Applying Machine Learning & Analytics to build the S/4 Business Case

Kevin McConnell, SAP
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Analytics & ML to build S/4 Business Case
Kevin McConnell, Intelligent Technology Solution Mgt, SAP
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About the Speakers

Kevin McConnell, Intelligent Technology Solutions

- Kevin has been creating Intelligent Solution Initiatives for almost 20 years. First at SAS, then HP and now at SAP.
- He performed stand-up comedy in NYC over 25 years ago. *(Obviously it did not go well)*
Key Outcomes/Objectives

- Difference between Analytics & Machine Learning
- Understand the value Analytics & ML play in S/4
- Determine how to improve ROI with Analytics & ML
Agenda

- Why Analytics
- Customer POV
- Embedded ML vs ML Services
- Capabilities Available
- Building the Business Case
1997: W/L% .401
2002: W/L% .635
Salary $40M

1997: W/L% .401
2002: W/L% .635
Salary $120M

By using analytics to create, execute and review the plan they improved 58%

Leading with analytics allowed the A’s to achieve the same results as the NY Yankees in 2002

at 1/3 the cost

The same optimization can be applied to business
Analytics led S/4 Transformation Success

NGN used Digital Boardroom & Predictive capabilities to plan their S/4 Deployment

Challenges
- Growth limited by geography
- Competition & Regulators preclude price increases
- Profits must come from efficiencies

Business Benefits
- Predicting leaks increased profitability
- Recovered 3rd party & internal costs
- Improved compliance (reduced risk)

“Digital Board Room is the command center for S/4”

Tom Pollock
Head of Smart Information Management
Northern Gas Networks
SAC enables Strategic Insight & powers Embedded Machine Learning

Leonardo & Analytics

- Discover
- Analyze
- Plan

Data Harmonization

Intelligent Applications

- Business Integrity Screening
- Tax Compliance
- Cash Application

S/4 Digital Core Capabilities

- Core Accounting: Smart Alerts for P&L
- Cost Mgt. & Profitability: Project Cost Forecast
- Financial Functions: Payment Block Disc @Risk
- Warehousing Transportation & Inventory: Stock in Transit

Embedded ML Scenarios

- Production Planning: Supplier Delivery Delay
- Operational Purchasing: Delivery Performance

Finance

Supply Chain

Procurement
Build the Intelligent Enterprise
Machine Learning Roadmap Excerpt

Machine Learning

- Payroll Fraud Detection
- Statement of Work Builder
- Career Planning: People Like Me
- Timesheet Anomaly Detection
- Manager and Administrator Self-Service Bot
- Program Office Guidance
- Automated Duty of Care
- Proactive Assistant
- AI Expense Approvals
- Sourcing Optimization
- Intelligent Customer Experience Suite
- Smart Worker Enablement on Shop Floor
- Predictive Overall Equipment Effectiveness
- Demand-Driven Replenishment Adjustment
- Data Pipelines
- Integration with additional CRM
- End-to-End Suite
- Intuitive UX
- Any iLanguage
- Q&A
- SAP CoPilot integration
- Context Management
- Insurance Bot
- Industry Bots
- Computer Vision for Bot Stability

- Train Your Own Model
- Table Extraction
- Custom Image Segmentation
- Data Scientist Notebook Support
- Customized Recommender
- Handwriting Recognition
- 3rd party Integration
- API Leverage
- Prebuilt Bots
- Process Monitoring
- Embedded Analytics
- ML and CAI Integration
- Bot Marketplace

- SAP Leonardo Machine Learning Foundation
- SAP Conversational AI
- SAP Intelligent Robotic Process Automation
- SAP S/4HANA
- SAP C/4HANA
- SAP Ariba
- SAP Concur
- SAP Fieldglass
- SAP SuccessFactors

- Semantic Contract Repository
- Multitouch Customer Attribution
- Lead Intelligence
- Influencer Map and Deal Finder
- Item Recommendation
- Customer Retention
- Smart Worker Enablement on Shop Floor
- Predictive Overall Equipment Effectiveness
- Demand-Driven Replenishment Adjustment
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- SAP Fieldglass Live Insights
- Total Workforce Insights
- Job Seeker Resume Ranking
- Chatbot Bookings
- Computer Vision Receipts
- Item Normalization
- Supplier Recommendation
- Sourcing Optimization
- Sourcing Recommendation
- Multitouch Customer Attribution
- Customer Retention
- Smart Worker Enablement on Shop Floor
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- Industry Bots
- Computer Vision for Bot Stability

