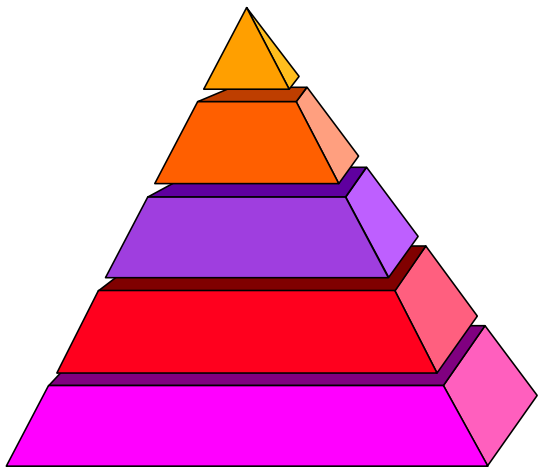
Presentation to the Boston SPIN

Software Estimation and Negotiation
"Changing the Game" in a Down Economy



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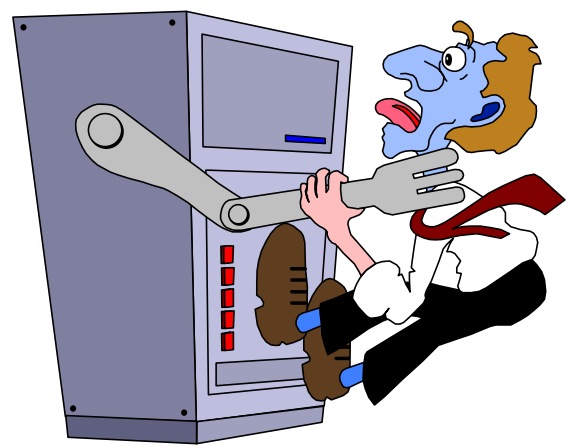
The Problem

The Infamous Chaos Report

- $250 Billion + Spent on IT Application Development
- 31% of Projects Will Be Cancelled, Representing $81 Billion in Losses
- 52.7% of Projects Will Overrun by >189%
- Only 16.2% On-time, Under Budget
- But with only 42% Original Functionality!

