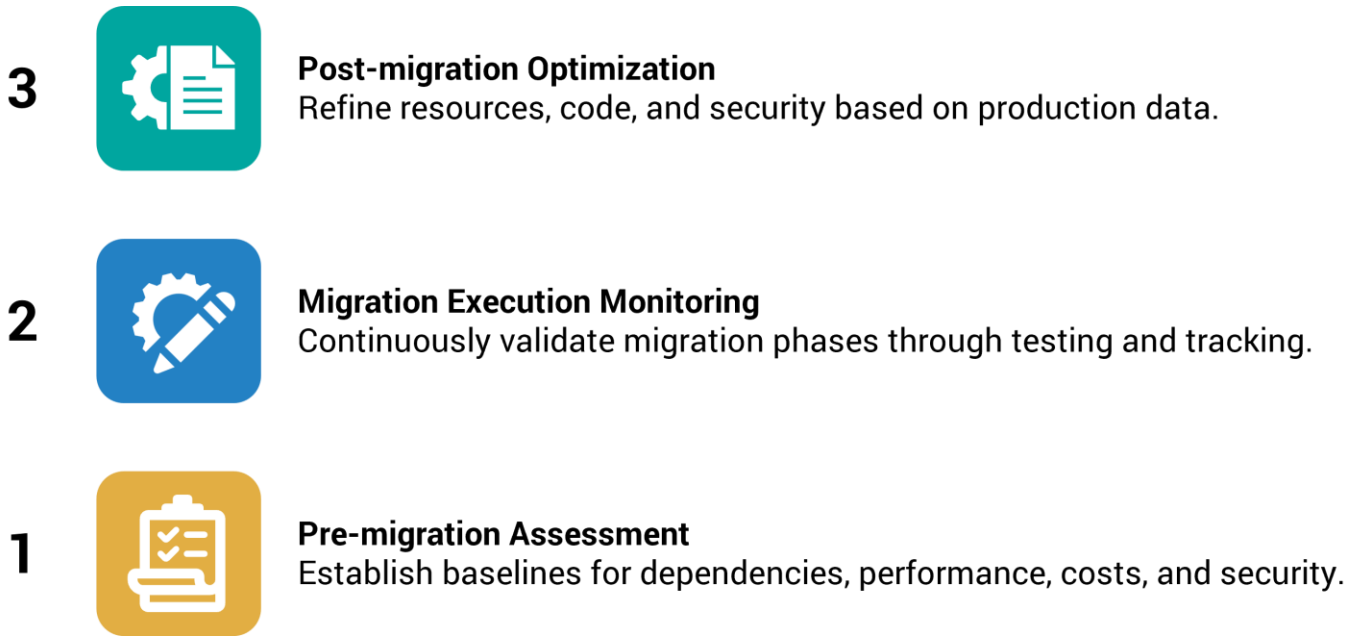
For phased migrations using canary deployments or blue-green patterns, Splunk monitors both environments simultaneously. Real-time dashboards show comparative metrics: error rates, response times, resource consumption, and business KPIs. Data integrity monitoring continuously validates synchronization between old and new systems through checksums, record counts, and business rules.

Post-migration: Optimization Through Intelligence

After migration, Splunk transforms operational data into continuous improvement opportunities. Resource right-sizing analyzes actual workload patterns, often identifying significant cost reduction opportunities through data-driven optimization. Application performance monitoring pinpoints specific ABAP code segments performing poorly with HANA's columnar structure.

Production access patterns captured by Splunk reveal opportunities to implement least-privilege without disrupting operations. The platform shows which authorizations are actually used versus merely assigned, enabling systematic permission reduction based on evidence rather than assumptions.

Figure 8. Achieving Successful S/4HANA Migration



Source: Enterprise Strategy Group, now part of Omdia

Technical Architecture Considerations

Splunk's Azure-native Architecture

When Splunk operates on Azure infrastructure alongside SAP workloads, it leverages native Azure services to optimize performance and reduce operational overhead. Azure Event Hubs handles high-volume telemetry ingestion, processing millions of events per second during batch processing windows. Intelligent storage tiering leverages Azure Storage's lifecycle management to reduce costs significantly compared to keeping all data in high-performance tiers.

Azure Private Link ensures SAP data never traverses the public internet when flowing to Splunk. Integration with Azure Key Vault eliminates hardcoded credentials, while managed identities provide secure authentication between services.