- SAP Job Matching
- Resume Matching
- Job Normalization
- Job Matching for Candidates
- AI Invoice Processing
- Item Recommendation
- Supplier Recommendation
- Multitouch Customer Attribution
- Customer Retention
- Smart Worker Enablement on Shop Floor
- Predictive Overall Equipment Effectiveness
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- SAP Intelligent Robotic Process Automation
- SAP S/4HANA
- SAP C/4HANA
- SAP Ariba
- SAP Concur
- SAP Fieldglass
- SAP SuccessFactors

- Employee Self-Service Bot
- SAP Fieldglass Live Insights
- Total Workforce Insights
- Job Seeker Resume Ranking
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SAP Leonardo embedded intelligence in SAP S/4HANA

Predictive Analytics integrator

Seamless Integration

Predictive Analytics integrator enables SAP Applications such as SAP S/4HANA to create and ship Predictive use cases specific to their business directly to their customers.

Manage Model Lifecycle

- Customers can retrain models directly within the applications.
- Model debriefing enables users to verify model quality.

Easily Adapt & Customize

- Customer/Partners can adapt Predictive use cases or create new ones based on their own business needs in SAP Predictive Analytics and publish to the application with one click.
Intelligent Enterprise Examples
### SAP Leonardo embedded in S/4HANA

**Machine Learning and Predictive Analytics**

<table>
<thead>
<tr>
<th>Module</th>
<th>Equation</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sourcing and Procurement</td>
<td>SAP S/4HANA + SAP Leonardo</td>
<td>Contract Consumption: Proactively renew contracts by predicting their expiration and consumption</td>
</tr>
<tr>
<td>Material Management</td>
<td>SAP S/4HANA + SAP Leonardo</td>
<td>Stock in Transit: Mitigate production risks by forecasting stock in transit delays</td>
</tr>
<tr>
<td>Sales Analytics</td>
<td>SAP S/4HANA + SAP Leonardo</td>
<td>Sales Quotation Conversion: Improve Sales Forecasts</td>
</tr>
<tr>
<td>Procure-to-Pay</td>
<td>SAP S/4HANA + SAP Leonardo</td>
<td>Payment Block – Cash Discount at Risk: Avoid loss of cash discounts</td>
</tr>
<tr>
<td>Finance</td>
<td>SAP S/4HANA + SAP Leonardo</td>
<td>Smart Alerts for Profit &amp; Loss Analysis: Get informed of hidden unusual costs and revenue opportunities</td>
</tr>
<tr>
<td>Idea</td>
<td>SAP S/4HANA + SAP Leonardo</td>
<td>Project Cost Forecast: Mitigate project budget overruns</td>
</tr>
</tbody>
</table>
## SAP Leonardo intelligent applications for Machine Learning and Predictive

<table>
<thead>
<tr>
<th>SAP S/4HANA®</th>
<th>+</th>
<th>SAP® Leonardo</th>
<th>=</th>
<th>ML Enabled Business Scenarios</th>
</tr>
</thead>
</table>
| SAP S/4HANA   | + | SAP Leonardo   | = | **SAP Business Integrity Screening**  
| Finance       |   | SAP Predictive Analytics | = | Increase accuracy of fraud alerts  
|               |   |                           |   | with predictive analytics |
| SAP S/4HANA   | + | SAP Leonardo   | = | **SAP Tax Compliance**  
| Finance       |   | SAP Predictive Analytics | = | Smart Automation on Compliance Issue Processing |
| SAP C/4HANA   | + | SAP Leonardo   | = | **SAP Opportunity Scoring**  
| Cloud 4 Customer | | SAP Predictive Analytics | = | Increase win rates with Predictable sales pipeline  
|               |   |                           |   | and revenue forecast |
SAP Smart Alerts for Profit & Loss Analysis enables users to

