

The Past and Future of CPM Project Scheduling

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Introduction

Innovation not Invention

Invent

- To create new

Innovate

- To make better

It's Not About the Software

Humans

- Expertise

Software

- Improve Efficiency



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Critical Path Method

CPM

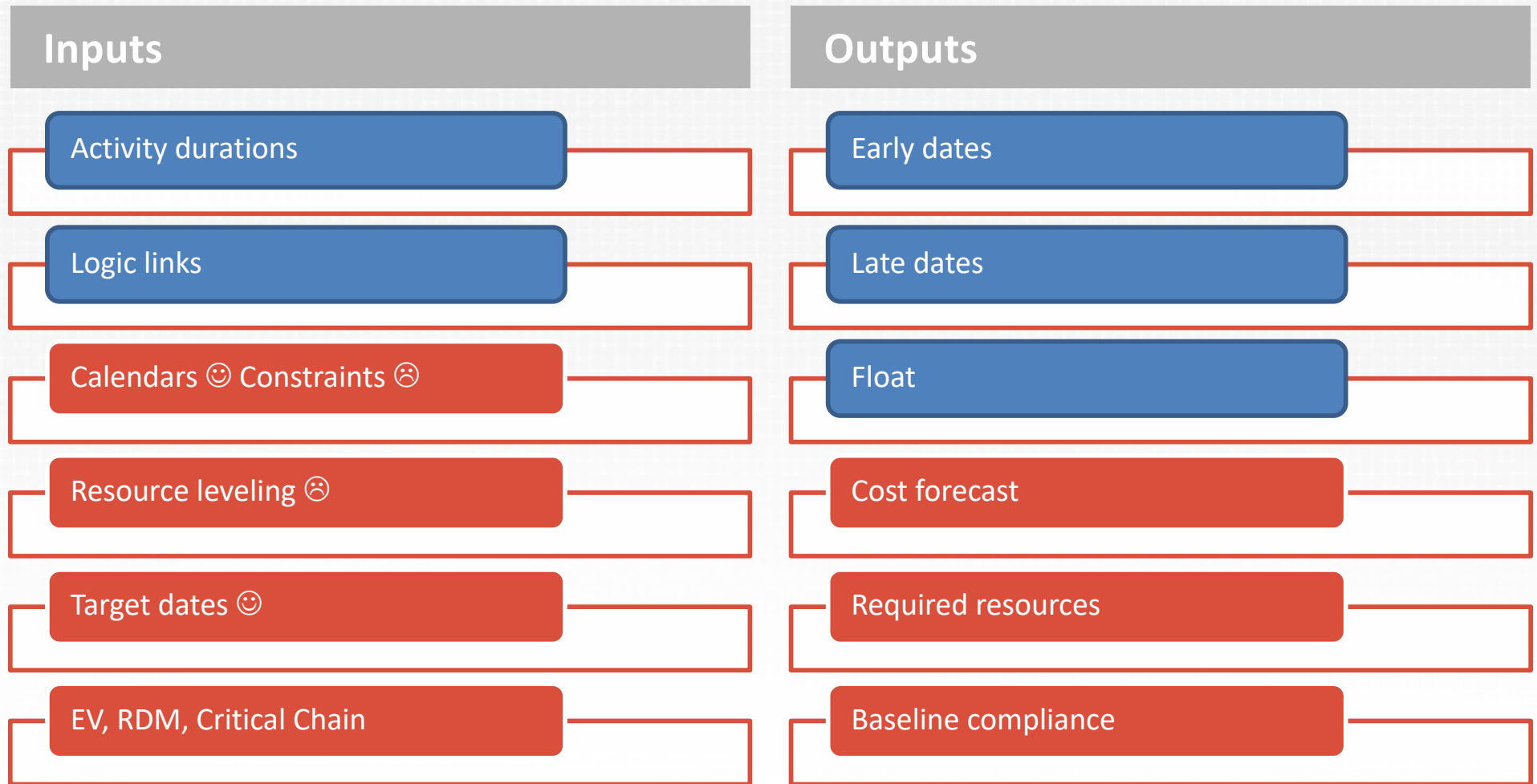
- 1956 – CPM invented
 - Dupont/Remington
 - UNIVAC-1 computer
 - Simple technique
- Generates dates & float
 - Dates are NOT inputs
- Today - same algorithm
 - 15 lines of code

