How a Global Manufacturer Consolidated its Asset Management Platforms with Zero Downtime

Agenda

- Introductions

- Project Description
  - Project Objective/Challenge
  - Project Background
  - Project Timeline

- Solution Approach & Overview

- Project Results & Benefits

- Lessons Learned

- Q+A

About the Speaker

Bill Quinlan

- Manager Plant Floor Systems with responsibility for Global Maximo at 28 sites (single instance)
  - Joined AAM in 2006

Bill Wallace

- Principal Consultant at SRO Solutions
  - Consult with AAM for the zero-downtime tool, SDU

Russ Anderton

- Vice President at Cohesive Solutions
  - Account Executive for AAM for this project

American Axle and Manufacturing

COMPREHENSIVE SOLUTIONS
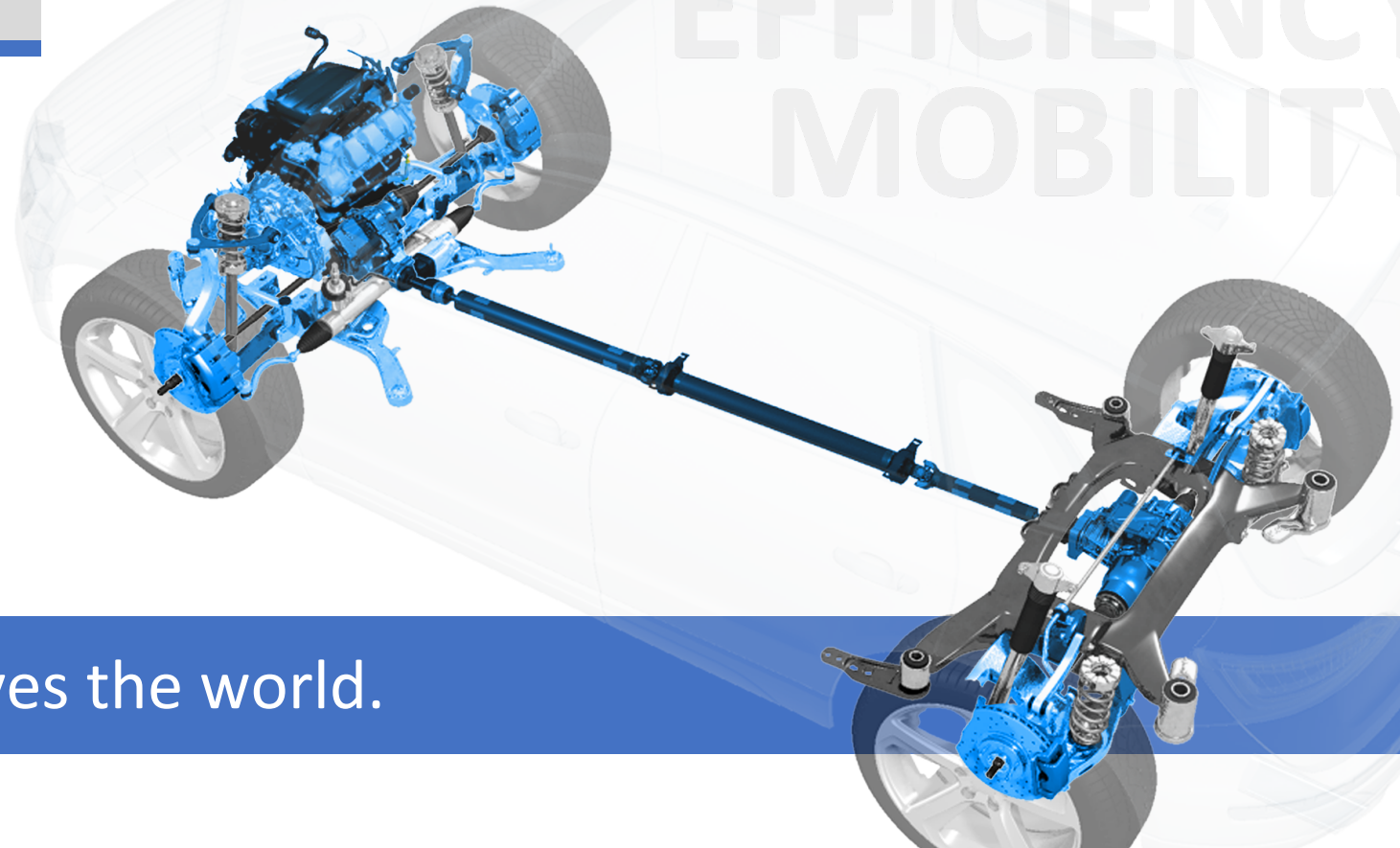from engine to driveline.

