Intelligent Project Management

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About the Speakers

Sreejith Mohan Menon

- Development Architect, SAP Labs India
- Responsible for design and development of S/4 HANA applications focusing on the Intelligent ERP Scenarios

Key Outcomes/Objectives

1. Intelligent Project Management
2. Early Insight into Budget Overrun
3. Better Project Planning with Cost Prediction

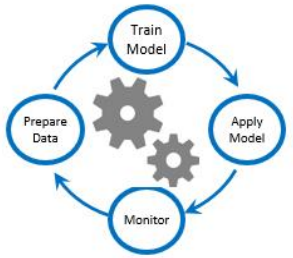
Agenda

- Motivation and Overview
- Project Cost Forecasting
- Forecast Detailed Analysis
- Situations – Possible Budget Overrun
- Demo
- Q&A

Motivation and Overview

Problem

- Projects don't meet their budget and timeline.
- Reserving safety buffer leads to poor project planning and forecasting.

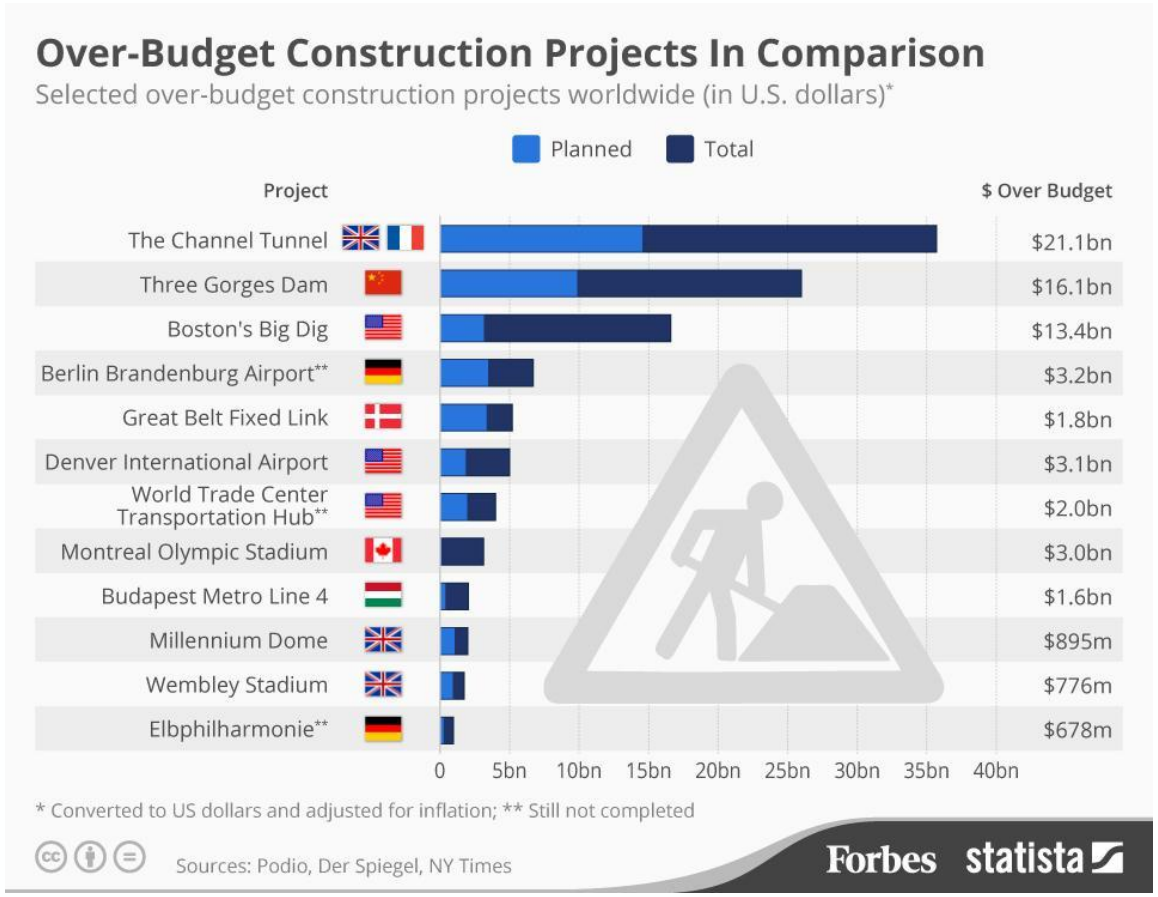


Advanced Analytics / Predictive Analytics

Goal

- To increase planning/forecasting accuracy by automatically learning by past
- How will my cost plan look like accordingly to similar projects in the past?
- How will my project schedule and cost evolve based on the current progress and the experience of historical project data?