SAP-specific Intelligence Layer

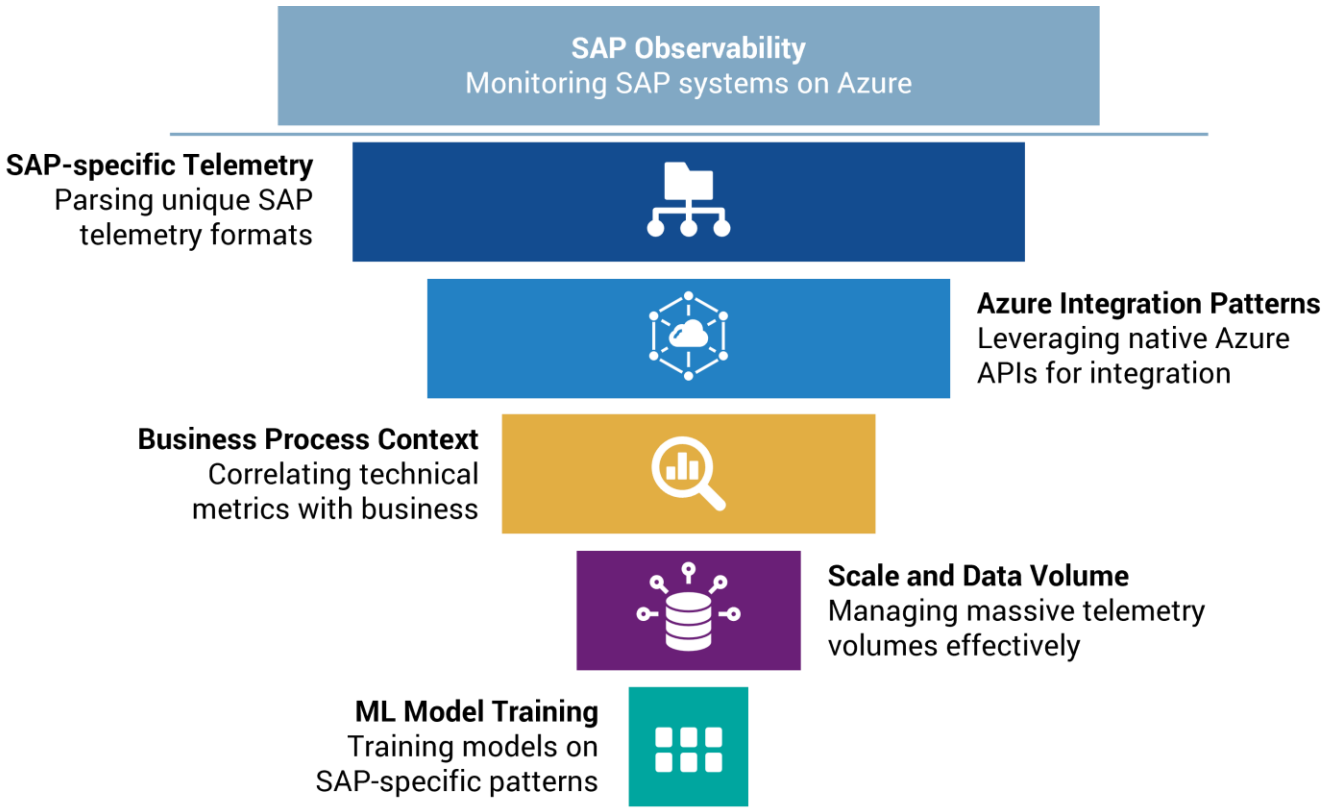
Splunk's prebuilt content for SAP provides business-aware monitoring that understands the relationship between technical metrics and SAP transaction codes. When database response time increases, Splunk identifies which specific business transactions are affected (e.g., order entry, material movements, or financial postings).

The platform parses ABAP runtime statistics, identifying inefficient custom code patterns. Splunk recognizes common performance anti-patterns like nested SELECT statements in loops, missing indexes on custom tables, and inefficient use of internal tables. Development teams receive specific optimization recommendations rather than generic performance alerts.

Integration Patterns for Hybrid Scenarios

During migration, organizations often operate in hybrid mode, with some systems on premises and others in cloud. Splunk Universal Forwarders deploy on-premises stream data to Splunk Cloud on Azure, while maintaining local caching for resilience. Despite distributed data sources, Splunk provides unified operational views where a single dashboard can display metrics from on-premises ECC, cloud-based S/4HANA, Azure infrastructure, and external services.

Figure 9. SAP Observability on Azure: Unveiling Hidden Technical Complexities



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Conclusion: The Three-way Solution as a Migration Enabler

The 2027 ECC support deadline fixes the timeline for what is, for many, the most complex transformation they will undertake. Moving from monolithic, row-based ECC to distributed, columnar S/4HANA isn't a lift-and-shift process; it's a reset of custom code, integration patterns, and operations.

The convergence of S/4HANA, Azure, and Splunk addresses this head-on through complementary strengths: S/4HANA provides the modern business platform and simplified data model; Azure supplies SAP-certified, enterprise-grade cloud services and hybrid connectivity; and Splunk delivers unified observability that crosses application, data, and infrastructure boundaries where traditional monitoring stops. Together, these components turn migration risk into managed change.

Two common starting points benefit immediately. Organizations running ECC on prem with Splunk can migrate both SAP and Splunk to Azure to preserve dashboards, alerts, and institutional know-how while modernizing the underlying platform. Teams keep the operational muscle memory they rely on—precisely when change is most disruptive. Conversely, SAP shops already on Azure can close visibility gaps for S/4HANA by implementing Splunk to unify views across infrastructure and SAP workloads, reducing manual correlation during incidents.

Enterprise Strategy Group's findings reinforce why observability cannot be an afterthought. Treating Splunk as a parallel workstream enables earlier detection, continuous validation, and systematic optimization. Running Splunk on the same Azure estate as SAP further streamlines ingestion, storage, and processing via native services, while retaining SAP-specific intelligence that generic tools lack so that correlation happens at the speed real-time operations demand.

The bottom line is that successful S/4HANA programs require all three elements—S/4HANA's business capabilities, Azure's certified cloud foundation, and Splunk's unified observability—working in concert. With the deadline approaching and complexity growing, the organizations that move now will transform deliberately rather than react under pressure.

About Enterprise Strategy Group
Enterprise Strategy Group, now part of Omdia, provides focused and actionable market intelligence, demand-side research, analyst advisory services, GTM strategy guidance, solution validations, and custom content supporting enterprise technology buying and selling.

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