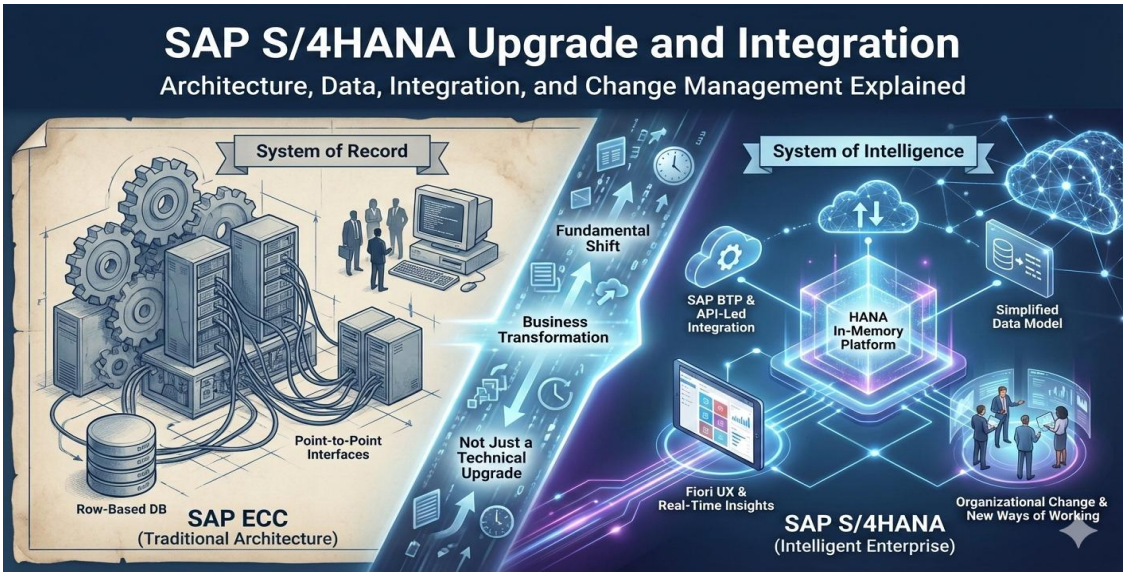

SAP S/4HANA Upgrade and Integration

Architecture, Data, Integration, and Change Management Explained

Upgrading from SAP ECC to SAP S4 HANA is not a traditional technical upgrade. It is a fundamental shift in system architecture, data model, integration strategy, and how users work every day. Programs that succeed treat S4 HANA as a business transformation enabled by technology, and not as a purely technical (IT) exercise.

This article explains the core architecture changes, integration strategy, project approach, and the most underestimated risks, including data readiness and organizational change.

Core Differences in Architecture

SAP S4 HANA introduces a radically different technical foundation compared to ECC.

• SAP S4 HANA runs exclusively on the SAP HANA in memory database. This changes how data is stored, processed, and reported.

• Screens and how to use the SAP system change for every person. SAP Fiori becomes the primary entry point instead of SAP GUI menus and T codes. Users work from role based tiles and apps rather than navigating long transaction paths

• Search driven navigation replaces memorizing transaction codes. Screens are new, simpler and faster with fewer required fields.

• The way to obtain information and reporting changes. Users see real time status without running batch reports.

• Traditional ECC aggregate and index tables are largely eliminated. HANA calculates results in real time instead of relying on pre aggregated data.

• The data model is simplified and unified. A key example is the universal journal table ACDOCA, which merges FI and CO data.

• Material ledger becomes the standard, not an option, impacting inventory valuation and finance integration.

• Many custom Z tables and reports built to compensate for ECC limitations become obsolete or redundant.

This simplification improves performance and transparency but exposes data and process inconsistencies that were hidden in ECC and require re-training and strong change management.

A global manufacturing company had been running SAP ECC for over 15 years. Reporting performance was slow, and finance relied on multiple reconciliation reports to align Finance and Controlling. The upgrade to S4 HANA improved reporting speed and eliminated reconciliation pain. Month end close was reduced by two days. Finance gained real time visibility.

Change Impact Users Often Underestimate

• Users must unlearn ECC habits and shortcuts

• Excel based shadow processes are challenged

• Users are more accountable for data accuracy at entry

• Training must focus on scenarios, not transactions

• Early discomfort is common even when the system is working correctly

System Landscape Architecture Changes

The upgrade approach directly shapes the system landscape.

• You must choose between greenfield, brownfield, or selective data transition. Each option has different technical and organizational implications.

• SAP Fiori becomes the primary user interface, requiring a Fiori front end server, launchpad configuration, and role redesign.

• Existing integrations to other systems and applications may break because they rely on ECC tables or obsolete logic.

• HANA infrastructure sizing is memory driven and follows rules very different from traditional databases.