Motivation and Overview



One in six companies exceed its budget by

200%

- University of Oxford and McKinsey, 2011

Root Causes

Wikipedia, Cost Overrun

[…]**imperfect forecasting techniques,** inadequate data, […]**optimism bias with forecasters.**

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Project Cost Forecasting

Hypothesis 1:

There is a connection between the project (master) data and the project costs.

Hypothesis 2:

Similar projects have similar cost characteristics.

Master data

- Project Type
- Customer
- Cost Center
- Profit Center
- Location
- Duration

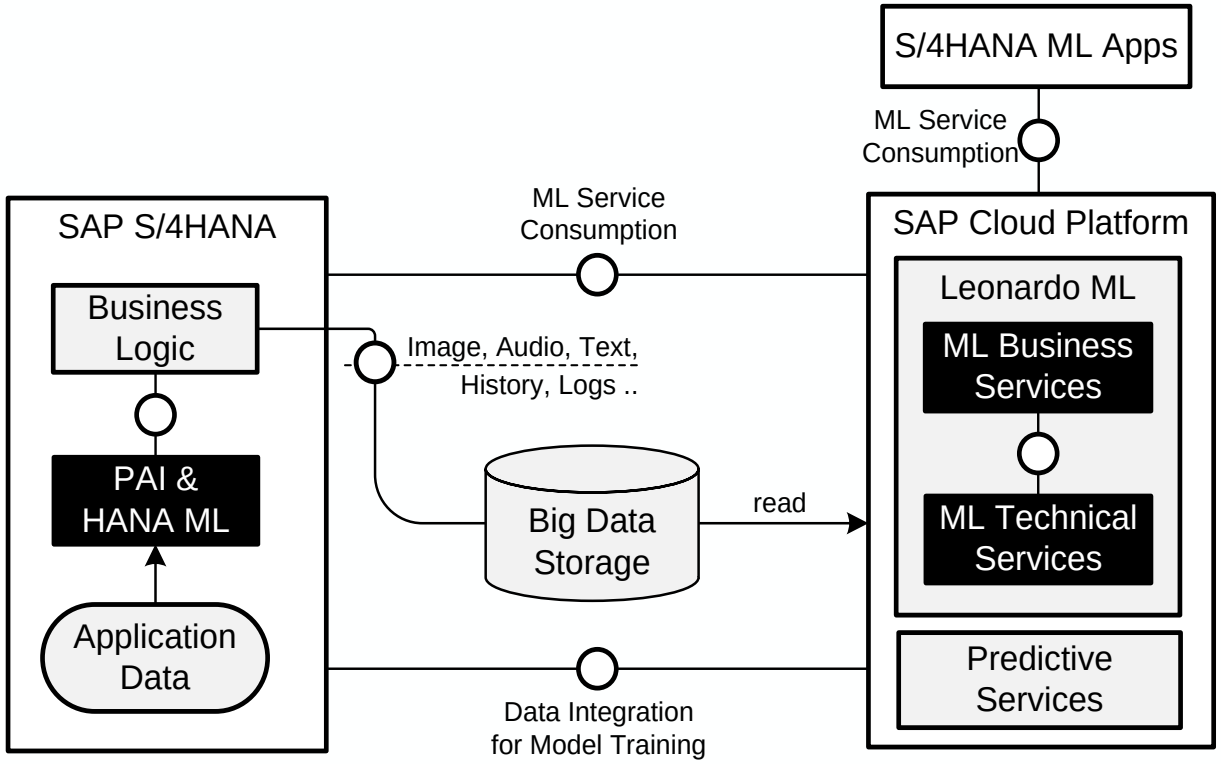
Transaction data

- Costs
- Resources
- Progress
- Change requests

External factors

- Weather conditions
- Inflation rate
- Exchange rates
- Commodity prices
- Vacation times.