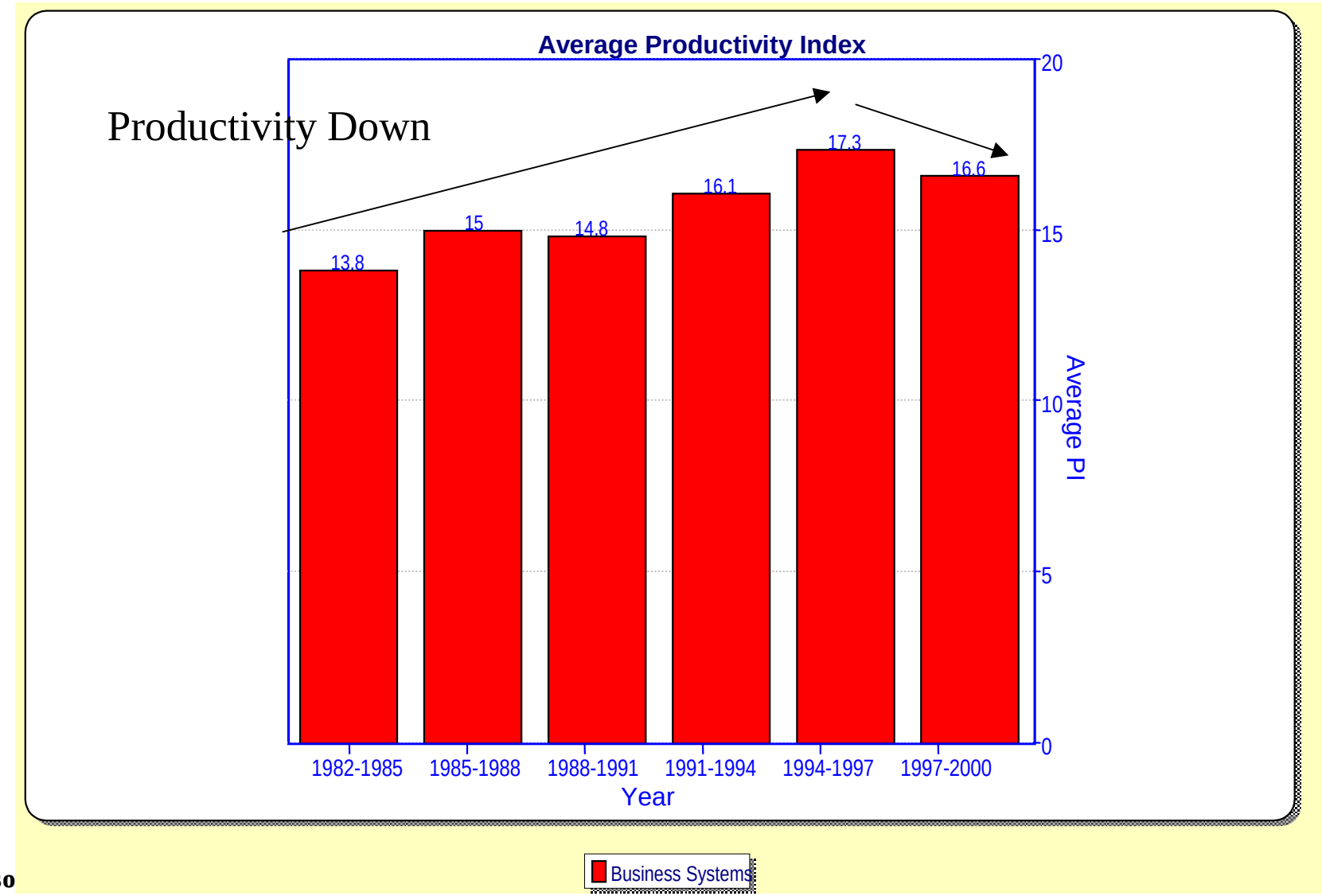


* Source: Standish Group, Dennis MA, **QSM Associates, Inc.**

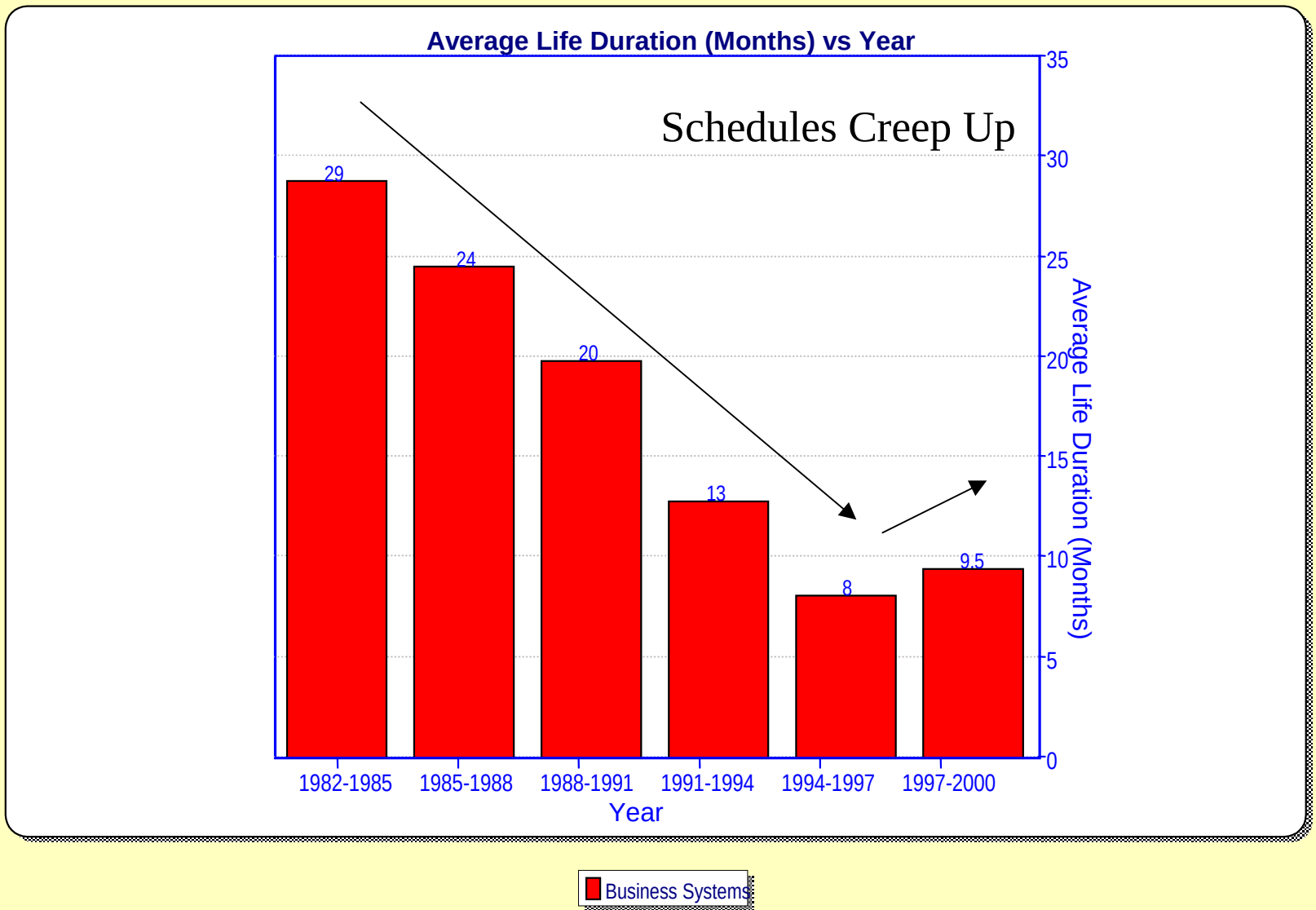
QSM Database Repository

- Large heterogeneous database
  contains over 6,300+ projects
- Represents over 685 million SLOC,
  6 million function points & over 200 languages
- Over 500 organizations across 18 countries
- Adding 200 - 400 projects/year

