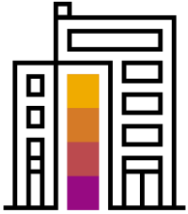




SAP® Innovation Awards 2020 Entry Pitch Deck

Southern CA Edison Chooses SAP and TATA Consultancy Services for
Enabling SAP Predictive Maintenance



Company Information

Headquarters	Rosemead, CA, USA
Industry	Electric Utilities
Web site	https://www.sce.com/

Southern California Edison (or SCE Corp), the largest subsidiary of Edison International is the primary electricity supply company for much of Southern California, USA. SCE is one of the largest electric utilities in the United States and a longtime leader in renewable energy and energy efficiency. With headquarters in Rosemead, Calif., SCE serves more than 14 million people in a 50,000 square-mile area of central, coastal and Southern California. SCE has provided electric services in the region for more than 125 years.

SCE maintains grid assets valued at more than \$20 billion, including 1.4 million power poles, 700,000 transformers and 103,000 miles of distribution and transmission lines. In the past 5 years, SCE's energy efficiency programs have helped customers save enough energy to power 1.2 million homes for a year. SCE delivered approximately 15 billion kilowatt-hours of renewable power to its customers in 2012. That's nearly 20 percent of all the electricity delivered that year -- and more than any other U.S. utility. In addition, SCE operates a regulated gas and water utility. SCE is the sole commercial provider of natural gas and fresh water service to Santa Catalina Island, including the city of Avalon, California. Southern California Edison is creating the grid of the future — one that supports high levels of carbon-free resources and integrates new technologies and services, while being safe, reliable and resilient.

SCE chooses SAP and TCS for enabling SAP Predictive Maintenance and Service

Southern California Edison



Although still relevant, **preventative** maintenance typically results in over-maintaining assets and high cost. The **Predictive & Prescriptive** approaches to maintenance with machine learning and IoT-enabled engineering simulations to reduce unplanned failures and the number of maintenance actions.

Challenge

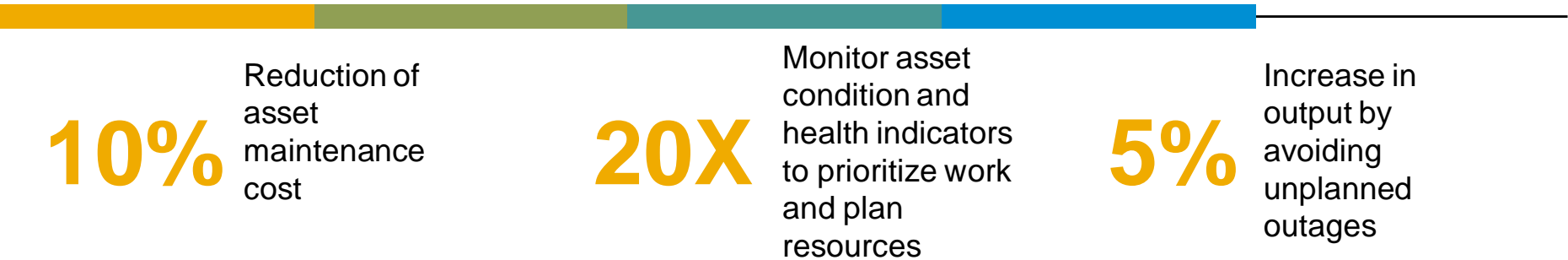
SCE is working every day to reduce wildfire threats and improve safety throughout Southern California. Proper maintenance of assets is essential to prevent asset failures. Preventative maintenance typically results in over maintaining assets and high cost.

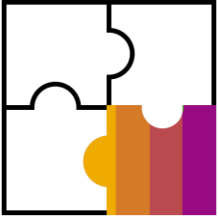
Solution

Predictive prescriptive approaches to maintenance with machine learning and IoT enabled engineering simulations to reduce unplanned failures and the number of maintenance actions.

Outcome

Avoidance of costly disruptions by predicting equipment malfunctions before they happen by processing huge volumes of information technology (IT) and operational technology (OT) data using sophisticated machine learning algorithms. Prevent unplanned downtime and schedule maintenance at a time that is least disruptive to operations.





Participating Partner Information



SAP | TCS

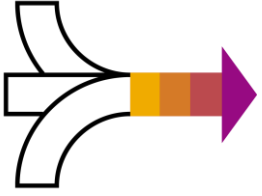
Management of the PoC within the SAP and TCS partnership



SAP SE is a German multinational software corporation that makes enterprise software to manage business operations and customer relations. The company is especially known for its ERP software. SAP is headquartered in Walldorf, Baden-Württemberg, Germany with regional offices in 180 countries. The company has over 425,000 customers in over 180 countries.

Tata Consultancy Services Limited is an Indian multinational information technology service and consulting company headquartered in Mumbai, Maharashtra, India. It is a subsidiary of Tata Group and operates in 149 locations across 46 countries. TCS is the largest Indian company by market capitalization.