- Automatically explore the multi-dimensional space of available filter combinations
- Detect unusual increases and decreases in single key figures
- Notify about changes in trending behavior
- Warn about correlation changes between multiple key figures
- Allow users to collaboratively expand on those automatic findings by placing annotations

Business Benefits

- Decrease time for investigation
- Earlier detection of unusual business situations
- Better collaboration through annotations
Payment Block - Cash Discount at Risk

Avoid loss of cash discounts

SAP Payment Block - Cash Discount at Risk allows accountants and purchasers to:

• Proactively display issues requiring attention, all relevant information, and actions in one place
• Analyze the underlying issues with detailed data context
• Receive recommendations based on former user behavior
• Avoid loss of cash discounts

Business Benefits

• Reduce effects for exception handling and recurring tasks
• Process automation to enable faster decision making
• Avoid loss of cash discounts
• Enable employees focus on important tasks
SAP Quantity Contract Consumption advise leaders to

- Anticipate contract renegotiations in time
- Negotiate with supplier early and efficiently
- Define the predictive models, train and run the scenarios
- Pre-built set of KPIs allow for robust analytics on S/4HANA cloud data with drill down functionality

Business Benefits

- Enhanced usability for the businesses visualizing with predictions
- Early & efficient supplier renegotiation
- Better prices for goods from suppliers
- Enhanced purchasing compliance
- Providing predictive analytics for the business scenarios
SAP Predict Arrival of Stock in Transit

Predict and manage delivery delays

SAP Predict Arrival of Stock in Transit allows warehouse managers to

- Predict the arrival date of a shipment and classify the status into different classes
- Defining the predictive models, training and running the scenarios
- Pre-built set of KPIs allow for robust analytics on S/4HANA cloud data with drill down functionality.
- Early & efficient visibility for stock transport orders
- New integration capabilities with SAP S/4HANA Cloud to gain real-time insights in produce scenario’s with predictive analytics

Business Benefits

- Optimize and automate the business process of tracking Stocks In Transit
- Overall more reliable planning / scheduling of goods in transit processes
- Providing predictive analytics for the business scenarios
- Enhanced usability for the businesses visualizing with predictions
Project Cost Forecasting
Predicting project costs ahead of time

Project Cost Forecasting allows the Project Manager to
• Forecast the project cost with increased accuracy
• Reduce the risks of budget overruns
• Reduce Manual Efforts

Business Benefits
• **Cost savings**: Less budget overruns and better project investment decisions based on more realistic estimations
• **Efficiency**: Reduced effort for project cost planning and forecasting while improving the accuracy
• **Customer satisfaction**: Improved customer satisfaction due to ability to deliver projects on time

Set up Project Structures  Plan projects  Execute projects  Monitor and control project

Project period-end closing & project closure
SAP Business Integrity Screening
Detect and rank information that positively correlates with anomalies

SAP Business Integrity Screening allows your Business Analysts and Investigators to

• Automatically detect and rank attributes within classified data that positively correlate with anomalous cases
• Incorporate them with existing detection methods into new Business Integrity Screening strategies
• Seamlessly integrate algorithms of HANA’s Automated Predictive Library (APL)
• Leverage robust, state-of-the-art machine learning algorithms

Business Benefits

• Detection of new suspicious patterns
• Reduction of false positives
• Seamless integration of ML algorithms into the proven SAP Business Integrity Screening framework
SAP Tax Compliance
Smart Automation on Compliance Issue Processing

With every new decision the company’s Tax Knowledge Base grows and

SAP Tax Compliance allows your Tax Managers to

• Transparently apply HANA’s Automated Classification
• Benefit from the company’s memory of its tax managers past decisions
• Automate compliance issue processing and limit human interaction to exceptional cases
• Choose level of automation on compliance check basis

Business Benefits

• Automatically learn from new decisions
• Increase efficiency by smart compliance issue processing automation
• Seamless integration of ML algorithms into the SAP Tax Compliance
Buyers need to re-negotiate contracts that are soon to be expired. The Machine Learning algorithms identify the contracts that are at the end of the term and provide the probability if a contract is going to be consumed sooner than expected.