Landscape decisions made early are difficult to reverse and have long term cost and adoption implications.

A consumer goods company initially planned a brownfield conversion to minimize disruption. With assistance, upgrades checks and a simplification analysis was performed to help them choose an approach that balanced speed, cost, and business transformation. After high volumes of unused custom code and obsolete master data was identified, the company shifted to a selective data transition approach. This reduced custom code footprint by over 40 percent, lowered long term support costs, and improved user adoption due to cleaner processes.

Technical Architecture Considerations

The technical part of the upgrade affects every layer of the system.

• Custom ABAP code must be analyzed using SAP tools to identify syntax changes, HANA SQL issues, and table model incompatibilities.

• Activation of business partner and the universal journal impacts finance, logistics, and integration architecture.

• Reporting shifts toward Core Data Services views, which become the foundation for operational and analytical reporting.

• Batch jobs and performance tuning must be redesigned because HANA processes data differently than disk based databases.

Ignoring these changes leads to performance issues and broken business processes after go-live.

Security and Roles Architecture

Security is no longer just about SAP GUI roles.

• Fiori introduces catalogs, groups, and spaces that must be aligned to business roles.

• SAP S4 HANA introduces more granular authorization objects due to simplified tables and new processes.

• Poorly designed roles surface as business disruption immediately after go-live.

Security design must run in parallel with functional and Fiori design, not at the end.

Integration Architecture for SAP S4HANA

Integration with S4 HANA requires a fundamental shift in mindset.

API Based Integration Preferred

• Use SAP released APIs instead of direct table access.

• APIs are available as OData and REST services.

• SAP API Hub is the reference for supported interfaces.

• APIs are upgrade safe and backward compatible.

Best for cloud systems and new integrations.

Event Driven Integration

• S4 HANA publishes business events such as sales order creation or invoice posting.

• Downstream systems consume events asynchronously.

• This reduces tight coupling and improves scalability.

Typical tools include SAP Event Mesh and SAP Advanced Event Mesh on SAP BTP.

Middleware Based Integration

• SAP Integration Suite on BTP is the SAP strategic middleware platform. I have also used 3rd party middleware such as Boomi and MuleSoft quite successfully.

• SAP PI or PO is still supported but considered transitional.

• Middleware handles routing, mapping, security, retries, and monitoring.

Used for complex mappings and high volume transactional scenarios.

Supported Integration Technologies

• IDocs remain widely used and supported, especially for logistics.

• RFCs and BAPIs are supported but should be minimized for new designs.

• CDS views are used for read only data consumption and analytics.

Integration Best Practices

• Never integrate directly to S4HANA database tables.

• Use only SAP released objects.

• Centralize monitoring and error handling.

• Document integration ownership and contracts.

A healthcare company has an ECC system tightly integrated with over 30 external systems using direct table access and custom RFCs. The objective with the S4 HANA upgrade was to redesign integrations to be stable, upgrade safe, and cloud ready.

Actions taken:

• Replaced table based integrations with SAP released APIs.

• Introduced SAP Integration Suite as the central middleware.

• Implemented event driven integration for high volume order scenarios.

• Standardized monitoring and error handling.

Direct table access is the biggest integration risk in S4 HANA programs. With the changes, the company eliminated upgrades breaking integrations, reduced interface failures by more than 50 percent, and enabled faster onboarding of cloud applications.

Data Migration Architecture

Data migration is one of the highest risk areas.

• Brownfield upgrades use SUM with the Database Migration Option.

• Business partner becomes the single source of truth for customers and vendors.

• Universal journal and material ledger migrations require extensive preparation and reconciliation.

• Trial migrations are essential to validate timing, data quality, and cutover plans. It is not uncommon to have 4 to 5 comprehensive trial migrations.

Most failures are caused by data quality, not tools.

For example, during a brownfield conversion, multiple migration rehearsals failed late in testing, putting the entire upgrade project timeline and budget at a significant risk. The key point was to identify why the technical migration worked but business validation failed. The company analyzed failed Business Partner conversion logs and discovered duplicate vendors, incomplete customer records, and inconsistent charts of accounts. Then, a data cleanup initiative led by functional owners took place, which finally allowed the project team to re-ran migration rehearsals after remediation.

Data issues surface late unless addressed before the technical upgrade starts. It is strongly advisable to start on data cleaner up soon and obtain Finance and Procurement business sign off earlier in the project.

Reporting and Analytics Architecture

Reporting changes significantly in S4 HANA.

• Classic ECC tools like LIS and some extractors are deprecated.

• Embedded analytics uses CDS views, the HANA engine, and Fiori apps.

• BW landscapes may need redesign depending on how much reporting moves into S4.

This enables real time insight but requires new skills and design patterns.