ML Solution Architecture



EMBEDDED ML:

SIMPLE CASES LIKE TRENDING OR FORECASTING

ALGORITHMS WITH LOW CPU/RAM/DATA DEMAND

SIDE-BY-SIDE ML:

DEEP LEARNING CASES LIKE IMAGE OR LANGUAGE PROC.

NEURAL NETWORKS WITH HIGH GPU/RAM/DATA DEMAND

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Project Cost Forecasting

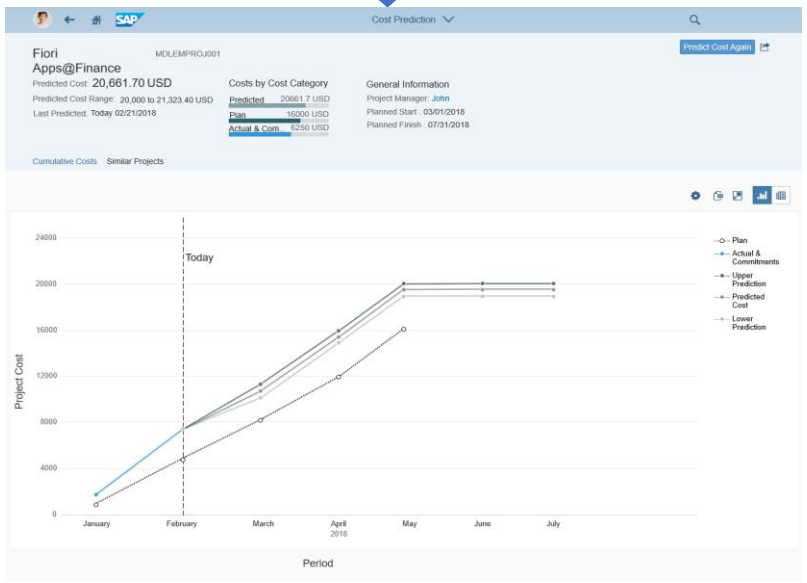
Get K-Nearest-Neighbors

Derive weighted averaged cost curve from neighbors

Similar Projects

Projects (4)

Project	Project Manager	Planned Start	Planned Finish	Plan Cost	Actual Cost	Project Similarity	
Bring your own device MDLEMPROJ023	George	11/22/2017	04/28/2018	17,000.00 USD	7,000.00 USD	**0.9**	Exclude
Hybris Implementation MDLEMPROJ024	Oliver	12/21/2017	05/25/2018	19,000.00 USD	6,550.00 USD	**0.8**	Exclude
IOT Project MDLEMPROJ022	James	01/02/2018	07/15/2018	17,500.00 USD	7,500.00 USD	**0.7**	Exclude
Project Apollo MDLEMPROJ021	Charlie	03/03/2018	08/04/2018	16,500.00 USD	6,660.00 USD	**0.6**	Exclude



Project Cost Forecasting

PLANNED PROJECTS

- **Predict**
  - Get 5 Similar Projects
- **Adjust Cost**
  - Multiply cost by weights
- **Adjust Date**
  - Calculate posting dates based on Normalized Cost Duration

$$TotalPredictedCosts = \sum_1^k ActualCosts_k * ProjectWeight_k$$

ACTIVE PROJECTS

- **Predict**
  - Get 5 Similar Projects with Cost to Date as additional feature
- **Adjust Cost**
  - Multiply cost by weights
- **Adjust Date**
  - Calculate posting dates based on Normalized Cost Duration
- **Rescale**
  - Compute rescaling factor based on Actual and Predicted Costs

