OAK RIDGE National Laboratory

June 2026

Upgrade Unlocked:

Inside an S/4HANA Technical Upgrade

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U.S. DEPARTMENT OF ENERGY

ORNL IS MANAGED BY UT-BATTELLE LLC
FOR THE US DEPARTMENT OF ENERGY

Agenda

- About ORNL
- Project Context
- Partner Collaboration
- Project Readiness
- Change Management
- Mock Cutover
- Production Cutover
- Lessons Learned

About ORNL

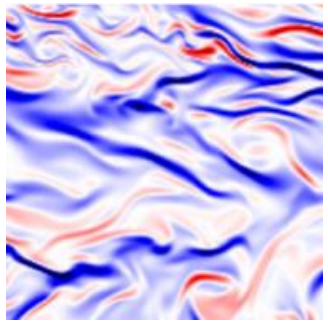

OAK RIDGE NATIONAL LABORATORY
BIG SCIENCE
BIG IMPACT
Ts
Tennessine
CRAY
OAK RIDGE
National Laboratory
ENERGY
Hewlett Packard
Enterprise
AMD
FRONTIER
OAK RIDGE
National Laboratory

ORNL's mission

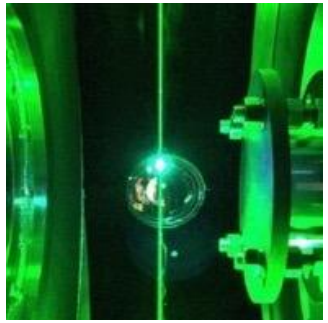
Deliver scientific discoveries and technical breakthroughs that will accelerate the deployment of solutions in energy and national security and, in doing so, create economic opportunity for the nation.

ORNL’s foundational expertise yields solutions to challenging problems with global impact