**SAP Quantity Contract Consumption** advise procurement leaders to:

- Anticipate contract renegotiations in time
- Negotiate with supplier early and efficiently
- Define the predictive models, train and run the scenarios
- Pre-built set of KPIs allow for robust analytics on S/4HANA cloud data with drill down functionality

**Business Benefits**

- Enhanced usability for the businesses visualizing with predictions
- Early & efficient supplier renegotiation
- Better prices for goods from suppliers
- Enhanced purchasing compliance
- Providing predictive analytics for the business scenarios
SAP Cash Application
Intelligent receivables automation powered by SAP Leonardo Machine Learning

SAP Cash Application software intelligently learns matching criteria from your history, reads and processes payment advice documents, and automatically clears payments with minimal intervention.

- Improves days sales outstanding
- Integrates smoothly with SAP S/4HANA
- Allows shared services to scale as the business grows
- Drastically reduces manual effort to focus on strategic tasks and service quality
Using cloud analytics with SAP S/4HANA® lets HOERBIGER discover, visualize, and share insights in one future-fit system.

Operational dashboards in the SAP® Analytics Cloud solution present data from SAP S/4HANA® in real time so that HOERBIGER can:
• Establish a reporting system for plants with globally defined KPIs to improve plant performance
• Shorten audit times and reduce the support efforts in IT to free staff for more strategic tasks
• Control access to data and analytics based on global governance policies
• Ensure consistency and trust across the enterprise with a single version of truth sourced directly from ERP
• Provide role-based access to real-time data over virtual private networks or mobile devices
• Empower users to create data models and visualizations

“In this smooth integration of data from SAP S/4HANA with the analytics features of SAP Analytics Cloud, HOERBIGER has found a long-sought information management solution, becoming a truly intelligent enterprise that thrives through analytics-driven insights.”

Teja Ullrich, Senior Vice President – Corporate IT, HOERBIGER Wien GmbH
Ways of communicating SAP S/4HANA impact to your shareholders
SAP S/4HANA impact on stock price

Key Shareholder Value Levers

Revenue / Growth
- Better demand planning
- Lower stock-outs
- Higher brand reputation
- 20 FTE leaner customer service staff
- 14% new revenue
- 5% higher quality (reduced remakes)
- 15% higher on-time delivery
- 0.5% lower sampling costs

Profitability
- Cost of Goods Sold (COGS)
- Selling, General & Administrative (SG&A)
- 40% reduced Time for Project creation
- 3% lower raw materials spend
- 25% lower obsolescence
- 6% lower freight rates
- 40% faster Processing time for contract creation
- 20% procurement savings
- 20-30% lower R&D expense
- 84% process Standardization

Asset Efficiency
- Fixed assets such as Property, Plant & Equipment (PP&E)
- Liquid assets such as receivables and inventory
- More efficient use of assets; tear & wear, preemptive actions on maintenance and repairs, lower inventory, optimized cash

Strategic
- Speed, comprehensiveness, reliability, agility
- E.g., reduce business and operations reporting costs while improving the analytics results

Various S/4HANA customers

- New business model, new segments, better pricing, subscriptions, improved customer visibility & 360
- Inorganic: M&A, divestitures
- Sales Volume
- Price Flexibility
- Faster cycle, lower risk areas (prone to error and fraud), automation of manual tasks, standardizing & scaling
- 67% faster Financial closing (15 days to 5 days)
- 39 FTEs repurposed across Finance and IT
- 6% lower freight rates
- 10%, one time inventory reduction
- Up to 40% lower DSO
- 20% R&D expense
- 5-10% higher asset uptime

- Improved user Experience using Fiori
- Seamless Integration with Time Sheet System for Invoicing
- Refresh cycle time reduced by 50% by using AWS Lambda
- Simplified Process Structure (alignment with Standard SAP)
- 10% reduced Procurement savings
- 20% process standardization
- 84% process Standardization
- 3% lower obsolescence
- 0.5% lower freight rates
- 0.5% lower sampling costs
- 5% higher quality (reduced remakes)
- 15% higher on-time delivery
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- 40% faster Processing time for contract creation
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Appendix
SAP Predict Arrival of Stock in Transit
Predict and manage delivery delays

For companies issuing and receiving good from and to their plants, it is important to track the status of the materials in transit in order to take action in case of problems. The "Materials Overdue – Stock in Transit" app gives an overview of the open shipments allowing the business user to take action. With PAI we are enhancing the app with ‘Predicted Shipment Dates’ for each Goods Movement to allow Users to take action to manage delivery delays.