Business Challenges and Objectives

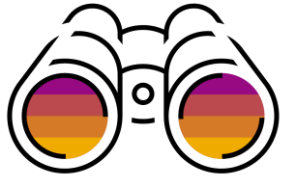
SCE continues to evaluate and implement new technologies and operating practices to further mitigate the potential for ignitions and to better respond to high wildfire risk conditions.

- Over the 2015 to 2017 time period, SCE experienced 302 reportable ignition events associated with electrical infrastructure within its service territory.
- SCE deployed a new multi attribute probabilistic risk evaluation model to evaluate safety risks.
- Electrical infrastructure assets are to be inspected, maintained, and repaired.
- SCE conducts annual routine patrols of overhead lines, communication circuits, above ground equipment, and overhead components of underground circuits, such as riser poles, terminations, and lightning arrestors.

Project Objectives – Southern California Edison 2019 Wildfire Mitigation Plan includes strategies, programs and activities that are in place, being implemented or are under development by Southern California Edison to proactively address and mitigate the threat of electrical infrastructure associated ignitions that could lead to wildfires, further harden the electric system against wildfires and enhance wildfire suppression efforts.

- Avoidance of costly disruptions by predicting equipment malfunctions before they happen by processing huge volumes of information technology (IT) and operational technology (OT) data using sophisticated machine learning algorithms.
- Prevent unplanned downtime and schedule maintenance at a time that is least disruptive to operations.





Project or Use Case Details

Use Case: Introduction of SAP Predictive Maintenance and Service for developing a risk based model for pole equipment to support predictive maintenance and risk mitigation during wildfire conditions.

- Net 9 (mainly based on GE Small World) and Map3D stores the cable/conductor data for SCE
- Net 9 contains all the attributes of our linear asset as well as the connectivity of the network
- Net 9 combines data from GE Small World and Map3D, so that it captures all the information needed to build the Geo-Schematic relationships of system.
- SAP is the source of pole and cable, conductor master data
- The goal is to build a model for the pole assets by using the data from Net9, MAP3D and SAP.
- The model will help for the predictive maintenance of assets and there by reduction of unwanted cost in preventive maintenance and avoid critical situation of wildfire.
- SAP Predictive Maintenance and Service will help to optimize resource management by sending technicians with the right parts at the right time and optimize asset performance.



Benefits and Outcomes

Business or Social

- Lower service and maintenance costs for assets
- Improved workforce scheduling and spare parts management
- Faster reactions with shortened repair times
- Higher asset availability
- Defect pattern identification capabilities
- Guidance for root cause analysis
- Improved product quality and production process
- Increased customer satisfaction and maintenance efficiency
- Higher service profitability

IT

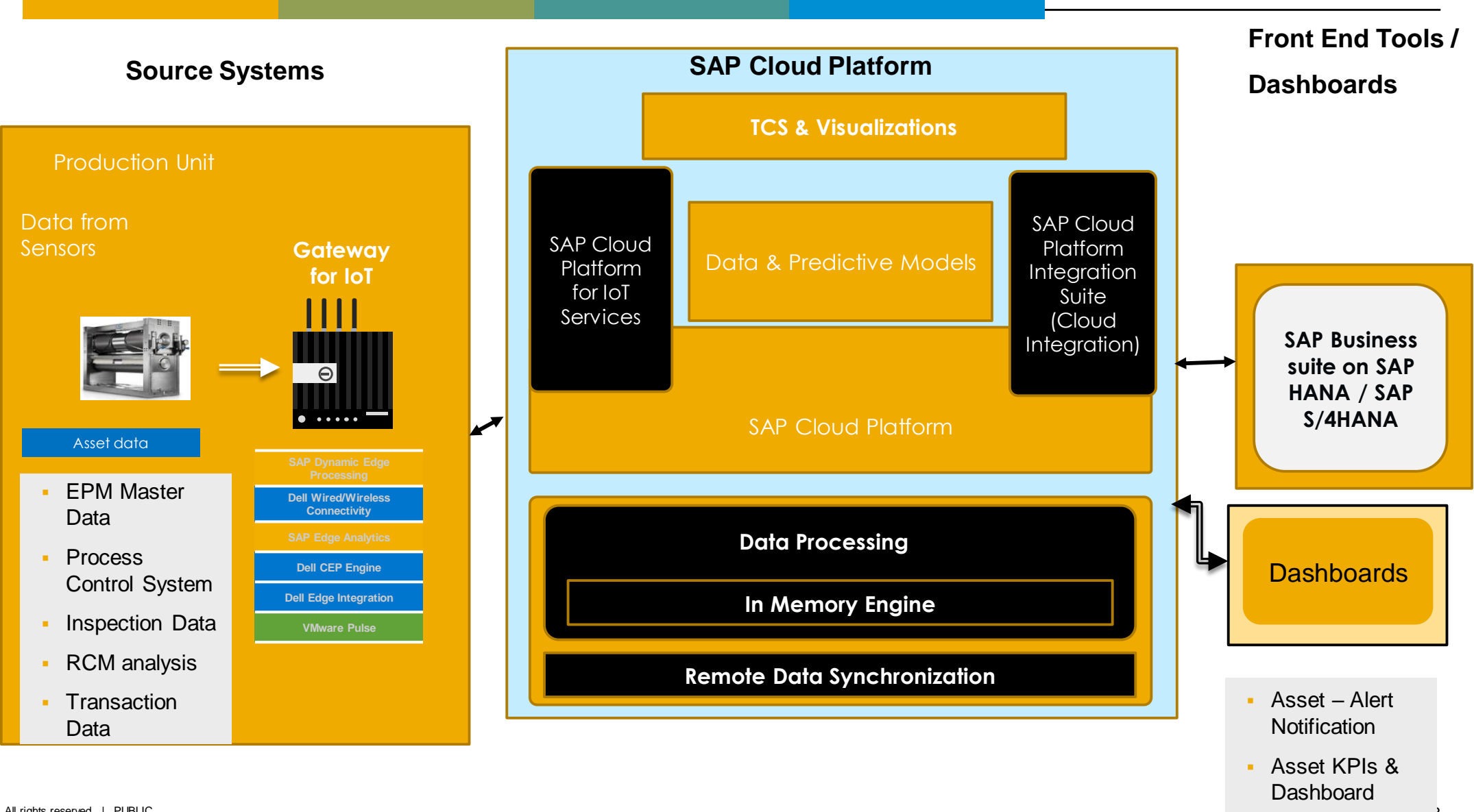
- Predictive maintenance prospectively determines the optimal time for planned maintenance measures.
- Advanced analytics to support maintenance execution and strategy decisions
- Failure Mode Analytic
- Leading Indicators Analytics
- Advanced Rule-based Alert Creation
- Prediction and Anomaly Detection Algorithms