CPM on the UNIVAC-1



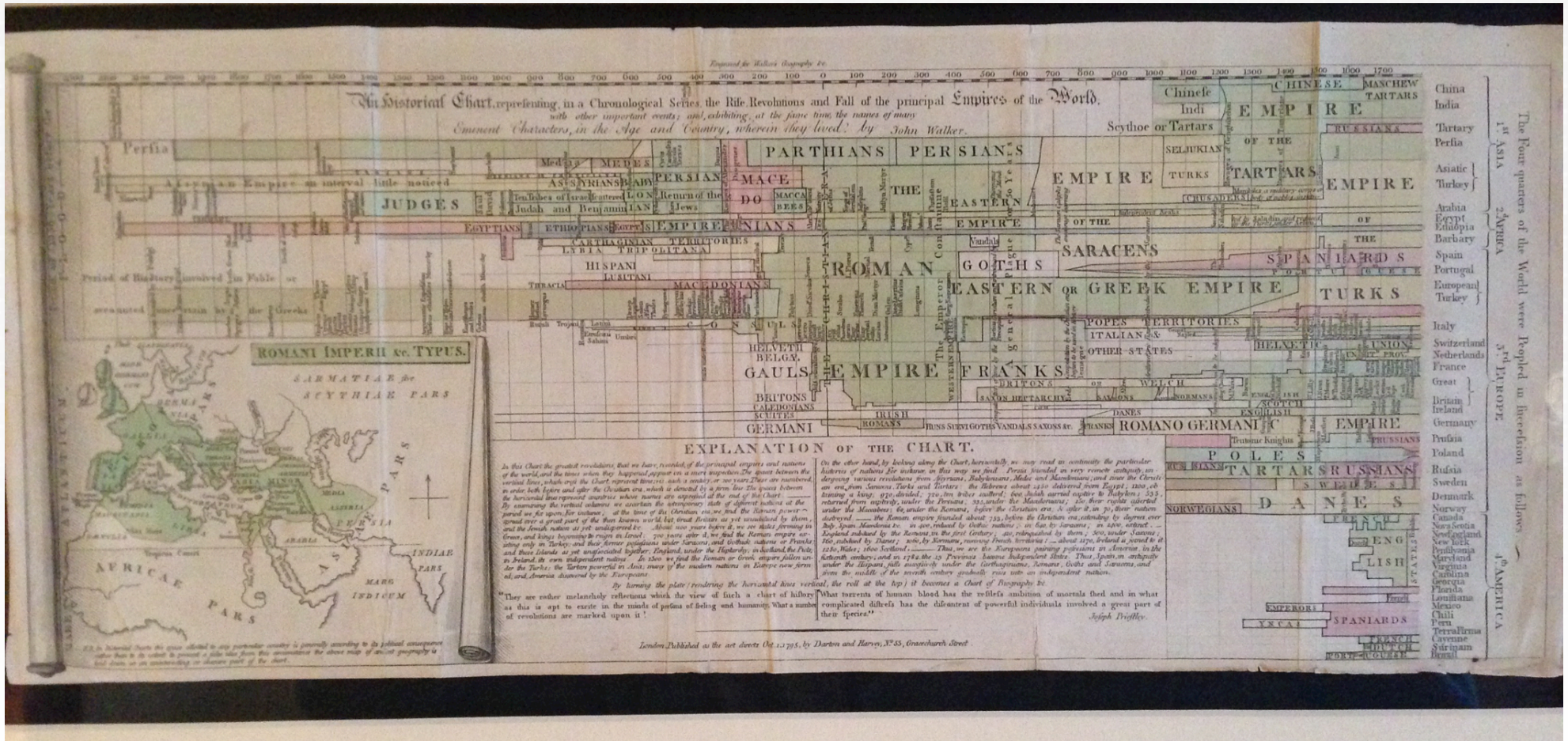
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CPM Really Hasn't Changed Much Since Then