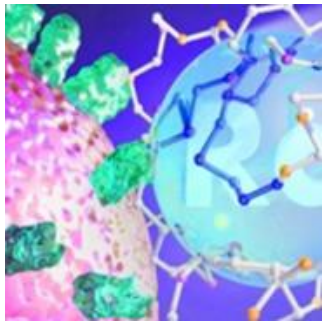
Biology and environment



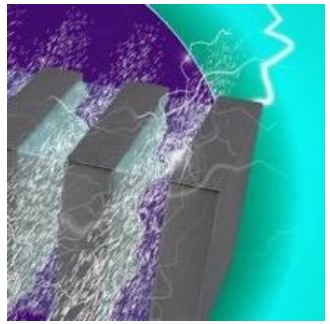
Fusion and fission



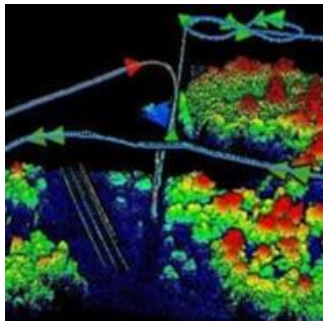
Isotopes

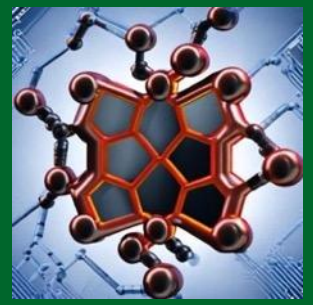


Energy science and technology

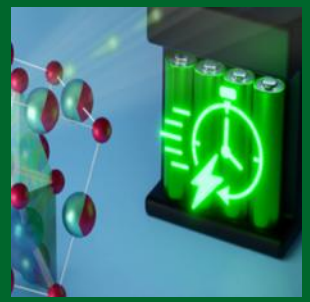


National security





Computing, AI, and quantum

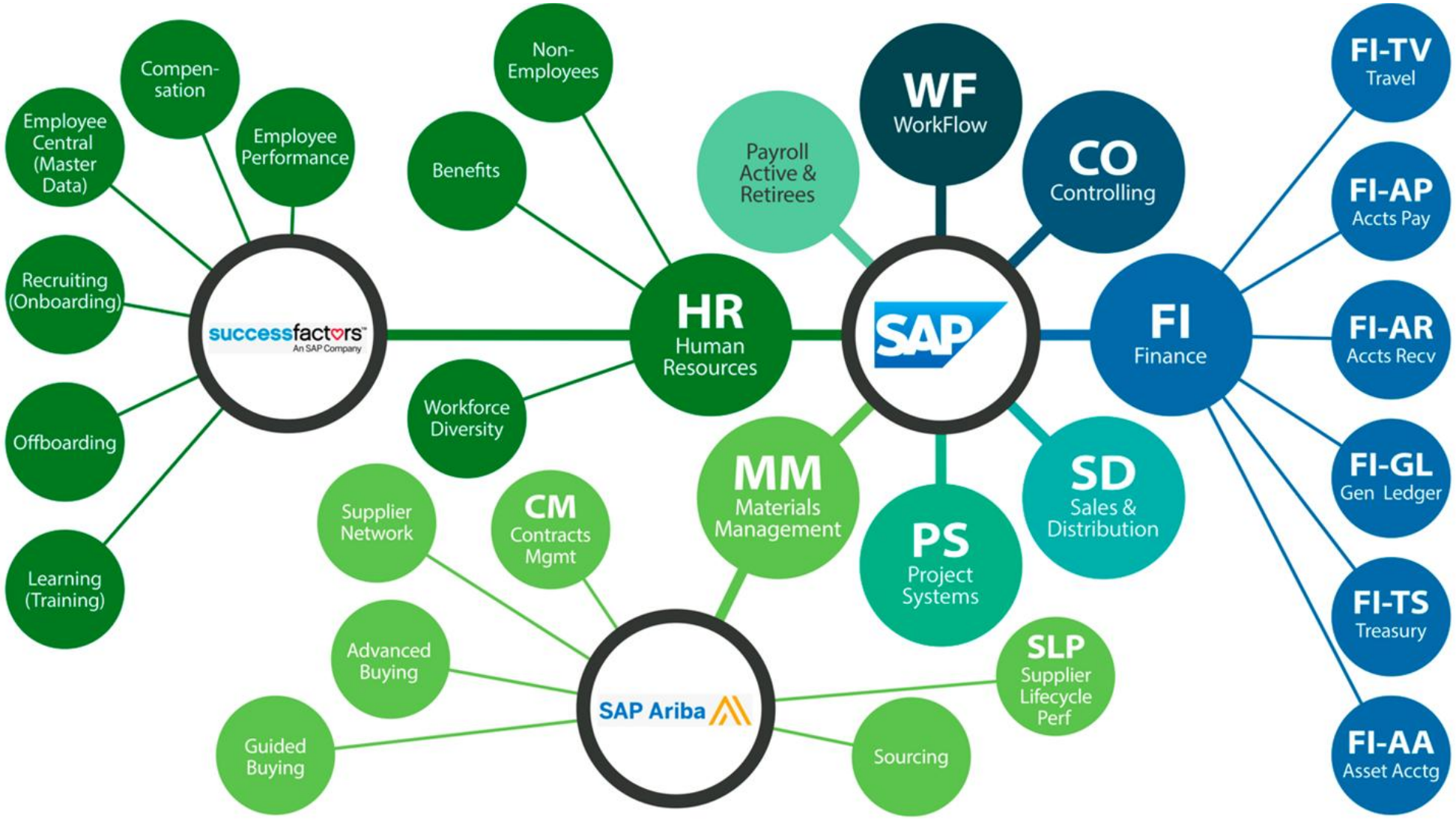


Neutrons

Materials, chemistry, and nuclear physics

Project context

The SAP footprint at ORNL is extensive, supporting nearly all critical business and operations functions.



An upgrade was necessary to maintain business continuity beyond 2027.

CONTEXT

SAP will stop supporting version ECC in 2027

MISSION

Upgrade from ECC to S/4 HANA to remain supported and to enable future business process improvements

PROJECT PHILOSOPHY

Minimize risk and incorporate lessons learned

APPROACH

Technical upgrade, reengineering only where SAP forces a change in process or technology. This approach minimizes risk and impacted staff as compared to new deployment

Lessons learned from prior business system projects were applied to strengthen our plan and delivery.

Sufficient resource allocation

Insufficient allocation of resources from business units impacts all phases of project delivery and overall quality

ORNL business requirements

New solutions must adequately account for realities of ORNL business requirements

Thorough Testing

All business areas/units should be represented during project team selection

Complexity of integrations

The complexity of integrations should not be under-estimated, and project plans should adequately account for them

Change management communication, and training

Project should apply a strong approach to change management, communications, and training that fits ORNL culture

Engage key users early in the implementation cycle and often

Learn from change management experiences on other projects

Identify change champions from the business early to help with communications

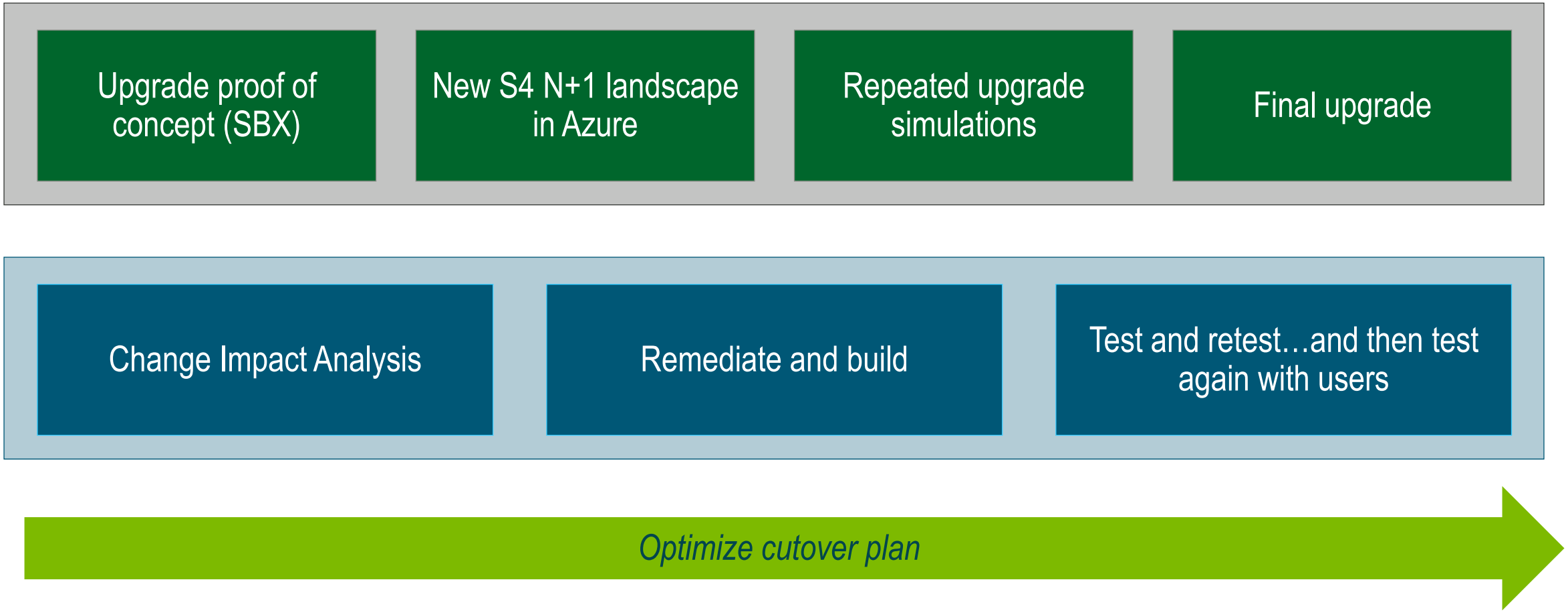
The project was guided by six essential elements of success that are rooted in.