$$TotalPredictedCosts = \sum_1^k ActualCosts_k * ProjectWeight_k$$

$$NewCosts_t = PredictedCosts_t * rescalingFactor$$

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Situations

IDENTIFICATION

BUDGET OVERRUN AS IT REACHES A THRESHOLD DURING COST POSTING

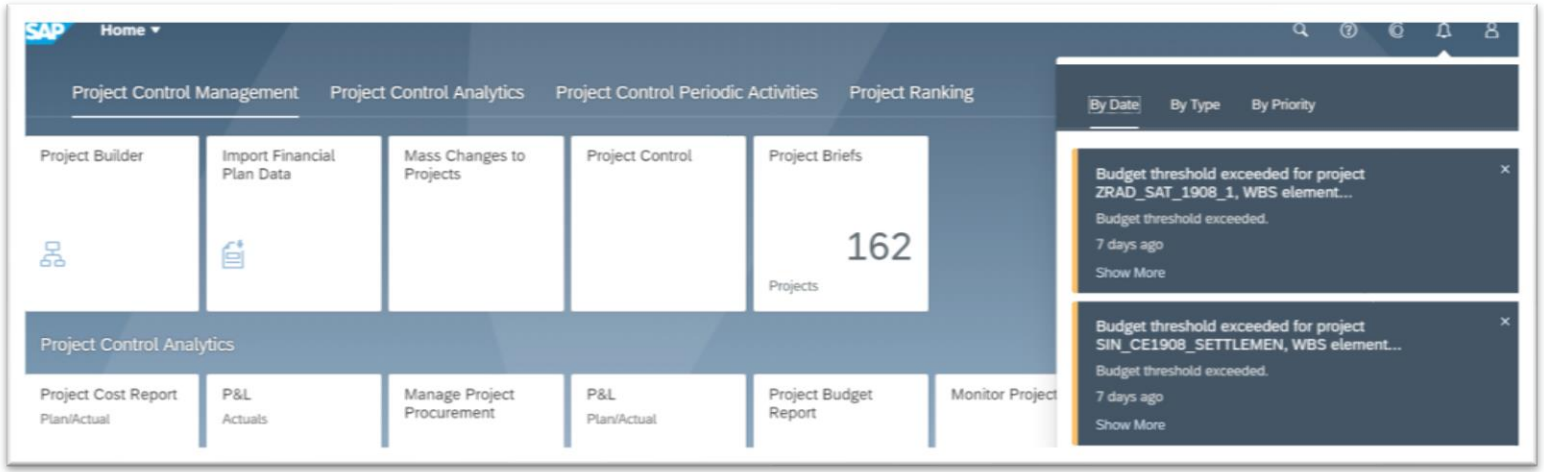
NOTIFY

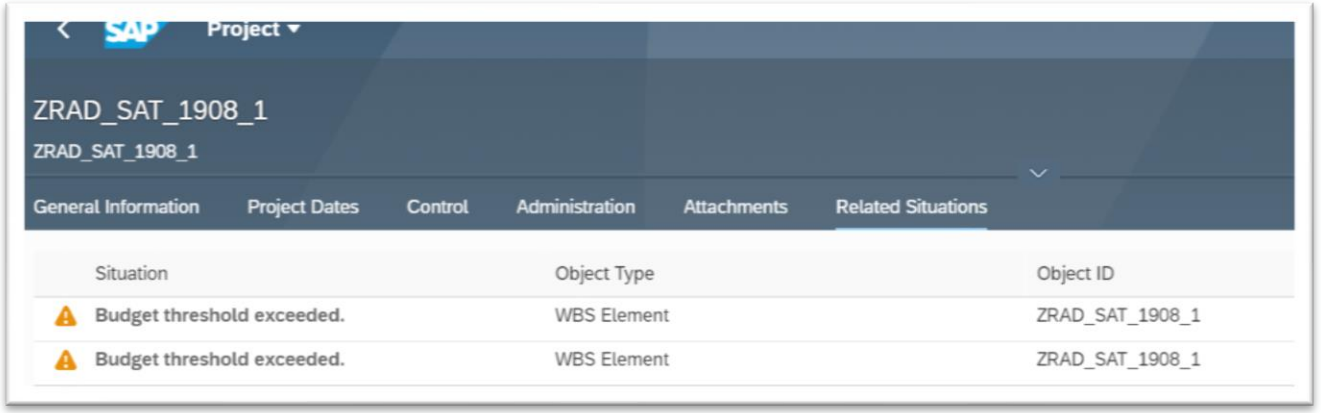
FIND THE RESPONSIBLE PEOPLE AND NOTIFY THEM

NAVIGATE TO THE PROJECT AND WORK PACKAGE WHERE THRESHOLD IS EXCEEDED