SAP Predict Arrival of Stock in Transit allows warehouse managers to

- Predict the arrival date of a shipment and classify the status into different classes
- Defining the predictive models, training and running the scenarios
- Pre-built set of KPIs allow for robust analytics on S/4HANA cloud data with drill down functionality.
- Early & efficient visibility for stock transport orders
- New integration capabilities with SAP S/4HANA Cloud to gain real-time insights in produce scenario’s with predictive analytics

Business Benefits

- Optimize and automate the business process of tracking Stocks In Transit
- Overall more reliable planning / scheduling of goods in transit processes
- Providing predictive analytics for the business scenarios
- Enhanced usability for the businesses visualizing with predictions
The invoicing process is already a highly digitalized and automated process. Algorithms are checking the invoices against the existing Purchase Orders and the procurement rules. In spite of a highly automated invoice matching process there are always exceptions which need manual interaction from purchasers or accounts payable experts, e.g. because of unplanned additional costs in the invoice or quantity / price deviations. These exceptions are time consuming and expensive. Supplier invoices automatically get blocked if a blocking reason occurs, and the responsible purchaser has to solve the underlying issues.

The process can be further automated by getting recommendations to track, analyze, and solve the situation. The faster processing time will also avoid loss of cash discounts.

SAP Payment Block - Cash Discount at Risk allows accountants and purchasers to:

- Proactively display issues requiring attention, all relevant information, and actions in one place
- Analyze the underlying issues with detailed data context
- Receive recommendations based on former user behavior
- Avoid loss of cash discounts

**Business Benefits**

- Reduce effects for exception handling and recurring tasks
- Process automation to enable faster decision making
- Avoid loss of cash discounts
- Enable employees focus on important tasks
SAP Smart Alerts for Profit & Loss Analysis

Get informed of hidden unusual costs and revenue opportunities

**Smart Alerts** aims to autonomously detect unusual business situations in revenue and cost accounts. Smart Alerts will pro-actively inform the group controller of potential issues and propose explanations for unusual business situations by analyzing the revenue and cost data.

**SAP Smart Alerts for Profit & Loss Analysis** allows your controller to

- Automatically explore the multi-dimensional space of available filter combinations
- Detect unusual increases and decreases in single key figures
- Notify about changes in trending behavior
- Warn about correlation changes between multiple key figures
- Allow users to collaboratively expand on those automatic findings by placing annotations

**Business Benefits**

- Decrease time for investigation
- Earlier detection of unusual business situations
- Better collaboration through annotations
Projects often do not meet their budget and timeline. Typical reasons are based on inadequate data and imperfect forecasting techniques, as well as political and psychological factors. So users often tend to be overly optimistic or, on the contrary reserve safety buffers resulting into poor project planning and forecasting. In addition project cost planning and forecasting can be quite effort intensive.

Using machine learning in combination with reference class forecasting, i.e. by learning from past projects, the system can derive project forecasts based on facts, rather than on subjective criteria. The first focus is on cost forecast for projects and Work Breakdown Structure (WBS) elements in SAP S/4HANA (cloud). The use case can be extended at a later point in time to cover for example investment portfolios as well as other project key figures apart from costs such as revenues, durations and schedules, or resource demands.

So the accuracy of project cost forecasts can be increased and hence the risks of budget overruns reduced. In addition manual efforts can be drastically reduced.