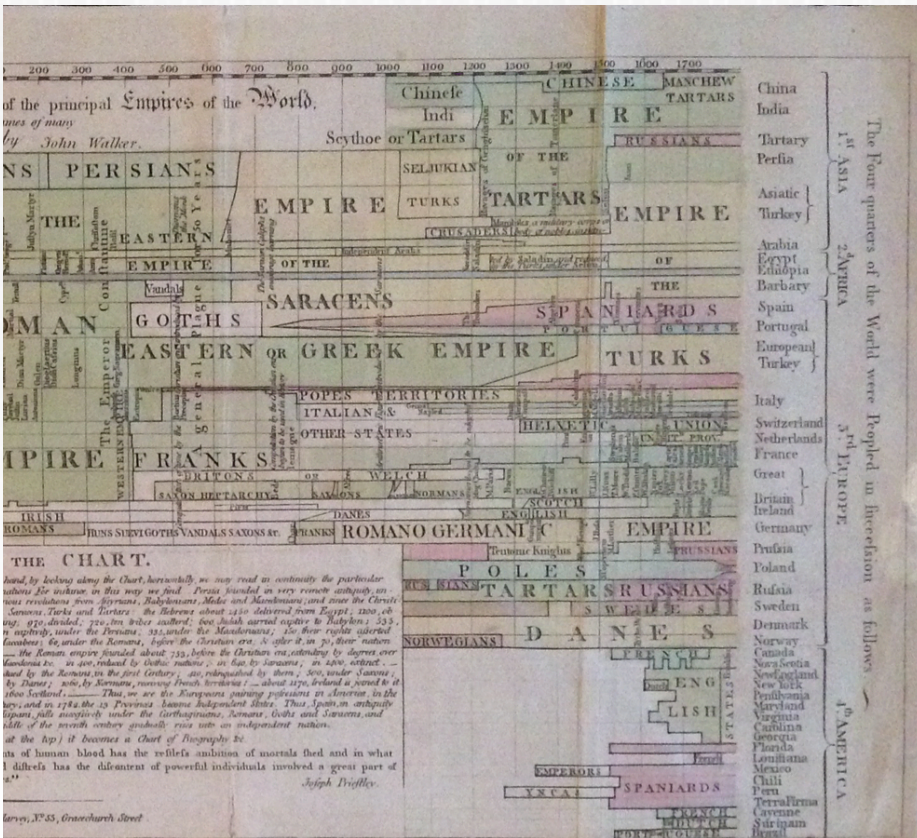
P6, MS Project, Phoenix, Acumen, Asta, Open Plan etc.
still use this approach today

A 1795 Harmonogram (The Empire Chart)

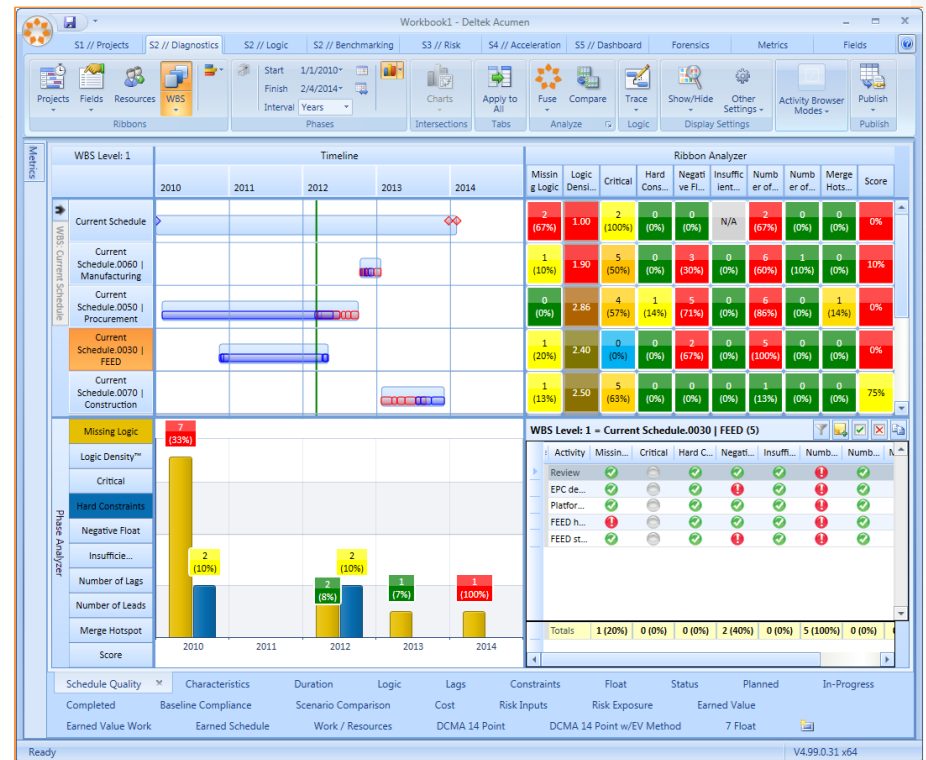


Standing on the Shoulders of Giants

1795 Harmonogram



2008 Harmonogram



The Past Twenty Years of PM Software

Software

- DOS/Windows (thick client)
 - Single-user e.g. P3, MSP
 - Multi-user e.g. P6
- Web (thin client)
 - Collaboration e.g. Lync
 - Remote statusing
- Cloud
 - Distributed systems
 - Subscription services
- >> Broader audience <<