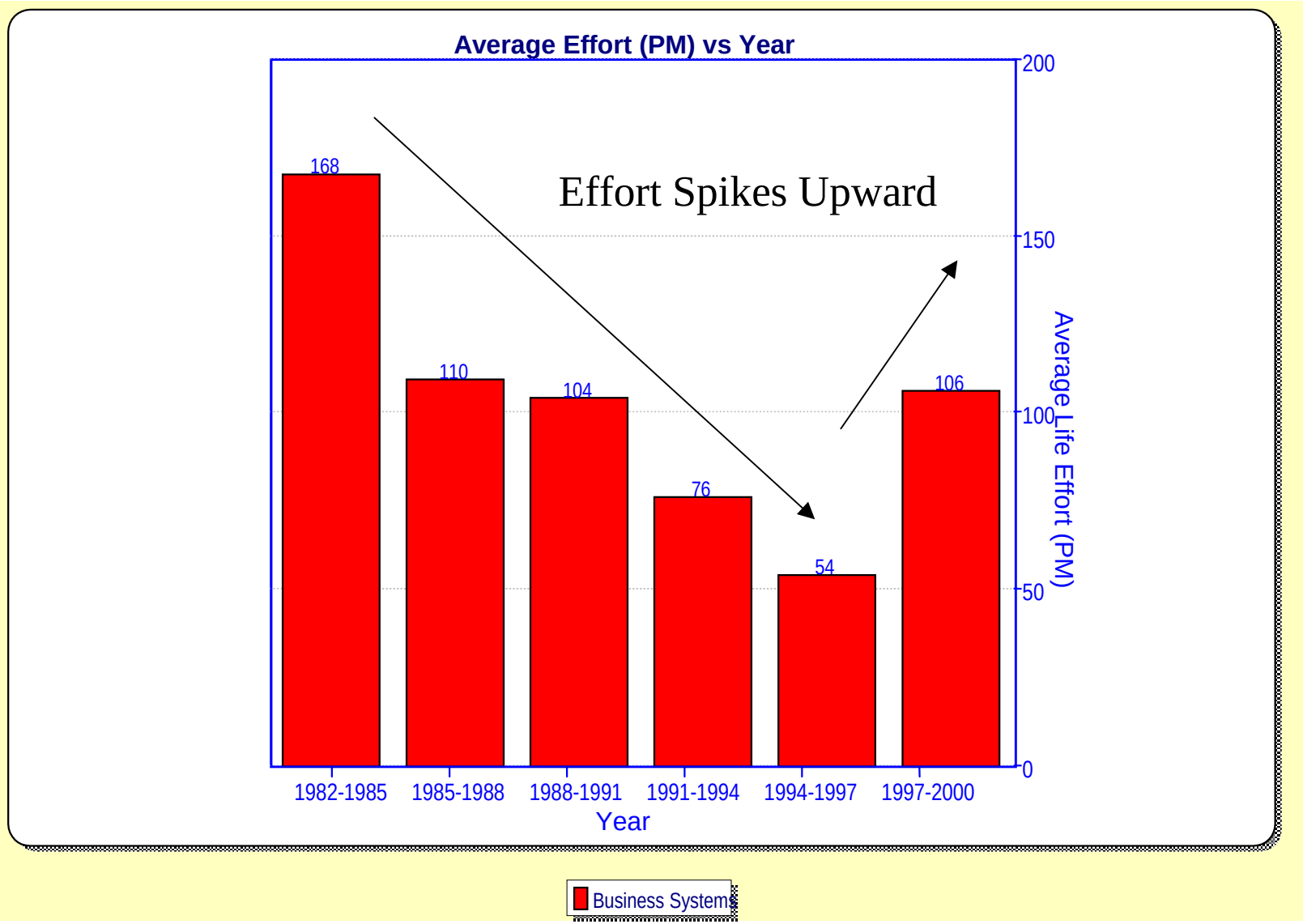
Recent Database Observations



Recent Database Observations



Recent Database Observations



Potential Reasons Why?

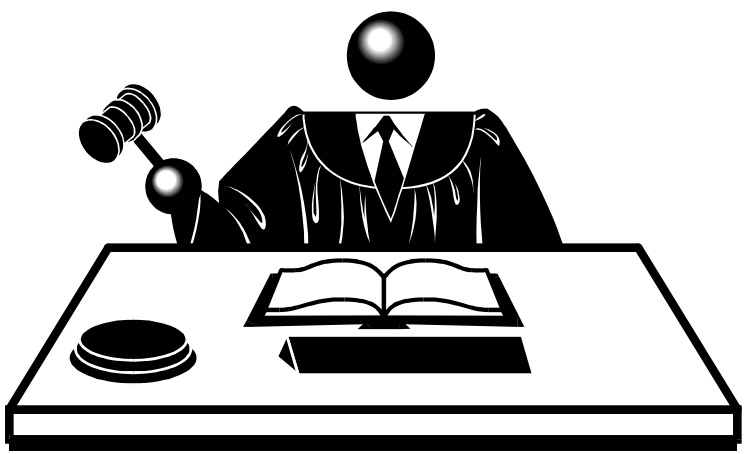
- Three major dimensions of software at the turn of the millennium – Y2k, emergence of the Internet, implementation of large scale packages such as ERP.
- Some argue that the easy stuff in IT applications is done, the harder stuff is now before us.
- N-tier client server, web-based apps, communications features, wireless capability, add an “engineering level complexity” to traditional IT.
- High degrees of staff turbulence in the typical software organization

Overall Outlook

- Internet Speed deadline pressures + cost pressures of 2001/2002 Recession = unprecedented constraints for software projects
- At the same time, we're being tasked to build harder and more complex applications – these take longer, and require more effort
- A clash (conflict) is happening – more need than ever to effectively estimate and negotiate software projects to deal with these pressures

Good to Know…

"As impressive as growth of the software industry has been, it is outpaced by growth of software-related litigation. It is not unusual for a large software development organization today to have upwards of 50 active cases on its hands."