Global tier 1 automotive supplier

Headquartered in **Detroit, Michigan**

World-leader in design, engineering and manufacturing of automotive systems and technologies

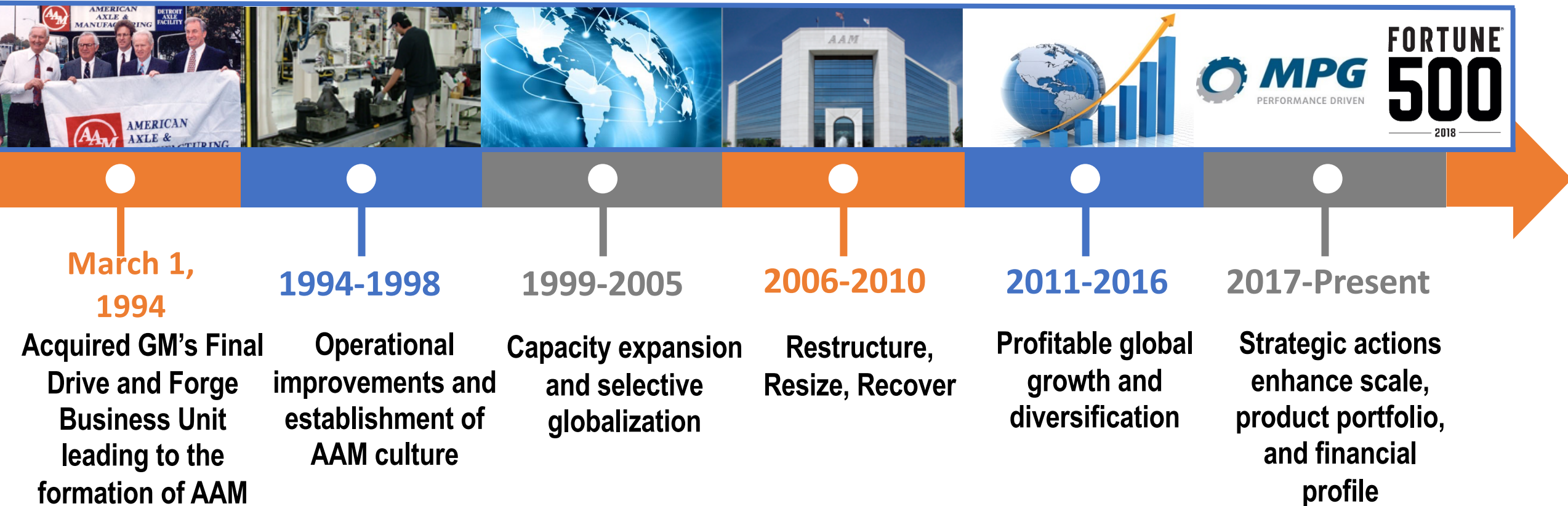Focus on **quality**, **operational excellence** and **technology leadership**

AAM delivers **POWER** that moves the world.

LIGHTWEIGHTING
EFFICIENCY
MOBILITY

History Timeline

For over 25 years, AAM has been Delivering POWER.