Project Management

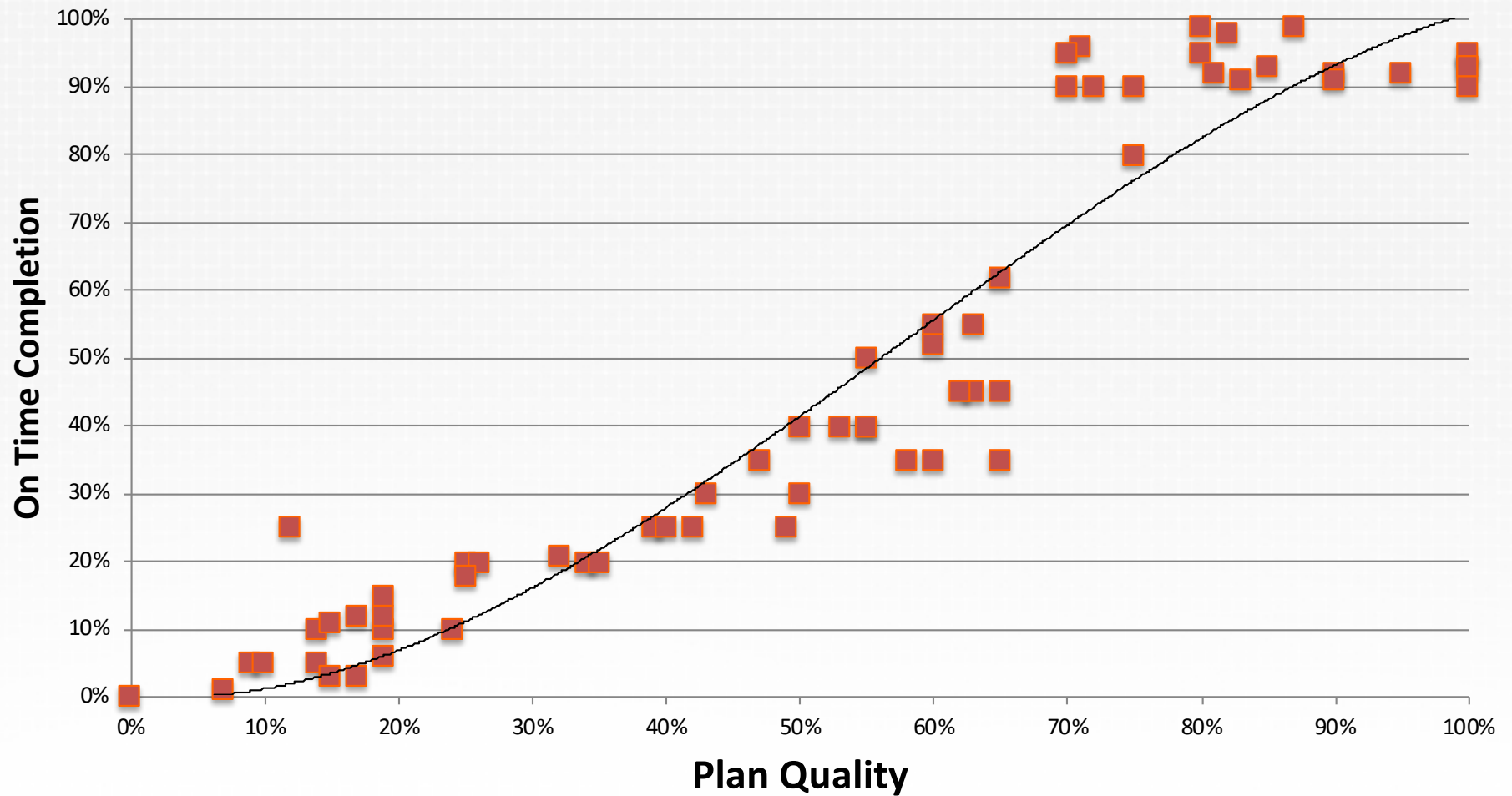
- Shift away from CPM
 - Scheduling brain-drain
 - Task based planning
- Numerous bodies
 - PMI, AACE, PP, COS
- Half a million PMP's!
- 300 million Google search results!