- ✓ **Business continuity**
  - Accurate and timely closing and financial reporting
  - Accurate purchase requisition and purchase order commitments and reporting
  - Accurate and timely supplier payments, including bank integration and check printing
  - Accurate and timely payroll results, pension payroll file generation/extracts, and benefits file generation/extracts
  - Ability to request, approve, and book travel
  - Ability to generate customer invoices and record collections
  - Ability to track budgets and enforce funds control
  - Ability to generate PAS requests
  - Accurate and timely reporting, including BI
- ✓ **Successful integrations to support critical business processes**
  - Ariba, SuccessFactors, BI reporting, etc.
- ✓ **Well-trained and prepared end user community**
  - Effective change management
  - Availability of relevant training
  - Adequately trained staff
- ✓ **Wise use of resources, avoiding under or overutilization**
- ✓ **Successful completion of testing**
  - Thorough user testing and automation where appropriate
- ✓ **ORNL functional and technical teams ready to take over support from implementation partner**

The project effectively managed challenges to minimize effects to the overall timeline.

- Environment set-up and application integration
- Resource constraints because of competing production demands
- Prerequisites and Mandatory Changes (e.g., Business Partner and Universal Journal)
- SAP security role change adaptation
- Test volume and complexity

How did we do it? – a SUPER Simple view



Partner Collaboration with EY

Why was EY the right partner for ORNL?

EY understood the ORNL business, culture, and operations. We listened, learned, adapted and achieved results together. We worked effectively side-by-side based on transparency and trust.

EY has deep experience from thousands of completed SAP projects, so they know how to execute complex programs. Their collective capabilities unlocked value and helped to deliver a successful project for ORNL.

EY tailored their approach to align with the ultimate goals of ORNL. They used knowledge of the organization to design an approach and build a team that reduced the overall risk profile by directly addressing key needs without overcomplicating the project.

Project Readiness

Janet Maddern

Go-live was made possible by strong executive engagement and contributions by 178 members across nearly 2 years.

OVER 22K lines of SAP ABAP code remediated

8 upgrades from ECC to S/4

1,719 system integration tests completed

NEARLY 400 SAP integration points tested

Nearly 800 resolved defects

Listened and communicated via
4 pulse surveys | **13** news publications

MANY leadership status messages and informational presentations

2,235 user acceptance tests completed

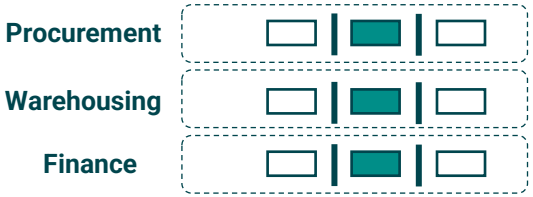
1,185 functional unit tests executed

Monitored 210 RAID Items

The project applied a progressive approach to testing, improving stability and quality with each pass.

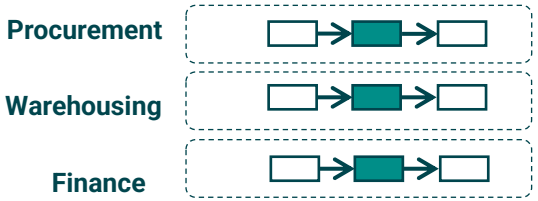
Technical Unit Test (TUT) and Functional Unit Test (FUT)

1,185 cases
293 bugs



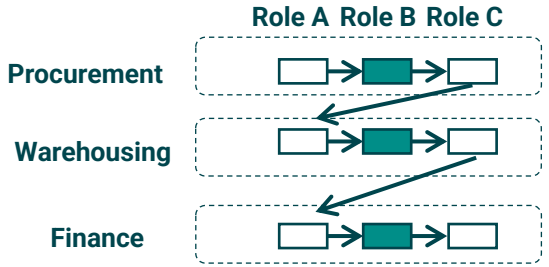
System Integration Test Cycle (SIT)

1,719 cases
390 bugs



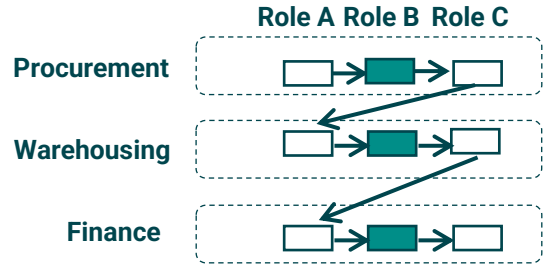
User Acceptance Test Cycle 1 (UAT 1)

331 scenarios
1,953 cases



User Acceptance Test Cycle 2 (UAT 2)

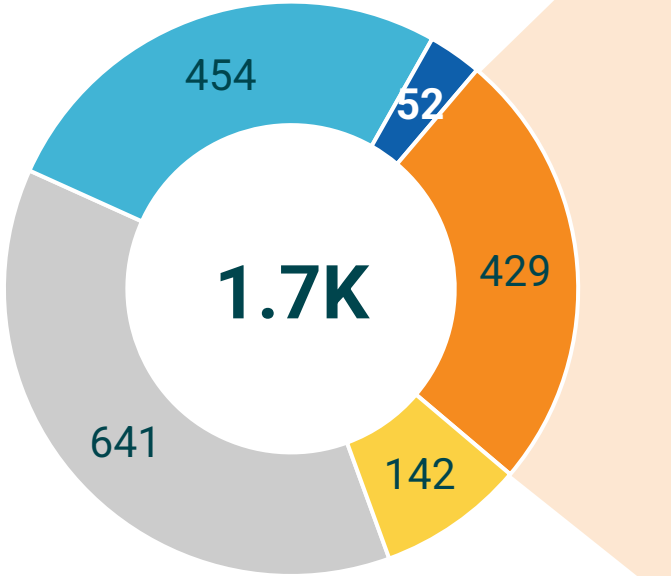
Environment set-up and application integration



STABILITY AND QUALITY

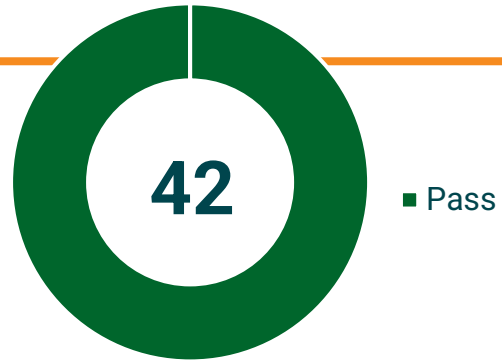
To objectively measure go-live readiness, all success criteria were mapped to test cases and monitored throughout testing.