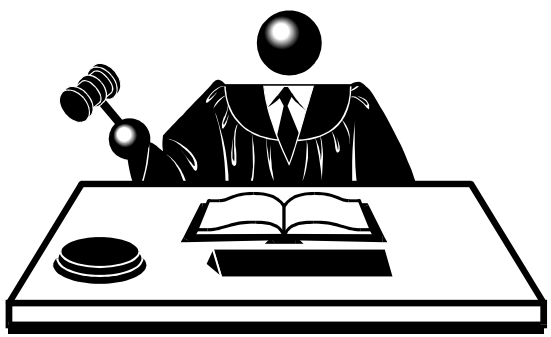


Tom DeMarco,
Cutter IT Journal

Good to Know…

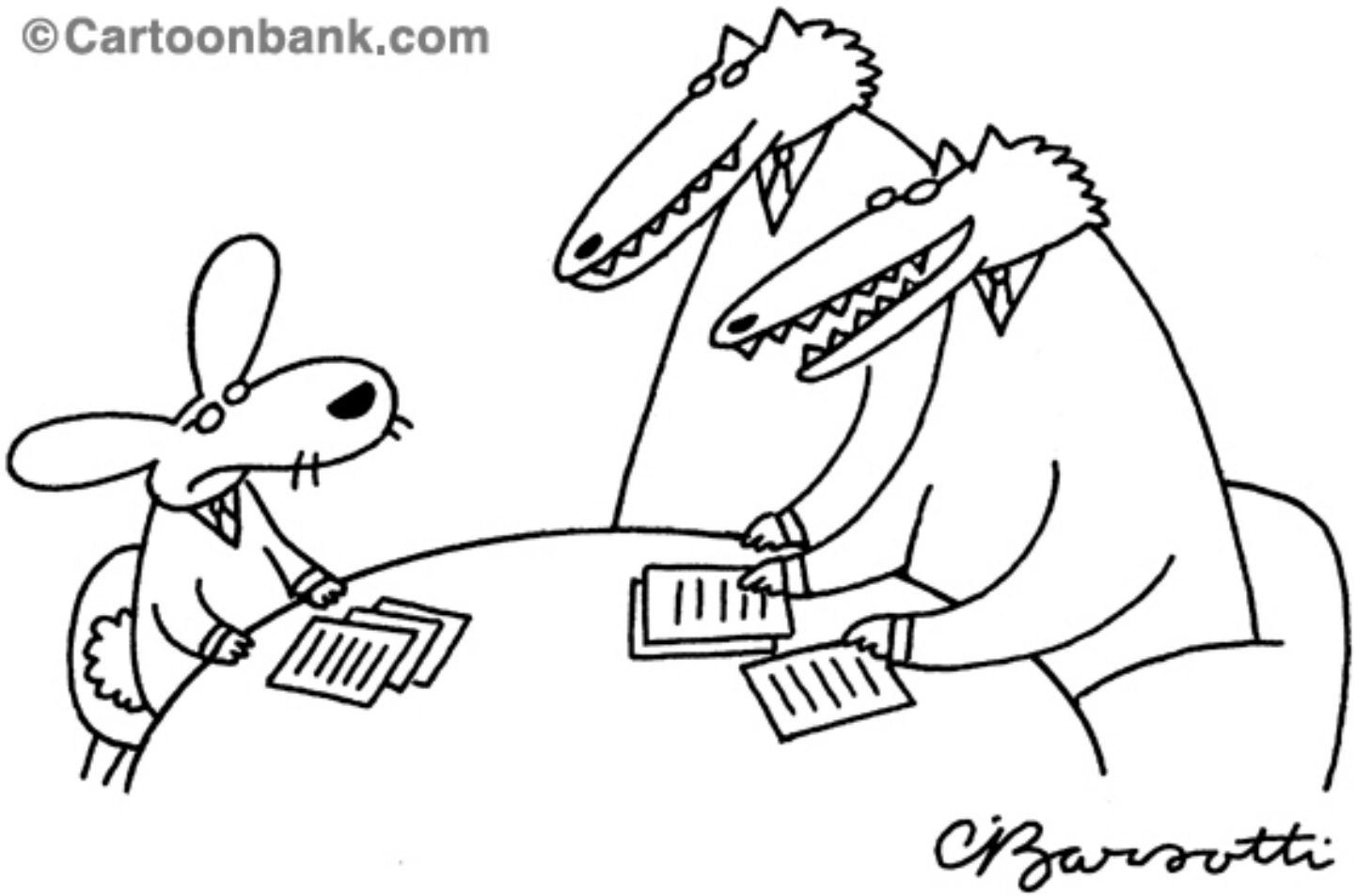
"Most litigation ends up focused on [lack of] measurement, management, requirements practice, or some combination thereof."

"Organizations that can't or don't measure themselves in a fairly systematic way are at a huge disadvantage in litigation. If you are deficient at measurement and the other side is on top of it, ***then the jig is up for you***."