Architecture Workstream Project Plan

Below are the core areas that need to form the foundation of a solid project plan:

1. Architecture Assessment and Discovery

• Review ECC landscape, modules, custom code, integrations, and reporting.

• Analyze simplification items and readiness check results.

• Document current dependencies and pain points.

2. Target Architecture Design

• Define DEV, QA, PROD, sandbox, and Fiori landscape.

• Design HANA sizing, high availability, and backup strategy.

• Define integration, security, and data architecture.

• Document universal journal and business partner impacts.

3. Custom Code Remediation

• Run ATC and Quick Fix tools.

• Classify code into keep, fix, replace, or retire.

• Redesign reports using CDS views.

4. Data Management and Migration

• Plan business partner conversion.

• Design finance and logistics migration steps.

• Coordinate SUM with DMO.

• Execute trial migrations.

5. Integration Rebuild

• Validate all interfaces.

• Redesign broken integrations.

• Shift to API first where possible.

6. Infrastructure and Basis Readiness

• Validate HANA sizing.

• Build landscapes, ideally copies of production (with less data due to cost constraints)

• Define transport and refresh strategy.

7. Testing and Cutover

• Define end to end test scenarios.

• Run multiple migration rehearsals.

• Finalize downtime and cutover steps.

8. Go Live and Stabilization

• Monitor performance and data behavior.

• Tune CDS views, batch jobs, and Fiori apps.

• Confirm security and integrations.

Most Underestimated Risk: Data and Process Readiness

The technical upgrade usually works. The problems come from business reality.

Why it is underestimated

• Leadership views it as an IT upgrade.

• Years of inconsistent data and custom logic exist in ECC.

• Functional remediation effort is underestimated.

Where it causes trouble

Master Data

• Business partner conversion failures.

• Material master inconsistencies.

• Chart of accounts and cost object issues.

Custom Processes

• Critical logic hidden in Z code.

• Dependencies on obsolete ECC tables.

Finance Configuration

• FI and CO misalignment exposed by the universal journal.

• Material ledger valuation issues.

• Asset accounting complexity.

Fiori and Security

• Roles treated as UI work instead of security redesign.

• Authorization gaps appear at go live.

How successful programs avoid it

• Start data cleanup months early.

• Treat S4 HANA as business transformation.

• Involve functional leads early.

• Run multiple migration rehearsals.

• Design Fiori roles alongside process design.

Second Most Underestimated Risk: Organizational Change and User Adoption

S4 HANA changes how people work.

Why it is underestimated

• Assumption that SAP is still SAP.

• Focus on technical milestones.

• Training pushed late or minimized.

Where it causes trouble

• Users lose familiar transactions and screens.

• New navigation and terminology cause confusion.

• Productivity drops at go live.

• Shadow processes reappear in Excel.

How successful programs manage change

• Treat change management as a core workstream.

• Train by role and scenario, not transactions.

• Use early Fiori exposure and pilots.

• Involve users in testing.

• Measure adoption and productivity.

As an example, in a S4 HANA upgrade project, despite a technically successful go live, users struggled in the first weeks. The company had to restore productivity and adoption after the fact, which significantly undermined confidence. Actions taken:

• Delivered role based and scenario based training.

• Used real business data in training environments.

• Provided quick reference guides and in app support.

• Established super user networks.

With quick and well thought out action, productivity recovered within weeks instead of months. The embedded analytics adoption increased. Leadership confidence improved.

It is important to remember that user adoption determines whether S4 HANA delivers business value. A strong change management and training program is vital.

Final Thought

Successful SAP S4 HANA programs balance architecture, data, integration, and people. S4 HANA simplification delivers value only when legacy workarounds are retired, not migrated. The technology enables transformation, but data quality, proper validation of integrations to other systems, and user adoption determine whether the business realizes value.

About the Author

Fernando Graf is a Senior Program Manager with 20+ years leading complex global technology, operations, and digital transformation initiatives. He combines MBA-level business strategy with deep technical expertise across SAP, SaaS, cloud, AI, supply chain, manufacturing, and retail enterprises. Fernando is known for turning underperforming environments into scalable, high-impact ecosystems that reduce cost, accelerate delivery, and unlock new revenue.

Career Impact Highlights: - **$300M+** combined revenue growth and cost savings delivered across Fortune 500 clients - Led development and launch of an AI SaaS platform achieving **430% sales growth** in 12 months - On-time and on-budget SAP upgrade and integrations leadership in **multi-million** projects - Directed M&A technology integrations generating **$100M+ in IT savings** - Proven leader of global teams across the US, LATAM, and Europe; fluent in English, Portuguese, Spanish; - Scrum Master Project Management certification, and Lean Green Belt and AI/ML MIT course work.

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