SIT Test Cases Mapped to KPIs



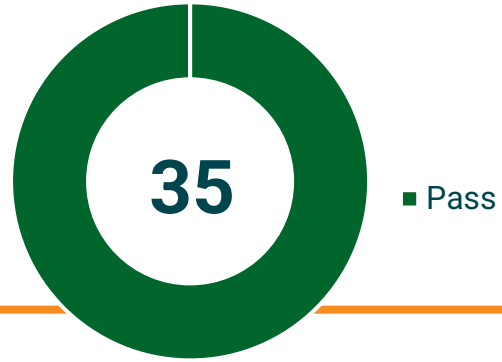
OTC

Accurate and timely inventory movements including stable and radio materials



Ability to generate proposals for SPP funded projects (SPP)

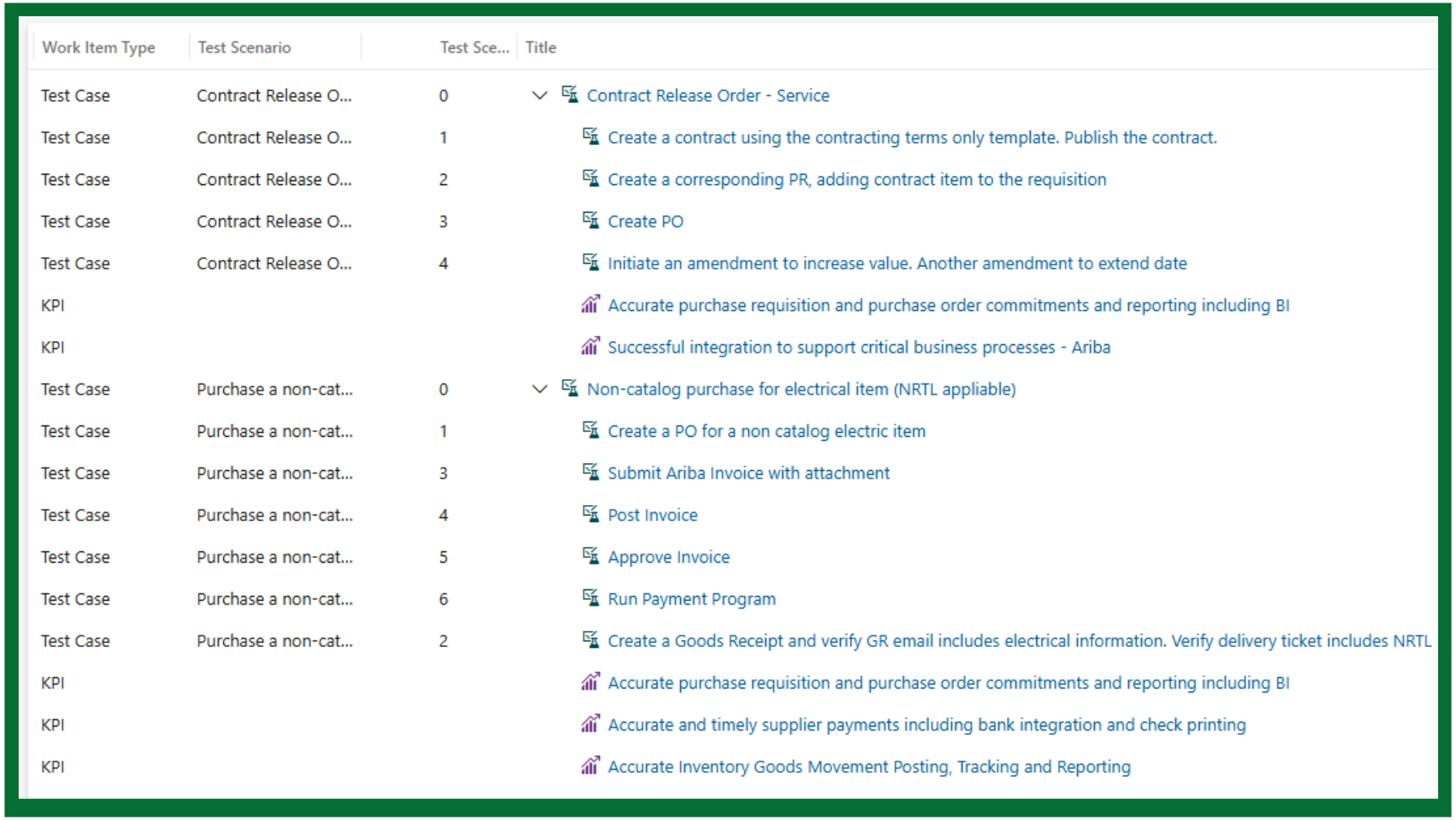
Accurate and timely customer payments including bank integration and check printing



Accurate contract, sales orders processing and reporting including BI

View from the EY Intelligent Delivery Platform PM tool

- All UAT1 test cases mapped to KPIs
- Linkage is maintained in Project Management tool (EY's IDP platform) from test scenario to test case to KPI
- Progress is monitored via performance dashboard and summary view in Excel