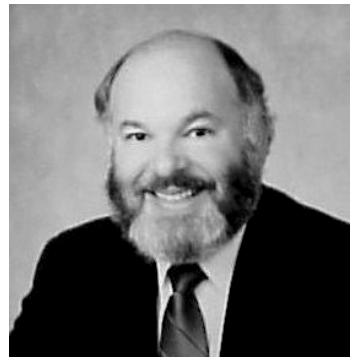
Tim Lister
Cutter IT Journal

Problem-Solving *Together*



"There. Now it's all on paper. Feel better?"

Rifkin's Criteria: Estimation Processes*



1) Commitments have to be based on work [scope] to be performed; therefore, there must be agreement on this
2) Estimates have to be based on a) the work to be performed and b) historical records of performance
3) Commitments must not exceed the capability to perform, or else there is no reason to estimate

*** Stan Rifkin, Master Systems Inc. (formerly with Carnegie Mellon SEI)**

Typical Problem-Solving "Together"

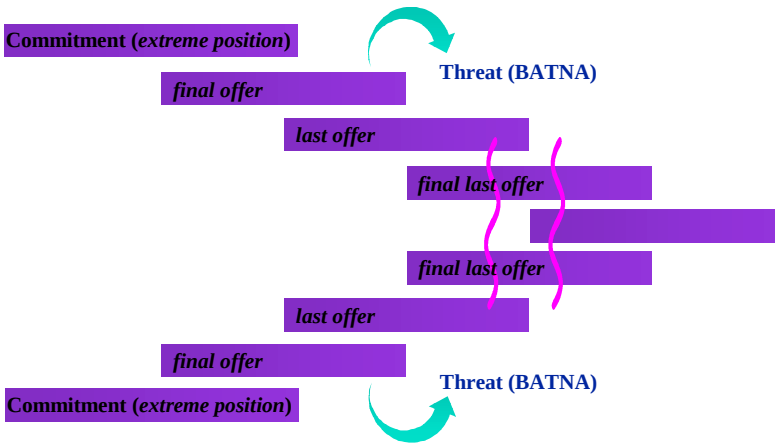
Negotiations quickly become adversarial

- **We define our positions**
- **We look to our "rights" under the contract**
- **We make threats**