Project Management Software Today

- Significant vendor consolidation
 - 2000: dot-com era - dozens of CPM-related startups
 - 2015: core group of established vendors
- Industry leading tools focused on ERP integration
 - Continued need for smaller, stand-alone CPM solutions
 - Earned value, schedule diagnostics etc. still evolving
- Risk software starting to be embraced
 - Moving away from highly complex, intimidating tools
 - Risk-adjusted schedules becoming more commonplace
- Accurately forecasting projects still huge challenge

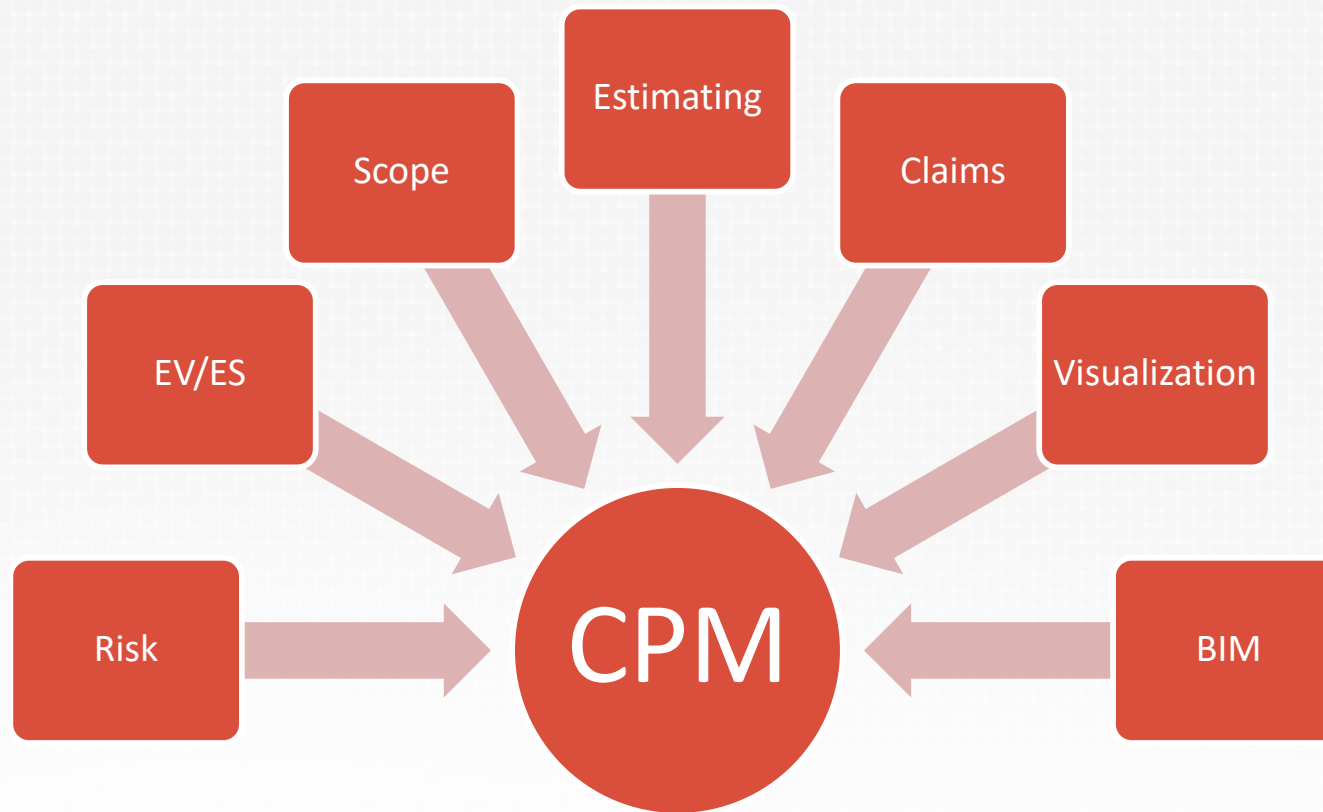
Can this Challenge Be Solved by Better Planning?