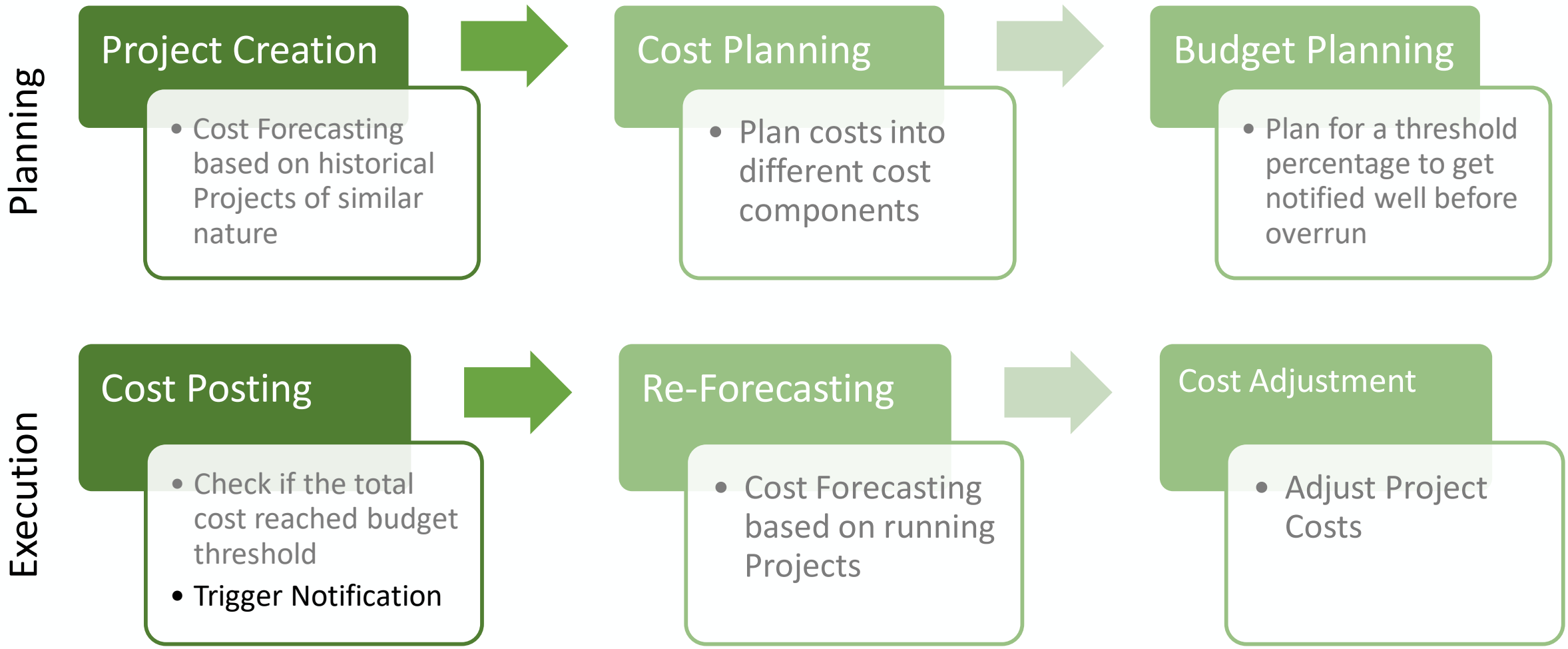
DETAILS

SHOW RELATED SITUATIONS IN THE OBJECT DETAILS





Intelligent Project Management



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Presentation Materials

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http://info.asug.com/2019-ac-slides

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Q&A

For questions after this session, contact us at Sreejith.mohan.menon@sap.com

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