Collaboration → Disillusionment → Hostility

Classic Positional Bargaining

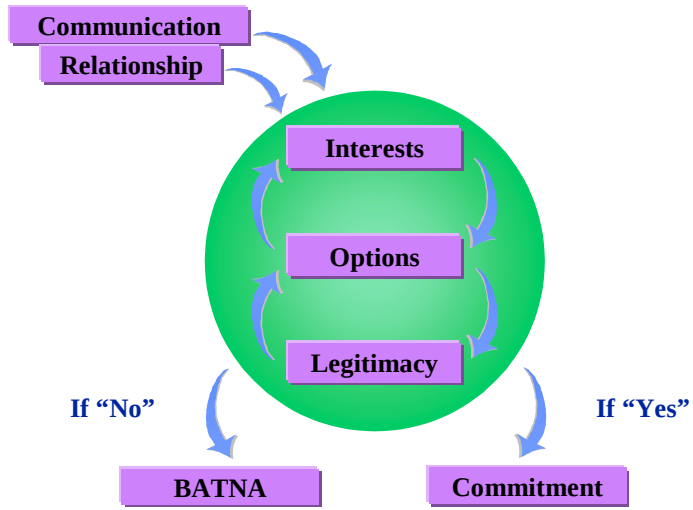
Classic Positional Bargaining



Assumptions

- Pie is fixed
- Only job of negotiator is to claim value

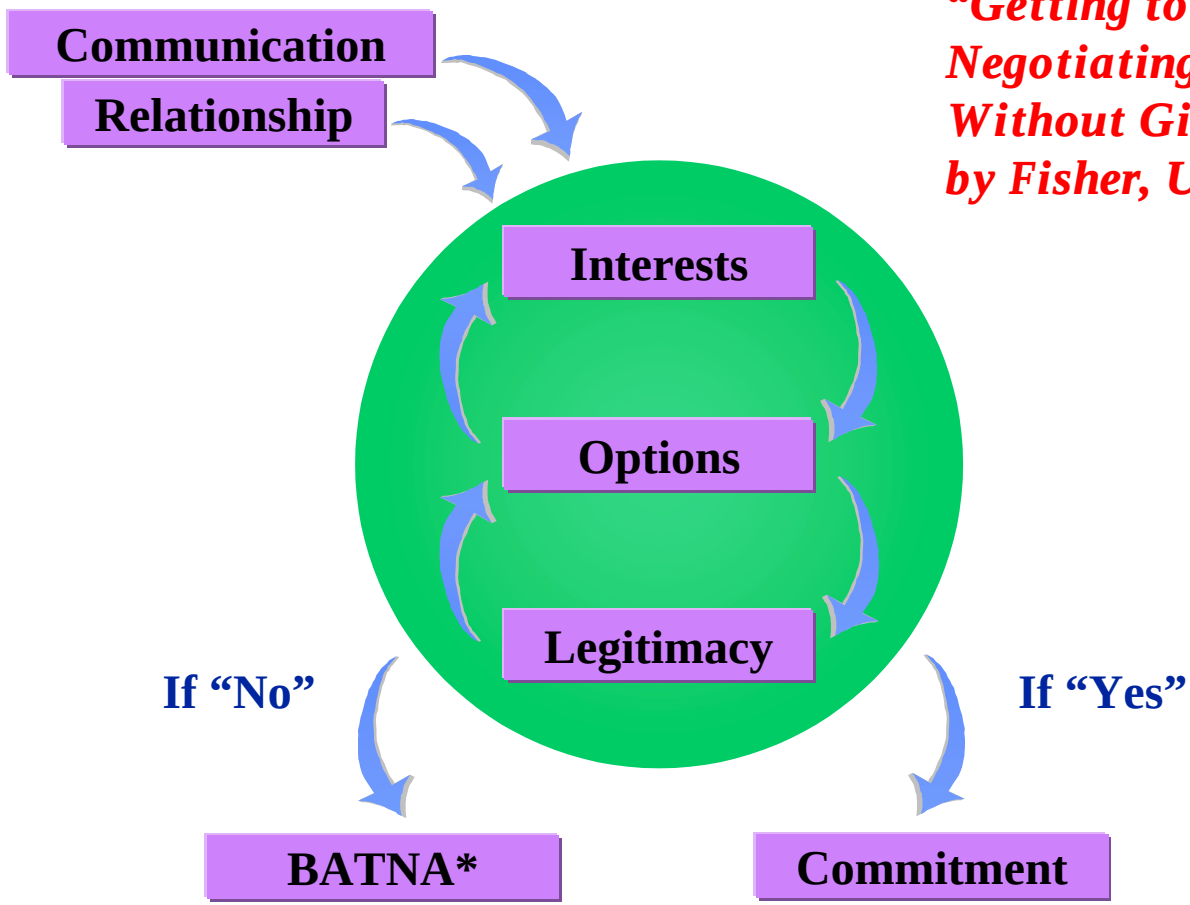
Joint Problem Solving



Assumptions

- Pie can be expanded
- Negotiators should look to create value before dividing it up

*Using the 7 Elements**



"Getting to YES – Negotiating Agreement Without Giving In", by Fisher, Ury and Patton