March 1, 1994
Acquired GM's Final Drive and Forge Business Unit leading to the formation of AAM

1994-1998
Operational improvements and establishment of AAM culture

1999-2005
Capacity expansion and selective globalization

2006-2010
Restructure, Resize, Recover

2011-2016
Profitable global growth and diversification

2017-Present
Strategic actions enhance scale, product portfolio, and financial profile

About AAM

$6.53B — 2019 SALES

21,000+ — ASSOCIATES

700+ — CUSTOMERS

17 — COUNTRIES

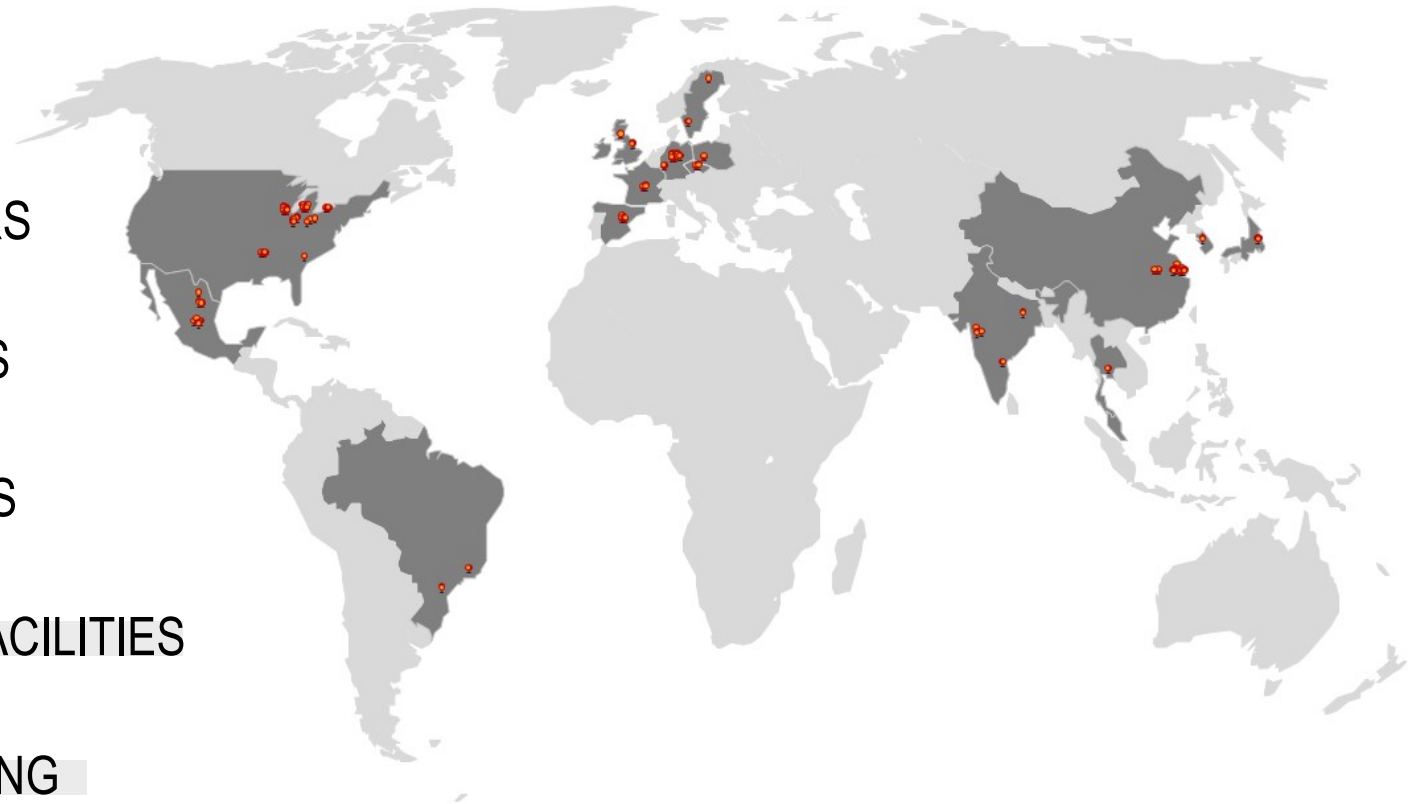**80** — APPROX. LOCATIONS

60+ — MANUFACTURING FACILITIES

16 — ENGINEERING CENTERS

Serving the World's Leading Brands

MORE THAN 700 CUSTOMERS WORLDWIDE

Project description

U p g r a d e   a n d   c o m b i n e   t w o   v e r s i o n s   o f   M a x i m o   w i t h   z e r o   d o w n t i m e