The Shortcomings of CPM

- It's not execution that is letting us down...
- CPM plans are overly optimistic
- Schedules are best case scenario
- Don't account for normal project occurrence
- Scope changes, uncertainty, risks
- Tools aren't providing enough guidance
- Focus on building more achievable schedules

It Takes More Than Just CPM to Make a Plan



Now let's evolve each of these

- Better plan the work
- Better work the plan

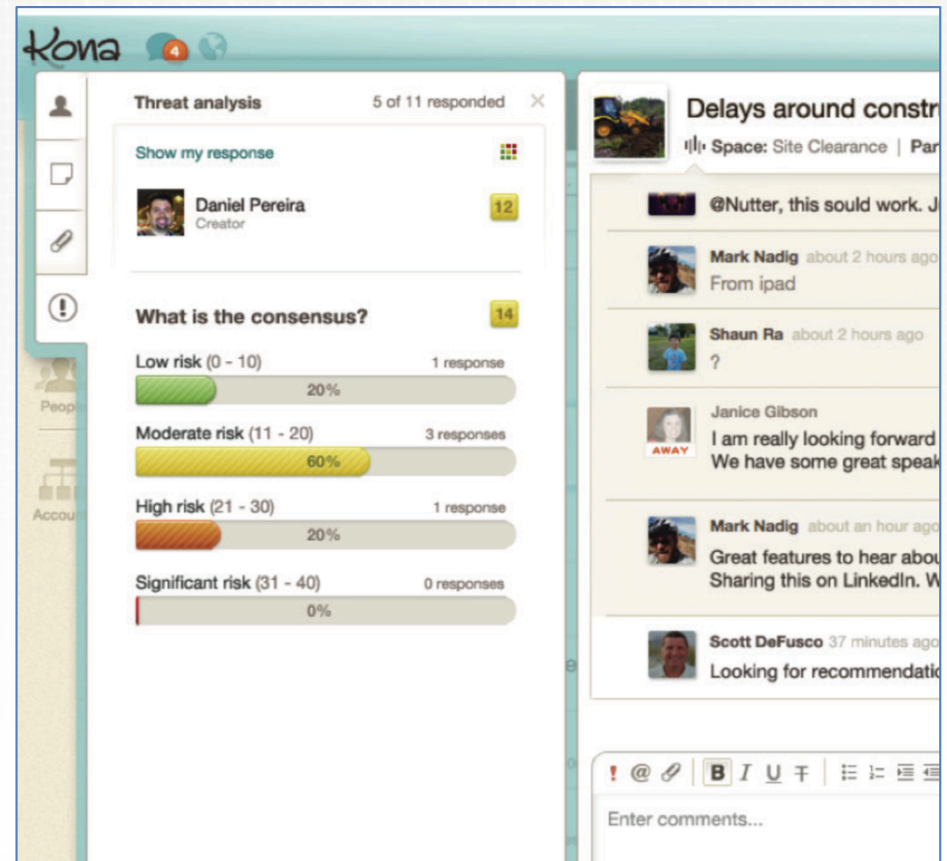


1) Consensus-Based Planning

The Concept

- Today it's backwards:
 - Planners create/own
 - Team members subscribe
 - Schedule review is telling
 - SME not bought into plan
- Calibration & validation
- More than just 'social projects' or collaboration
 - Voting
 - Consensus/ weighted average

Next Generation



Drives forecast certainty



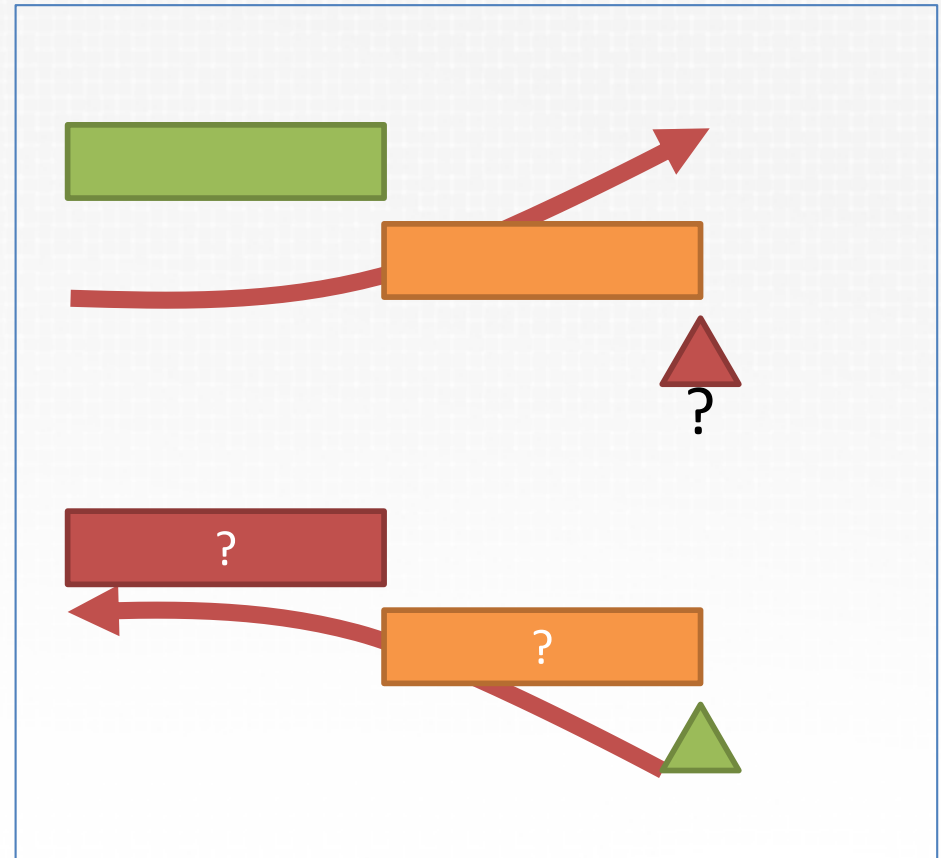
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2) Reverse CPM or Goal-based Planning

