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# Web Scheduler:
Data Center Deployment

# Agenda

- Intro
- Business Case
- Project Initiation
- Challenges
- Development, Test, Launch
- Adoption
- Impact
- Questions

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# Mike Karakos, PMP, CMRP

- US Navy 2003-2011
  - Nuclear Machinist Mate
  - USS Dwight D. Eisenhower (2x 550 MW pressurized water reactors)
- Oglethorpe Power Corporation 2011-2018
  - Maintenance Coordinator
  - Rocky Mountain Pumped Storage Hydroelectric Plant (3x 365 MW pump-turbine generators)
- Google 2018-2023
  - Technical Program Manager
  - Global Data Center Operations (26 campuses)
- Prometheus Group 2023-present
  - Director of Maximo Products

- 20 years O&M
- 13 years Maximo
- 8 years software project management
- Scheduling software experience:
  - AKWIRE Visualization Suite
  - PG Web Scheduler/PM/Job Plan
  - IBM Maximo Graphical Scheduler/Assignment Manager
  - Oracle Primavera P6
  - Microsoft Project
  - Smartsheets

# Business Case

- 1 new data center built per week (2x asset/headcount every 3 years)

- Averaged 200 work orders per week, per campus, heavily routed PMs (e.g., 300+ assets)

- 1:80 planner-tech ratio

- Planners were schedulers with no time for planning

# Business Case

- Poor latency and application performance in Maximo
- Planners lost their work often due to server/session crashes
- No graphical scheduling tools in place (Gantt)
- Spreadsheet focused planning with manual data flows
- Prone to human error
- No visualization of PM forecast and associated labor requirements
- No real-time resource loading metrics
- Standardized work controls existed but without a centrally managed tool, variations persisted

# Project Initiation

- Collected business requirements from across the fleet
  - Democratic business philosophy
- Reviewed and aligned expectations
  - Critical path type work (construction) eliminated from scope and restricted to daily maintenance use case
- Calculated ROI
  - Gain 5 effective FTE in labor savings
  - ~$1.3m/yr in administration
  - Avoided impact to reliability calculations as too many assumptions had to be made
- Bidding
  - Requirements shifted, mandate for web-based solution
  - Other tools simply did not come anywhere close to feature parity and coverage of our business requirements
- Executive Approval

# Challenges

# Internal Challenges

- Culture
  - Resistance to change, but quickly moving in the right direction
  - 100% alignment to make decisions
  - Rapid growth
  - Bandwidth, growth outpaced headcount
  - Disparity in domain experience and knowledge
  - Cash rich – downtime is expensive and parts are relatively cheap
- Timeline
  - Tight deadlines due to a very optimistic expectation, reality arrived quickly
  - Schedule slips resulting in escalated pressure
  - Limited resources to test
  - Limited access to data to identify and address edge cases

# Maximo Challenges

- Poor latency and DB performance
- Less than desirable server hardware specs
- Abnormal configurations impacting compatibility and limited functionality that had to be corrected prior to testing
  - Custom object structures (crewid instead of using Person Groups)
  - "Duration" (estdur), functionally used as the estimated labor hours field
  - No planned labor
  - Custom scripts for calculated fields
- All changes impacted multiple areas of the business
- Automation script created to populate all non-PM work orders with basic planned labor
  - Duration could be used to assume that at least 1 tech, as an undefined craft, would work for at least that many hours

# Development, Testing, Launch

- PG new to Maximo, learning curve

- Tight schedule, so features often had to be developed at the same time functional requirements were still being explored and finalized

- Strong desire and push to get away from spreadsheets

- Our needs vs. all other customers

- Performance, performance, performance!

- Subset of planners chosen as the core group of testers and governing body, intentionally selected with varying degrees of skill and knowledge

# Development, Testing, Launch

- Rapid pace of development and updates

- Data access restrictions bottlenecked or undermined testing

- Streamlined bug reporting and management is critical

- DEV, TEST, & PROD environments for both CMMS and Scheduler should have equal (or load-proportional) server hardware specs!

# Development, Testing, Launch

- Train-the-trainer and open office hours held
  - Recommend vendor/online training
  - Planners trained as trainers led to inconsistency in adoption and quality
- Regionally piloted – couple sites from each region, globally
  - Critical to success as many issues identified and fixed
  - Time zones
  - Timestamp formats
  - Varying definitions/use of work order fields
  - Varying local policies/regulations
- Globally launched
  - Well received, adopted quickly, and immediately impactful

# Adoption

- Resistance to change
- Technician training and work control changes
- Dashboard built to monitor/ highlight regional differences
- ISP bandwidth while remote
- Craft, Person Group, Labor record management and administration
- Planned Labor administration
- Job Plan revision cadence, process, and tools
- Communicate and train for Web Scheduler's rapid frequency of updates
- Planning and scheduling principles and best practices

# Impact

- Effectively added 11.2 FTE to the planning team and 5 FTE to the craft supervisors, saving ~$4m/yr labor
  - Increased capacity and efficiency administering the weekly schedule and PM forecasts
  - Planners have more time to plan
  - Improved focus on identifying and fixing conflicts, opportunistic maintenance, permits, and vendor coordination — better on-time completion and availability
  - More time to focus on process improvement and other projects

# Impact

- 35% increase in labor utilization (labor reported vs. available)
  - Better loading of schedules due to heatmap
  - Improved tracking of unavailability
  - Accurate estimates and accurate assignments, better aligned with reported (estimated vs scheduled vs. actual)
  - Improved visibility to management helped with accountability and setting progressively higher goals
  - Significantly improved confidence for data-driven headcount forecasts and contracted service management

# Impact

- Immense impact to availability but needed more time to measure
  - Annual PM Compliance climbed from 83% to 87% within 4 months - more PMs completed on-time as conflicts seen weeks in advance (reduced unplanned downtime)
  - Opportunistic maintenance increased as CMs were easily scheduled alongside PMs, or vice versa (reduced planned downtime)
  - Actual occurrences where cluster outages were experienced due to missed PMs, cost estimated to be billions, are now far less likely to occur

# Impact

- Instant improvement in planning accuracy, 130% to 96% (estimated/actual).
  - Ability to quickly analyze and revise planned labor using PG's Job Plan immediately reduced over-allocated labor, saving tens of millions in the first year
  - User-friendly interface enabled local planners/leads to take ownership of their site-specific planned labor in Job Plans

# Lessons Learned

- Realistic expectations
  - Timeline

- Remove obstacles to development and testing
  - Give appropriate access in sufficient quantity and with the right tools

- Test, test, test!
  - Project will either sink or swim

- Focus on efficiency and effectiveness
  - Efficiency drives adoption
  - Effectiveness drives impact

# Questions?

Thank you