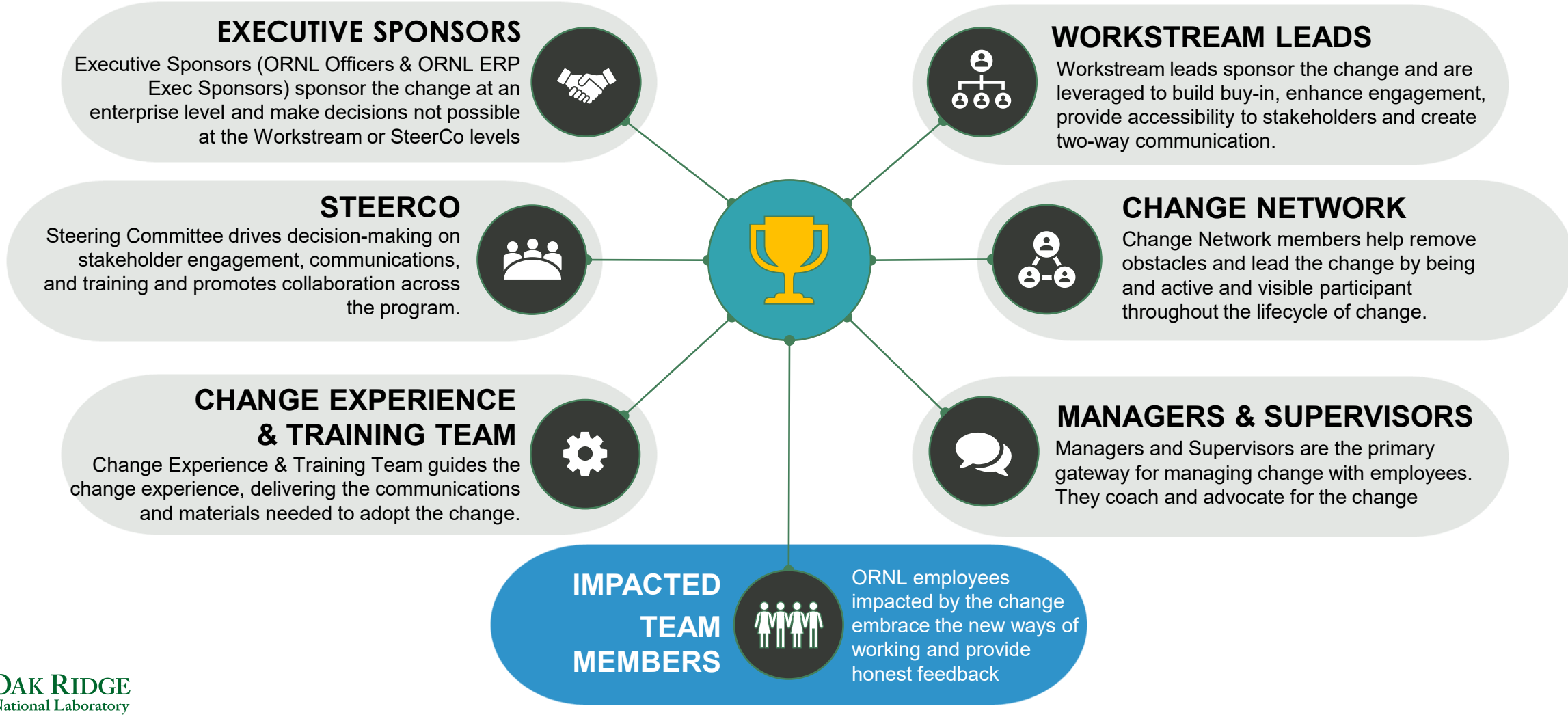
Work Item Type	Test Scenario	Test Sce...	Title
Test Case	Contract Release O...	0	Contract Release Order - Service
Test Case	Contract Release O...	1	Create a contract using the contracting terms only template. Publish the contract.
Test Case	Contract Release O...	2	Create a corresponding PR, adding contract item to the requisition
Test Case	Contract Release O...	3	Create PO
Test Case	Contract Release O...	4	Initiate an amendment to increase value. Another amendment to extend date
KPI			Accurate purchase requisition and purchase order commitments and reporting including BI
KPI			Successful integration to support critical business processes - Ariba
Test Case	Purchase a non-cat...	0	Non-catalog purchase for electrical item (NRTL appliable)
Test Case	Purchase a non-cat...	1	Create a PO for a non catalog electric item
Test Case	Purchase a non-cat...	3	Submit Ariba Invoice with attachment
Test Case	Purchase a non-cat...	4	Post Invoice
Test Case	Purchase a non-cat...	5	Approve Invoice
Test Case	Purchase a non-cat...	6	Run Payment Program
Test Case	Purchase a non-cat...	2	Create a Goods Receipt and verify GR email includes electrical information. Verify delivery ticket includes NRTL
KPI			Accurate purchase requisition and purchase order commitments and reporting including BI
KPI			Accurate and timely supplier payments including bank integration and check printing
KPI			Accurate Inventory Goods Movement Posting, Tracking and Reporting

Change Management

Justin Ferrell

Change was managed through a network.

Everyone in the ORNL ERP project is responsible for managing the change.



Summary of Change Impacts

What is the level of impact?

IMPACT	Record to Report (RTR)	Order to Cash (OTC)	Procure to Pay (PTP)	Warehouse Management (WM)	Human Capital Management (HCM)
Potential Impacts	31	8	16	3	3
In-Scope Impacts	**14**	**6**	**10**	**3**	**0**
OVERALL	**MEDIUM**	**MEDIUM**	**MEDIUM**	**MEDIUM**	**NONE**
PEOPLE	LOW	LOW	LOW	MEDIUM	NONE
PROCESS	LOW	LOW	LOW	MEDIUM	NONE
TECH	HIGH	MEDIUM	MEDIUM	MEDIUM	NONE
DATA	HIGH	MEDIUM	MEDIUM	LOW	NONE

There were approximately 400 ORNL users impacted by S/4HANA

Key functions / teams impacted across process areas, and approximate number of staff in teams

RTR (150)	OTC (110)	PTP (96)	WM (35)	HCM (3000 – Self Service)
General Ledger Accounts Payable Accounts Receivable Payment Services Cost Accounting Asset Accounting Treasury	Sales Representatives Shipping Clerks Billing Clerks Accounts Receivable	Buyers Accounts Payable	Materials Clerks MM Group Leader Chestnut Ridge MatOps Supervisor Stores/EBS Supervisor 7120 Receiving/DSO Supervisor 7120 Distribution Supervisor	Payroll

Key Change Themes

Introduction of FIORI tiles
S/4 replaces some SAP ECC transactions, which will create a different user experience of the solution.