The Concept

- Traditional CPM
 - Look forward from fixed point
 - Results in an uncertain finish
- Goal-based CPM
 - Look backward from given point
- Drives completion certainty
- Front-end risk is better
- Helps with whole-of-project lifecycle revenue modeling

Look Backwards not Forwards



Focus on what we need to achieve to get to a desired goal



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3) Risk Management Software

Risk Analysis Software

- Determine confidence
- Pertmaster, AcumenRisk
- It's really just CPM 😊
- Tools are complex
- Requires expert
- Contingency is reactive
- Activity not path based

Risk Register Software

- Largely qualitative
- Divorced from analysis
- Gives false positives
- Minimal workflow

- Project Register
 - Issue, risks, action items
 - Tie to schedule!

Next generation CPM: Risk-Adjusted Scheduling

- ⚡ Some tools starting to embed risk into scheduling
- ⚡ Risk-adjusted schedules more commonplace
 - More realistic than traditional CPM schedules
 - Account for scope uncertainty, external factors
 - Remove the mystery behind a P schedule
 - Most deterministic schedule are less than P10
 - Confidence level is the wrong metric to focus on
- ⚡ Energy sector now requires risk-adjusted schedules
- ⚡ Risk-adjusted schedules are actually deterministic!

Let's evolve risk management to
Confidence Management



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4) Schedule Integrity

The Concept

- Scheduling tools allow us to create anything... "float"
- Garbage in/out
- Very little validation
- Acumen Fuse, Steelray do an excellent job of checking after the fact
- Build this directly into schedule development process

Next Generation

- Analogous to a spell-checker
- Beyond structural integrity
- Additional checks/balances
 - Activity durations
 - Sequence of work
- Too much / too little
 - Redundancy
 - Over complexity
 - Breadth/depth checks

5) Benchmarking

Today

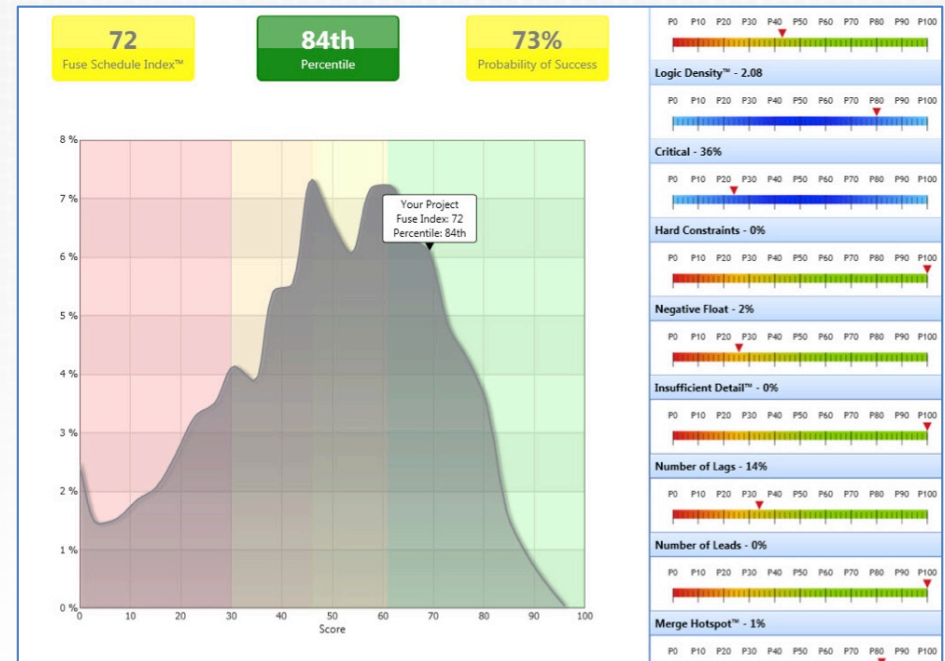
◀ We quantify everything

- Credit rating
- GPA, Fitness

◀ Why not for planning?