**Project Cost Forecasting** allows the **Project Manager** to:
- Forecast the project cost with increased accuracy
- Reduce the risks of budget overruns
- Reduce Manual Efforts

**Business Benefits**
- **Cost savings:** Less budget overruns and better project investment decisions based on more realistic estimations
- **Efficiency:** Reduced effort for project cost planning and forecasting while improving the accuracy
- **Customer satisfaction:** Improved customer satisfaction due to ability to deliver projects on time
SAP Business Integrity Screening
Detect and rank information that positively correlates with anomalies

Investigators may add supervised machine learning capabilities to screening strategies leveraging their company’s investigative history – without expert knowledge in data science and algorithm tuning

SAP Business Integrity Screening allows your Business Analysts and Investigators to

• Automatically detect and rank attributes within classified data that positively correlate with anomalous cases
• Incorporate them with existing detection methods into new Business Integrity Screening strategies
• Seamlessly integrate algorithms of HANA’s Automated Predictive Library (APL)
• Leverage robust, state-of-the-art machine learning algorithms

Business Benefits

• Detection of new suspicious patterns
• Reduction of false positives
• Seamless integration of ML algorithms into the proven SAP Business Integrity Screening framework
SAP Tax Compliance
Smart Automation on Compliance Issue Processing

With every new decision the company's Tax Knowledge Base grows and SAP Tax Compliance leverage this by continually classifying compliance issues and trigger automated correction measures or close them as false positives. In rare cases human interaction is requested to do the decision.

SAP Tax Compliance allows your Tax Managers to

- Transparently apply HANA’s Automated Classification
- Benefit from the company’s memory of its tax managers past decisions
- Automate compliance issue processing and limit human interaction to exceptional cases
- Choose level of automation on compliance check basis

Business Benefits

- Automatically learn from new decisions
- Increase efficiency by smart compliance issue processing automation
- Seamless integration of ML algorithms into the SAP Tax Compliance

![Automated Processing]

![User Interaction]

![Automated Completion]
SAP Leonardo embedded in S/4HANA
Machine Learning and Predictive Analytics

- **SAP S/4HANA Material Management** + **SAP Leonardo SAP Predictive Analytics** = **Dynamic buffer level adjustment**
  - Optimizes inventory buffers based on replenishment leads time

- **SAP S/4HANA Sales** + **SAP Leonardo SAP Predictive Analytics** = **Sales Forecast Prediction**
  - Forecast sales based on predictive analytics

- **SAP S/4HANA Sales** + **SAP Leonardo SAP Predictive Analytics** = **Delivery Performance**
  - Forecast sales based on predictive analytics

- **SAP S/4HANA Sourcing and Procurement** + **SAP Leonardo SAP Predictive Analytics** = **Supplier Delivery Delay**
  - Forecast sales based on predictive analytics
Demand-Driven Manufacturing
Dynamic Buffer Level Adjustment

In the planning method of “Demand-Driven Replenishment”, one key element is the dynamic adjustments of buffer levels.

One key input for the buffer levels recalculation is the buffer replenishment lead time. The buffer levels depend proportionally on this lead time. The more accurate the lead time can be determined, the better the buffer can be sized: big enough to ensure customer service levels, small enough to reduce bound capital.

Based on historic lead times and their business context suggest buffer level adjustments to serve best the ever-changing reality.

**Demand-Driven Replenishment** allows the Inventory Manager to
- Evaluate historic lead times of stock transfer orders
- Consider context information of orders to identify patterns and dependencies

**Business Benefits**

- Ensure best possible customer service levels at lowest possible costs (i.e. bound capital through buffered stock)
Supplier Delivery Prediction
Avoid delayed raw material availability or production rescheduling

Materials required for production are supplied by multiple suppliers. The delay in delivery would impact on-time production at plant and rescheduling assembly lines which is very costly. Indirect material delay also cause delay in supporting employees with required product/service. The Machine Learning algorithms identify the supplier delays based on the multiple situation and predicts the chances of delay. During creation of PO / PR, the lead time from material mater sometimes don’t take the processing and approval time into consideration.

Supplier Delivery Prediction allows purchasers to

• Predict more reliable delivery lead time when creating PR / PO
• Predict the arrival date of a shipment and classify the status into different classes
• The recommendations are enriched with insights gathered by the machine learning algorithm
• The results based upon transaction data predictions can later be reused at triggering sources such as Material Requirement Planning(MRP) or Source of Supply( SoS) to update delivery lead time or related parameters to avoid delays, thereby achieve delivery performance optimization.

Business Benefits
• More reliable planning / delivering of materials
• Avoid production delay and re-scheduling
• Decrease manual effort to monitor & resolve issues earlier
• Up to date lead time update for goods/services at master level for direct and indirect procurement