- Operating on 2 separate Maximo environments, 2 separate databases, 2 reporting servers, 2 Web Scheduler servers, 2 OS platforms
  - **US plants:** Maximo 7.6 on Windows , SQL DB on Windows platform, WebSphere
  - **Asian plants:** Maximo 7.1 on Linux (outdated and unsupported), Oracle DB on Linux, WebLogic

- Previous upgrade attempt to transition to Maximo 7.6 and SQL DB was abandoned because the system could not support Asian languages

- Completed upgrade from 7.1 to 7.6 with zero downtime (Oracle to Oracle and Linux to Linux)

- Consolidated 7.6 Windows into 7.6 Linux with zero downtime (SQL to Oracle and Windows to Linux)

Project background

AAM Maximo Team needed to roll out Maximo

- AAM expansion required that 7 new AAM sites be added into Corporate Maximo version

- Internally the IT team wanted to complete consolidation into single Maximo instance
    - Reduce support for duplicate solutions (Maximo, AAM Scheduler web, Custom Reports) as they all needed to be supported on SQL Server and Oracle

    - Single solution for future integrations
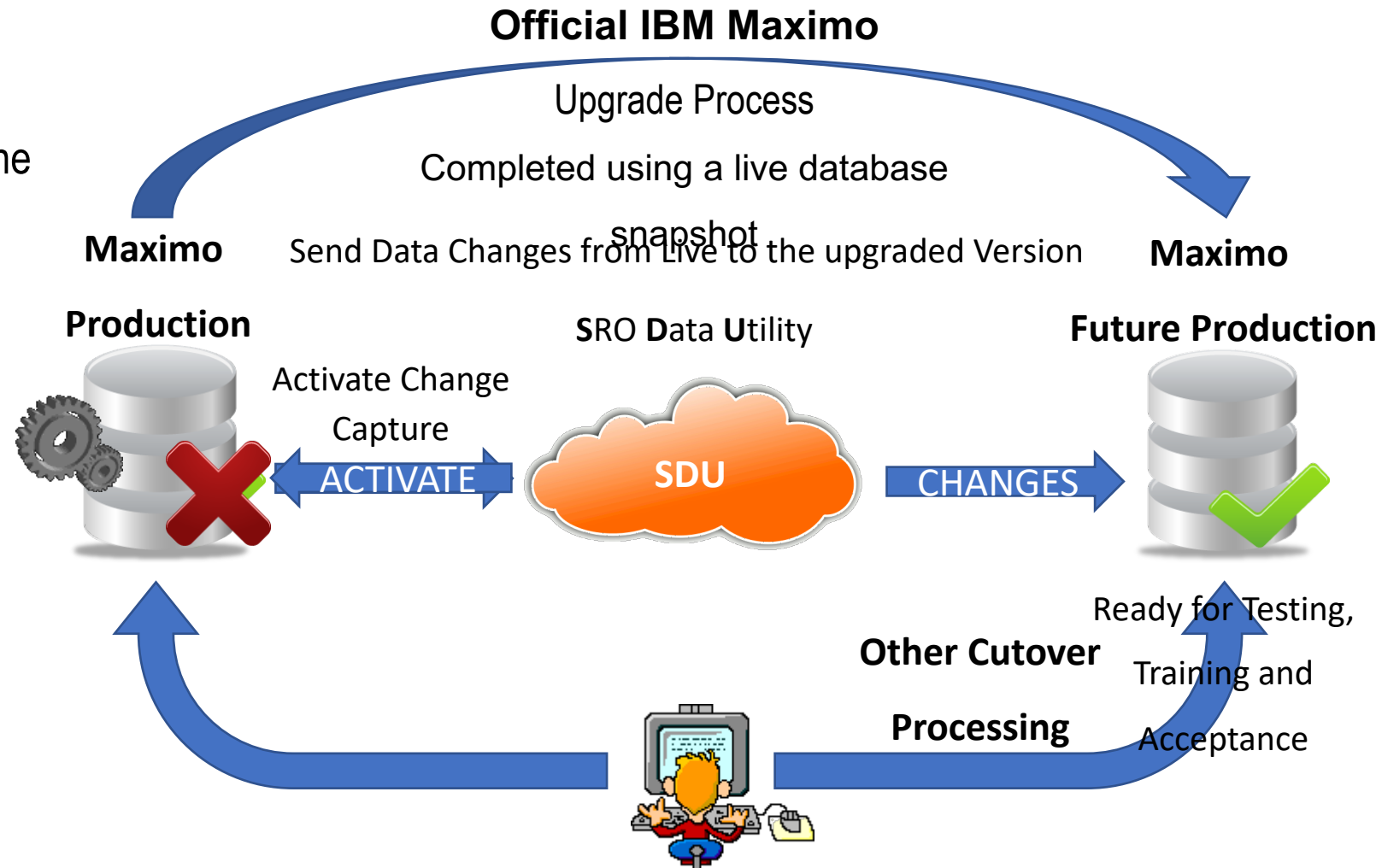
Solution Approach