- Structural integrity
- Realism
- Performance
- Achievability (risk)

Schedule Index



Measurable Standards



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6) Artificial Intelligence

Today

- ⚡ A huge amount of re-invention every time we build a CPM schedule
- ⚡ Basic sub-net concept
- ⚡ Parametric estimating not widespread

Next Generation

- ⚡ Feedback loops
 - Calibrate from actuals
 - Form of risk analysis
 - Frequency of change
 - Scope V execution
- ⚡ Knowledge-based

7) Deliverable-based Planning

Dan's Definition of a Project

“The expenditure of work
converting equity
(ownership interest)
into an asset”

⚡ If a project is about delivering an asset, why does CPM focus so much on work and not deliverables?

Measure the Value of the Asset

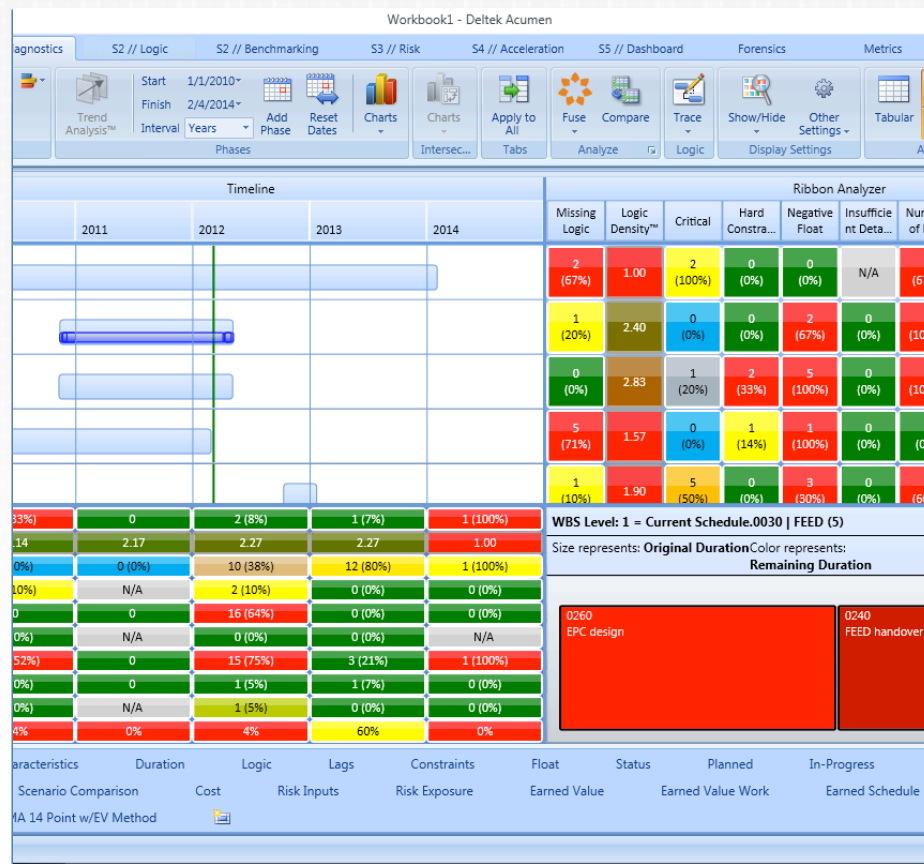
- ⚡ Earned value good start
- ⚡ CPM tools need to tie to deliverables
 - Satisfaction score?
 - Scope/work alignment?
 - Velocity metrics
- ⚡ Agile philosophy
 - Deliverables not tasks

8) Tie It All Together with Strong Visualization

Today

- ⏪ **1D - Gantt Chart**
 - Only shows time
- ⏪ **2D - Time-chainage**
 - Under-appreciated
- ⏪ **4D – BIM**
 - e.g. Synchro
- ⏪ **xD – Next Generation**
 - Graphical pivot table
 - Custom rotate/drill-down

xD Visualization



Conclusions

- Innovation is more important than invention
- We have luxury of repeating/testing during planning
- We only get one shot at getting it right in execution
- PM tools need to provide better decision support
- Complex is bad, simple is good...

Thank You!



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