Obsolete and Deprecated T-codes
As a result of S/4 simplification enhancements, certain transactions will be obsolete, and others deprecated completely.

Universal Journal and ACDOCA
S/4 eliminates the need for multiple journals by consolidating into a single Universal Journal with the new ACDOCA table.

Material Ledger (ML)
With S/4 and Universal Journal Entry / ACDOCA implementation, ML is mandatory and used for inventory valuation in multiple currencies/valuations and actual costing.

Training plan and content were completed and delivered before go-live.

Goal: Preparing the right people with the right information at the right time

TRAINING

Instructors
ORNL SAP SMEs

Supported by train-the-trainer

Audience
Start with SAP roles

Narrowed by ORNL leads

Content
Instructor-led: **8** courses

Web-based: **8** courses

Job aids: **21+**

Schedule
Planning to deliver post-UAT

COMMUNICATIONS

Comms Plan

All Comms:

48 complete

4 ongoing

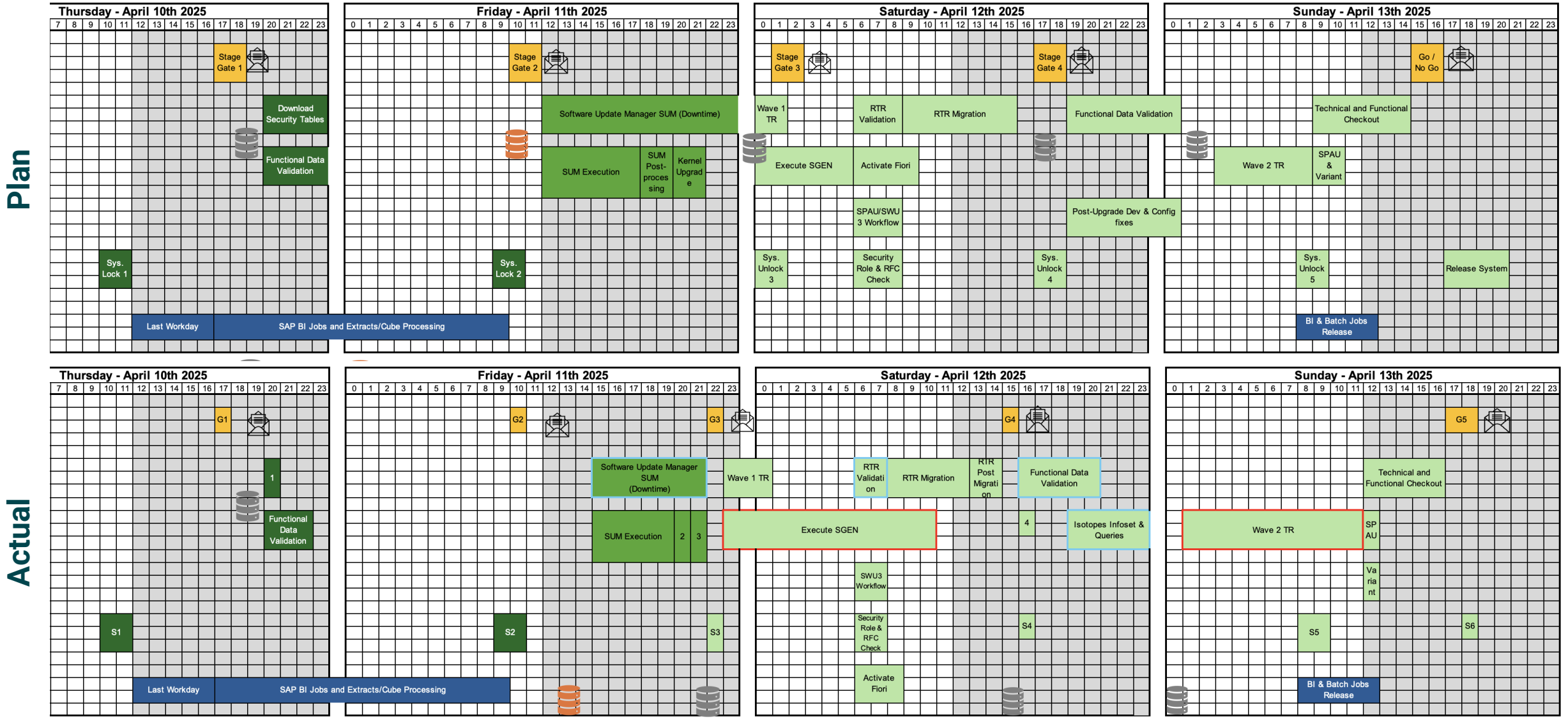
32 planned

- **Project updates and news articles** — Regular cadence for project team, affected groups, and lab leadership
- **Lab-wide campaign** — Lab-wide posters; *ORNL Today* article; Lab-wide info sessions
- **Pulse surveys** — Measure impact of engagement actions; Gather feedback; Understand sentiment

Mock Cutover
April 10 -13, 2025

Janet Maddern

Detailed cutover plan was rehearsed and refined via a mock cutover.

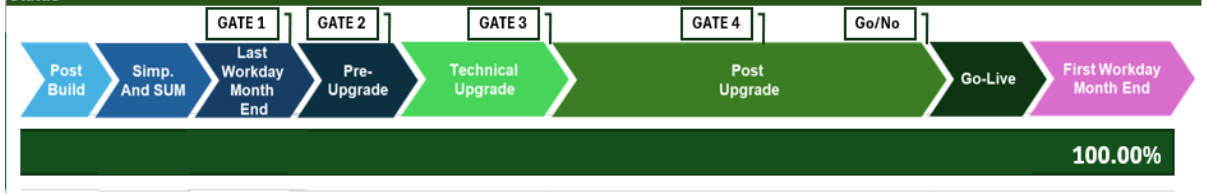


Mock cutover finished successfully within 2 hrs of plan.