- Cohesive Solutions was selected to consolidate both Maximo environments into a single environment

- Cohesive's Technical Upgrade methodology was used to manage the conversion, upgrade, and migration

- To eliminate production server downtime, Cohesive leveraged existing partnership with SRO solutions to use the SDU Zero Downtime tool

SDU Zero Downtime Tool

The SDU enables Maximo upgrades with massively reduced or no downtime

- Runs in parallel to your upgrade capturing all user data changed in the live system
- Allows users to continue working in live whilst the upgrade is completed
- The Maximo upgrade downtime is removed – the outage window is reduced
- The risk of a failed or delayed Maximo upgrade is no longer a concern as it is completed ahead of time
- The amount of time the Maximo upgrade takes is also no longer a concern

Official IBM Maximo

Upgrade Process

Completed using a live database snapshot

Maximo

Send Data Changes from Live to the upgraded Version

Maximo

Production

SRO **D**ata **U**tility

Future Production

Activate Change Capture

ACTIVATE

SDU

CHANGES

Ready for Testing,

Other Cutover

Training and

Processing

Acceptance

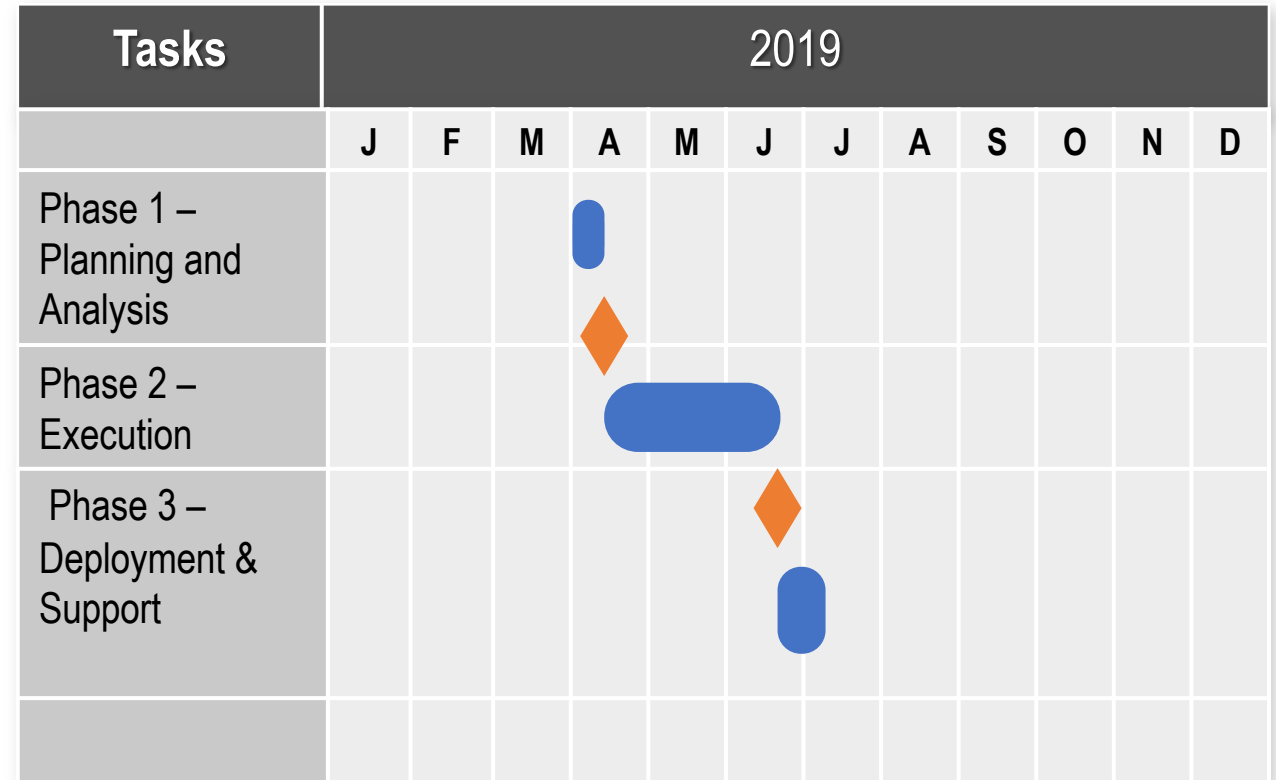# Maximo Consolidation ver 7.1 to 7.6

Phase 1
- Infrastructure/system architecture
  - Built new clustered servers

Phase 2
- Software installation – UAT, PROD, TEST
- Upgrade target environment
- SDU workshop including installation
         (zero downtime tool)
- Migration run phases & UAT
- UAT support and remediation

Phase 3
- Deployment and support

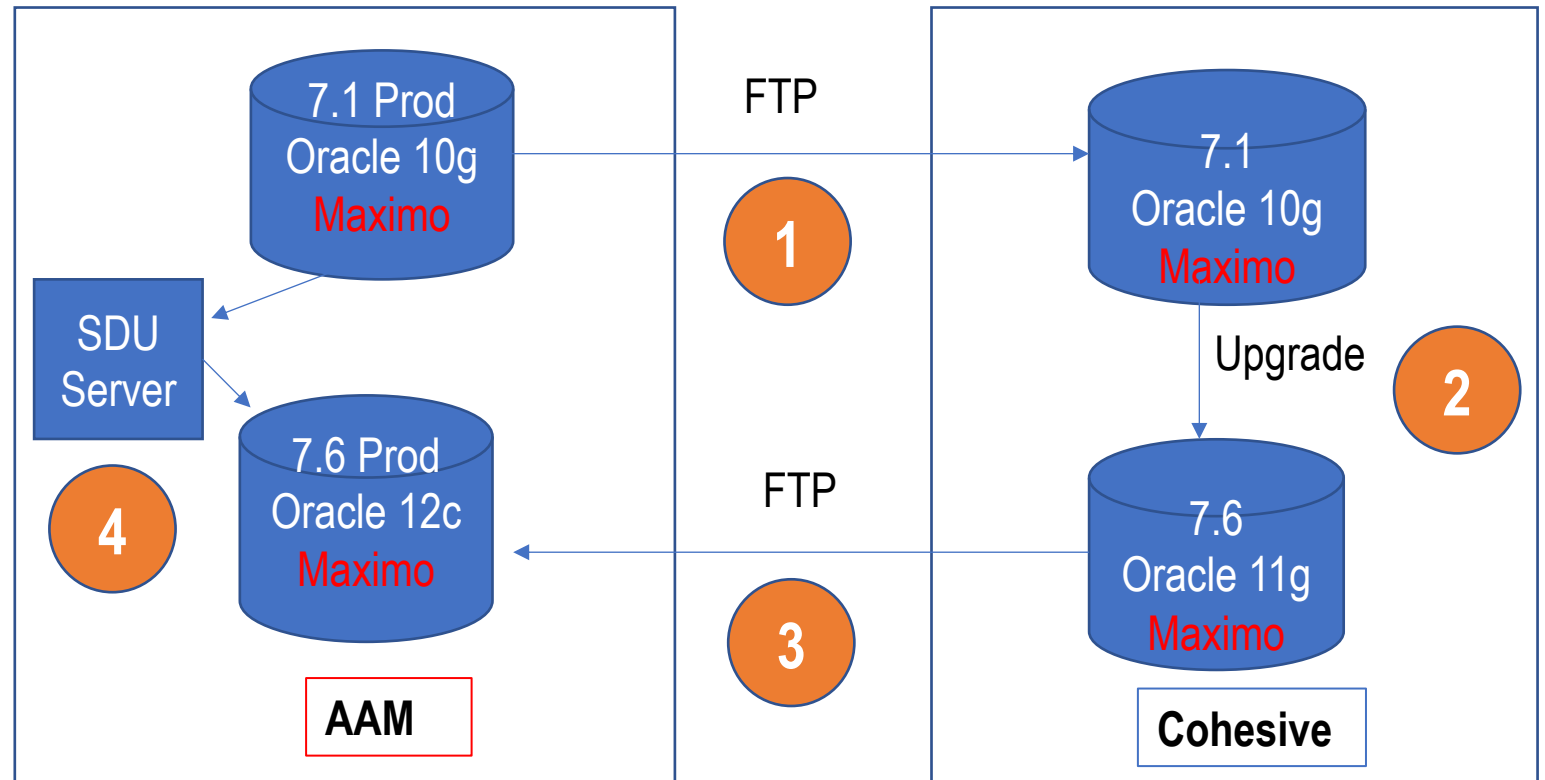| Tasks	2019											
	J	F	M	A	M	J	J	A	S	O	N	D
Phase 1 – Planning and Analysis				█ ◆								
Phase 2 – Execution					█	█						
Phase 3 – Deployment & Support						◆	█					