Human Empowerment

- Asset Performance Dashboards
- Alert Notifications in case of asset failure and automatic work order creation
- Asset Reliability Reports
- Asset Health score
- Asset Failure probability
- Asset Failure consequence and Risk score



Architecture





Deployment

Deployment status POC

Date 03/31/2020

Number of users 25 users

SAP technologies used:

	SAP product	Deployment status (live or proof of concept [POC])	Contribution to project
1	SAP Predictive Maintenance and Service	POC	To build the risk based asset model, different source systems are identified. The source data will be used as a input for SAP Predictive Maintenance and Service algorithms.
2	SAP Cloud Platform	POC	SAP Predictive Maintenance and Service hosted in SAP Cloud Platform.
3	SAP S/4HANA	POC	SAP Predictive Maintenance and Service output will be shown as dashboard and updated back to SAP S/4HANA.
4	SAP Cloud Platform Integration Suite	POC	Integration with SAP Business Suite

If you have used one of the services or support offerings from SAP Digital Business Services during the implementation or deployment phase, please select with ☒ one or more of the following offerings:

☐ SAP MaxAttention™

☐ SAP ActiveAttention™

☐ SAP Advanced Deployment

☐ SAP Value Assurance

☐ SAP Model Company

☐ Others: Collaborate with SAP product team and SCE data scientist.

☐ SAP Innovation Services

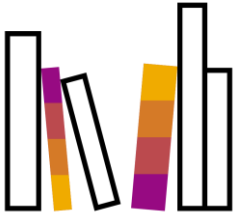
☐ SAP Innovative Business Solutions



Advanced Technologies

The following **advanced technologies** were part of the project.

	Technology or use case	Yes or No	Contribution to project
1	3D printing	No	
2	Blockchain	No	
3	Internet of Things (IoT)	Yes	IoT Edge Gateway to the Pole equipment
4	Machine learning or AI	Yes	Prediction & Anomaly Detection Algorithms
5	Conversational AI	No	
6	Robotic process automation	No	
7	Data anonymization	No	
8	Augmented analytics	No	



Additional Information

SAP Predictive Maintenance and Service documentation on SAP Help Portal:

https://help.sap.com/viewer/product/SAP_PREDICTIVE_MAINTENANCE_AND_SERVICE_CLOUD/1908/en-US

Machine learning capabilities reference:

<https://help.sap.com/viewer/f50a0b24de8e4968a683e6f926bf1563/1908/en-US/654d095bd73a401fb789491a23fc5bb5.html>

<https://help.sap.com/viewer/f50a0b24de8e4968a683e6f926bf1563/1908/en-US/29c1651b82e148849f82b5a18f5fea8c.html>

<https://help.sap.com/viewer/f50a0b24de8e4968a683e6f926bf1563/1908/en-US/41bb398a0eff41e9a3d5360be5865177.html>