Summary

520	693.33	63
Total Tasks Completed	Hrs Total Effort Complete	Total Task Owners

Status



S4M Post Build			
100.00% Completion	38 Complete	0 In Progress	0 Not Started
S4M Simplifications and SUM			
100.00% Completion	33 Complete	0 In Progress	0 Not Started
S4M Month End (Last Workday)			
100.00% Completion	18 Complete	0 In Progress	0 Not Started
S4M Pre-Upgrade Activities			
100.00% Completion	66 Complete	0 In Progress	0 Not Started
S4M Technical Upgrade Activities			
100.00% Completion	25 Complete	0 In Progress	0 Not Started
S4M POST-UPGRADE ACTIVITIES			
100.00% Completion	48 Complete	0 In Progress	0 Not Started
GOLIVE			
100.00% Completion	6 Complete	0 In Progress	0 Not Started
First Workday/STARS/SOCA			
100.00%	7	0	0

Statistic	Count of tasks
Execution time at least 10% longer than expected	28
Execution time at least 10% shorter than expected	56
Actual execution time = expected	433
Average Variance from expected	10.62%
Adjusted Average Variance from expected (excluding 10% outliers)	-2.47%

Note: Mock Cutover Lessons Learned in Appendix

Production Cutover

June 1, 2025 Go-Live

The team refined cut-over and contingency plans and was prepared and staffed to execute at go-live.

Full System Backup

Backup can be used to restore if an unrecoverable event occurs

Detailed Migration Script

Staff followed a detailed migration script, including go/no-go decision points

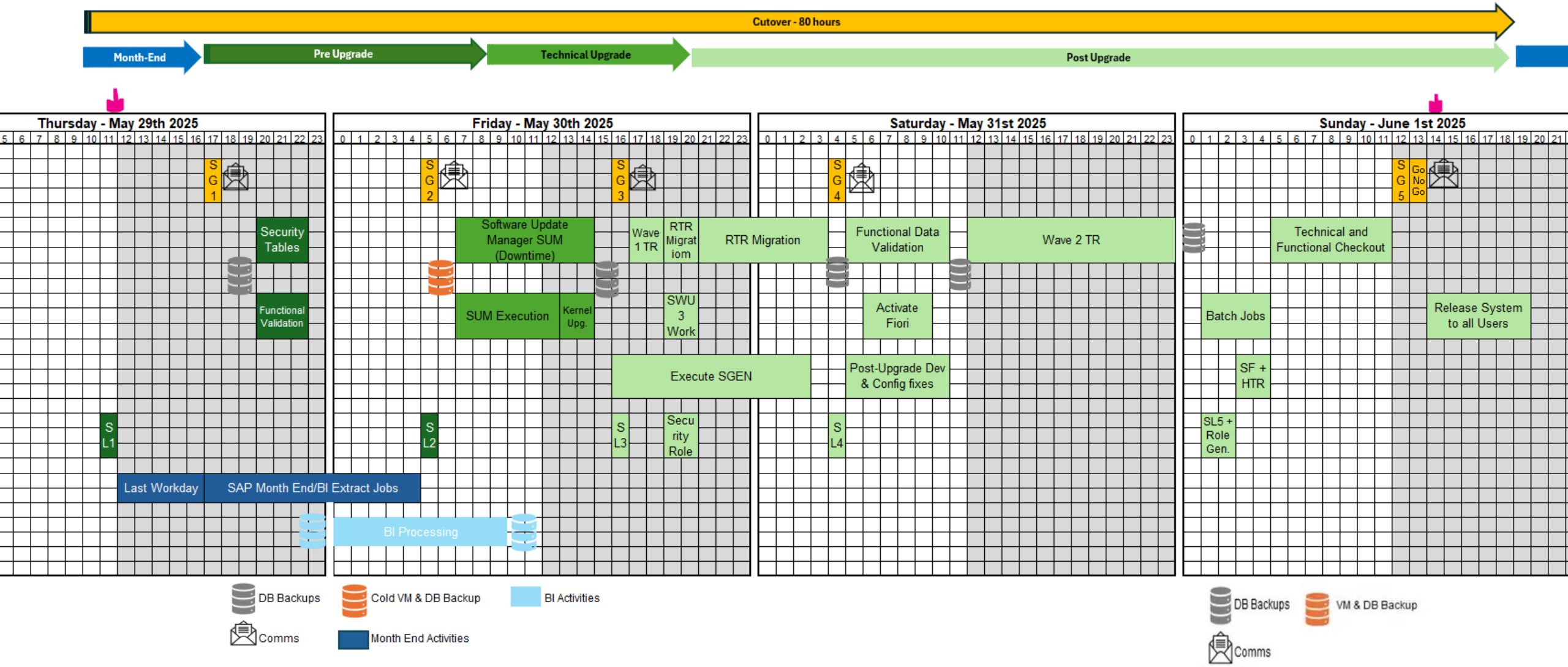
Elevated Support Level

At go-live, staff was ready to respond to issues 24/7, with extended support available from both EY and SAP