Upgrade Process

Steps

1. Send copy of Maximo 7.1 Oracle database to Cohesive

2. Cohesive upgrades to Maximo 7.6

3. AAM team imports upgraded database into AAM private Cloud

4. Enable data replication (7.1 to 7.6) with SDU tool – Zero Downtime required

Functional Validation

Maximo 7.6 Application validation

- Performed functional testing of the new Maximo 7.6 with data from 3 sites
  - AAM Scheduler – ASP based web page
  - AAM Custom reports – (validated 66 custom reports)
  - AAM Maximo web pages (validated AAM customizations)

      AAM Asset Management

      AAM Crafts Work Order Tracking

      AAM Enter EM Event

      AAM Job Plans

      AAM Preventative Maintenance

- Engaged large AAM manufacturing locations to Test including load testing

Data Validation

Maximo 7.6 Data validation

- Validated the movement of data from 7.1 to 7.6 for a subset of large locations (3 sites)
  - Picked several existing Work Orders in 7.1 and made changes to those and ensured that the changes were reflected in 7.6
  - Validated that the changed data was also displayed properly on the AAM custom screens

    AAM Asset Management

    AAM Crafts Work Order Tracking

    AAM Enter EM Event

    AAM Job Plans

    AAM Preventative Maintenance

- Validated the number of table rows imported against the number that was sent by Cohesive
- All data was kept including older historical data