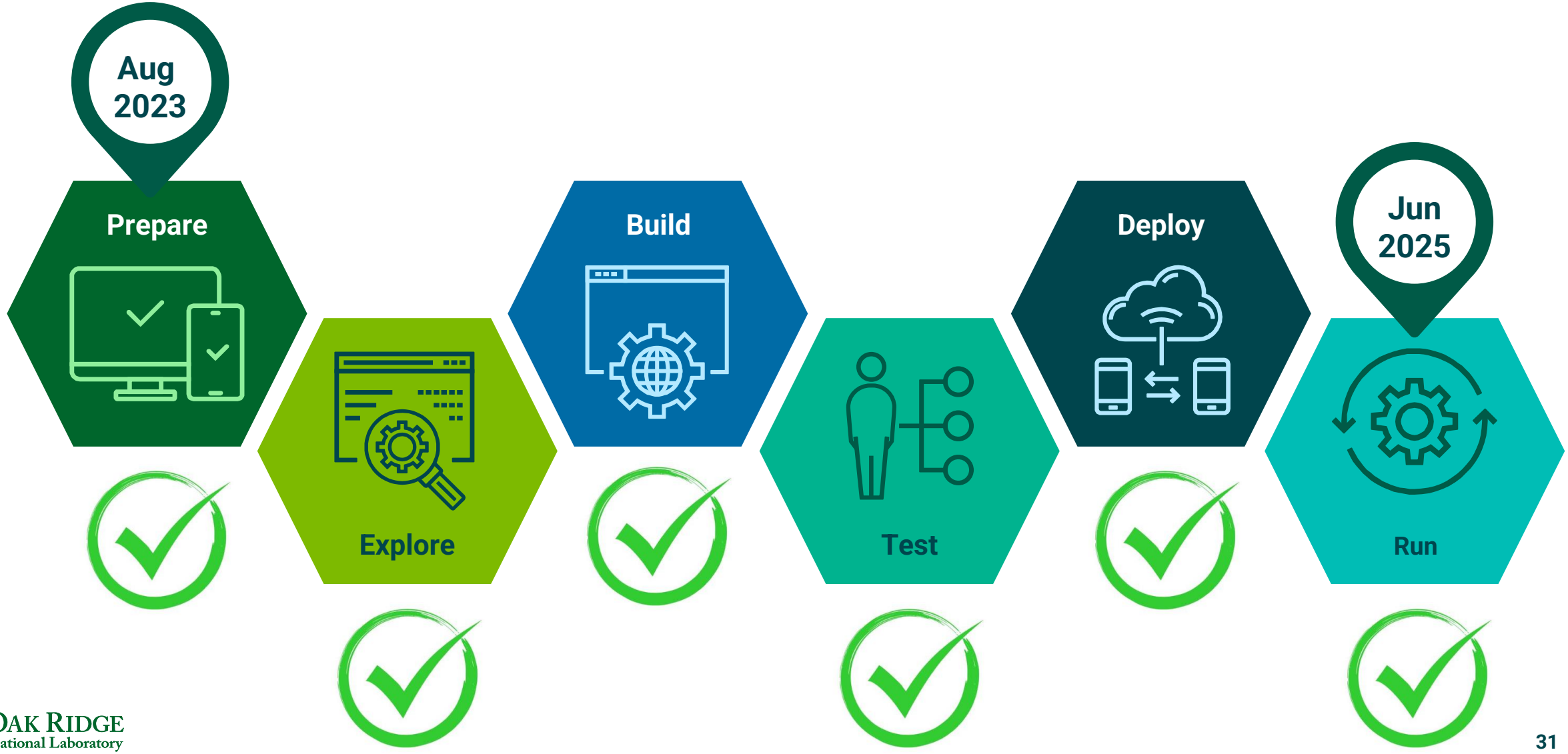
Post-Upgrade Issue Resolution

Defects were captured and triaged using our project case/issue tracking process and toolset, and SQA process was followed

The team executed the refined, 24x7, production cutover script, summarized here.



Upgrading ORNL's ERP was essential to supported operations beyond 2027 and was completed on time and under budget.



Lessons Learned

Justin Ferrell

What caught us by surprise?

- GUI Update/Kernel update not being on the latest version; had to reactively update upon encountering issues
- Security authorizations – deprecated auth objects, new auth objects – MANY unexpected changes
- Custom technical objects requiring remediation – needed to remediate more than just the highest priorities identified via S/4 HANA Readiness Check
- Complexity of migration from customers and vendors to business partners – DO NOT UNDERESTIMATE

What We Did Well

- Used an advanced DevOps tool (EY IDP) for tracking/status of development tasks, TUT, FUT, SIT, and UAT – **GAMECHANGER**
- Included/executed a true mock cutover
- During production cutover, included a continuous bridge meeting for issue identification and resolution
- Change management – communicated early and often!
- Used Accelerator Tools to improve understanding of impact
- Incorporated full end-to-end regression testing – **CRITICAL**
- Parallel testing executed for critical processes (ex. month end close, payroll)

What We Did Well (cont.)

- Involved functional stakeholders and business end users during test cycles
- Level of engagement from executive leadership
- Preparation and Planning for hypercare helped ensure good support
- Testing at the object level (beyond technical unit testing) is not sufficient; plan to test at least at a transaction/process level
- Governance and strong communication
- Utilized separate contract from implementation parter for additional resources

What We Did Well (cont.)

- Remote cutovers can be effective when team adheres to guidelines and expectations
- High risk projects should consider the addition of a program advisor, outside of the implementation partner and the home organization, to provide perspective
- Enforced blackout period for changes to existing production system
- Clear, concise instructions of testing expectations and documentation are important – created easy-to-use survival guide/reference for each testing phase

What We Could Have Done Better

- Been more open to bringing in new resources (onboarding and investing time) - identify those constrained resources early and plan accordingly from a mitigation perspective.
- Included time in schedule to define test cases and data dependencies at beginning of each testing phase
- Planned for expert time when building training content (overlapped with UAT)
- Executed a more detailed analysis on table structure changes and the changes in the timing of table updates
- Prerequisite requirements should be taken seriously and executed prior to project start

What We Could Have Done Better (cont.)

- Acted early when resource was not a good fit
- Workstreams were too broad; should have been further refined to cover heavy business process areas
- Both legacy data and newly created data should have been used in test cases
- Included negative testing in test scenarios (ex. feeder files with intentionally bad data)
- Use of single role testing added complexity to testing strategy and number of changes needed. In hindsight, should have tested with composite roles and/or role assignments that represented real users

What We Could Have Done Better (cont.)

- Defined a methodology during all testing cycles to identify and track changes impactful from a training perspective
- Architecture in quality/test environment should mimic the production architecture; plan for load testing both in the GUI and web apps

Questions