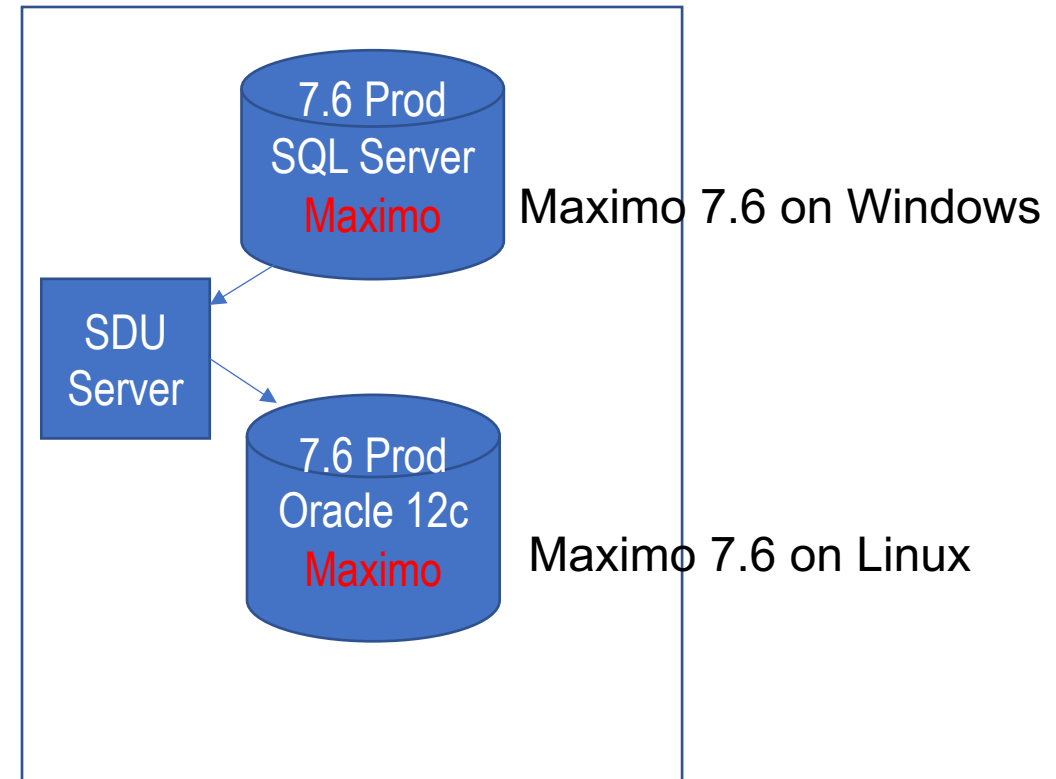# Maximo final merge (stretch goal)

Background:
- 20+ 7.1 sites are now running 7.6 Oracle on Linux
- 5 7.6 sites running on Windows with SQL

What was done:
- Pull data across from 7.6 SQL to 7.6 Oracle using SDU tool **(both are in PROD now)**
- Validate data migration
- Completed UAT
- Went live

Timing:
- July to Sept 2019 while AAM team was rolling out Maximo to new sites – zero downtime
- SDU tool replicated all changes between 7.6 SQL and 7.6 Oracle during this time

7.6 Prod
SQL Server
Maximo

Maximo 7.6 on Windows

SDU Server

7.6 Prod
Oracle 12c
Maximo

Maximo 7.6 on Linux

Benefits to this approach

- Zero downtime needed to upgrade 7.1 to 7.6

- Performed UAT with near live data

- Enables testing in future environment which minimizes go live risk

- Reduces potential outage for upgrade as the future system is already live

- No risk of having to roll back changes as system has already been upgraded and validated

- Actual 7.1 to 7.6 upgrade was performed off-site and required minimal computer resources from AAM Maximo team

- Did not require AAM to stand up another environment for upgrading

- AAM team was able to deploy 2 new Maximo sites during the upgrade process

- Ability to achieve the stretch goal due to the cost and time savings due to use of SDU vs. traditional approach

Go-Live timing

- **Pre-go-live tasks**
  - Send notice to Maintenance community on Monday 24-June-2019 at 8 AM with new link
  - Create web page that displays new URL when old URL is selected
  - Notify Customer Care Team of this new URL for Maximo

- **Go-Live tasks – approx. 5 minutes**
  - Disable existing Maximo 7.1 Oracle URL at 8 AM Wednesday 26-June-2019
  - Enable web page notice with displays new URL
  - No disruptions from the Go-Live, went unnoticed by end users

- **Backout plan**
  - Disable new URL
  - Re-enable old URL

Lessons Learned

- Do your homework on the solution, tools, and vendors
  - Develop formal evaluation criteria for potential vendor partners
    - Select best solution not necessarily the lowest cost
    - Cost-benefit analysis
  - Complete homework prior to having consultants on-site
    - Completed the data analysis of the Maximo tables which sped up the on-site work
  - Validate that you have the proper vendor partner prior to engaging them
    - Obtain customer references and verify

Thanks for your time!

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- 678-429-2151

Q+A

- What is the selection criteria process?

- What challenges did you face with having to switch database types on this migration?

- Would SDU tool allow for a phased deployment?