* **Best Alternative to a Negotiated Agreement**

7 Elements - Communication

Ensure Good Two-Way COMMUNICATION

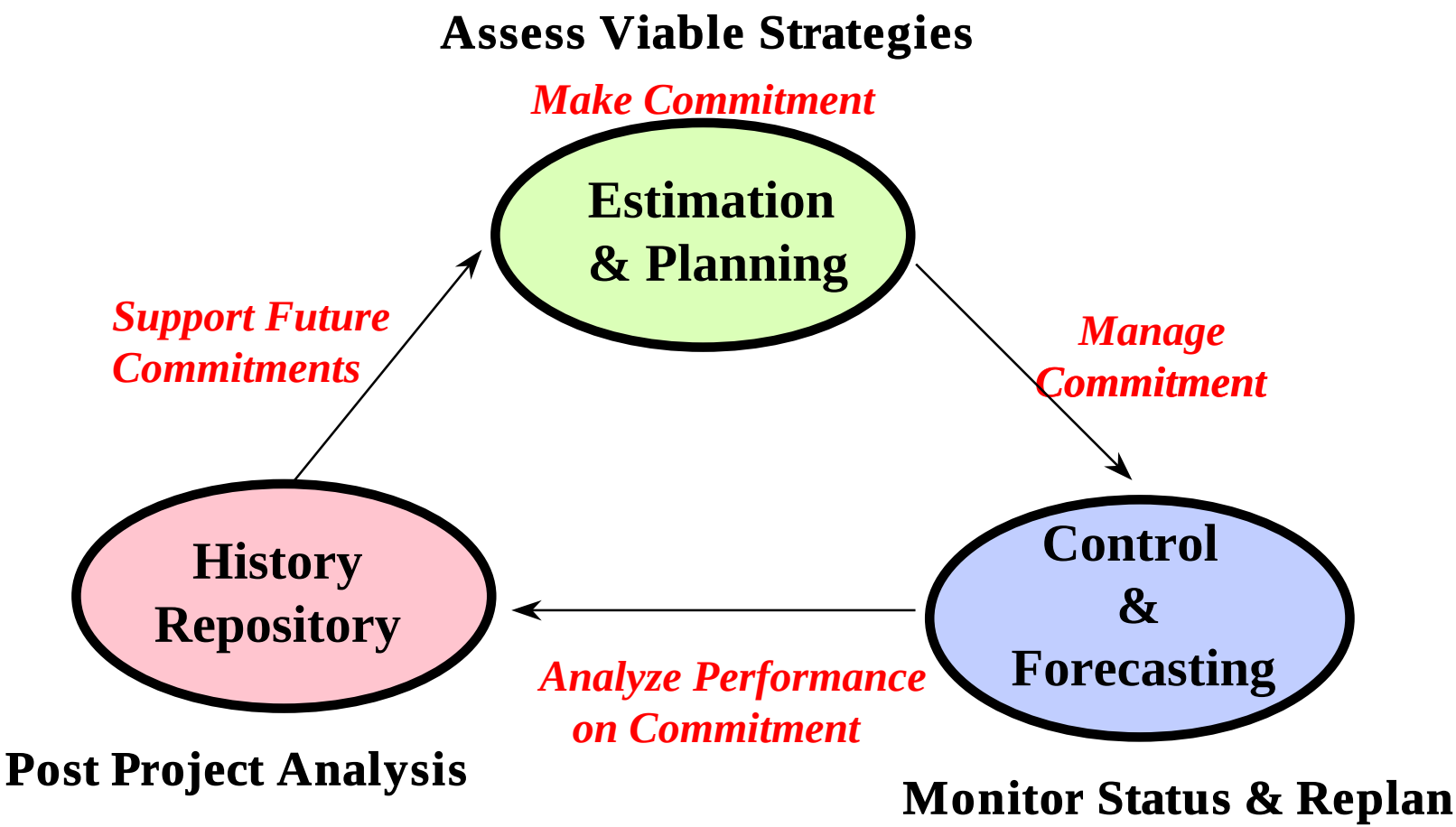
- Negotiate over the process first
- Balance advocacy and inquiry
- Explain your reasoning, inquire into theirs
- Listen and show that you have heard

* Source: Vantage Partners LLC and Triad Consulting

Good Communication & Solid Working Relationship

- Partners raise issues early
- Data & reasoning shared along with conclusions
- Each looks at contributions that led to problem & corrects their pieces
- Strong feelings handled honestly & professionally
- Commitment to work together while aware of each side's alternatives

A Mature SW Management Process



7 Elements – Communication (con't)

Deal with the RELATIONSHIP and the substance, each on its own merits

- Be "unconditionally constructive" on the relationship
- Separate the people from the problem
  - Attack the problem, not the people
  - Use interests, options, etc. to address the problem
  - Discuss people issues separately and explicitly
- Speak for yourself, not for them
- CCBD - Consider Consulting Before Deciding

7 Elements - Interests

Clarify INTERESTS, not positions

- Requirements Analysis is all about interests
- Ask “why”
- Share some of your interests
- Share your understanding of theirs; ask for feedback
- Solicit criticism of possible options

7 Elements - Communication

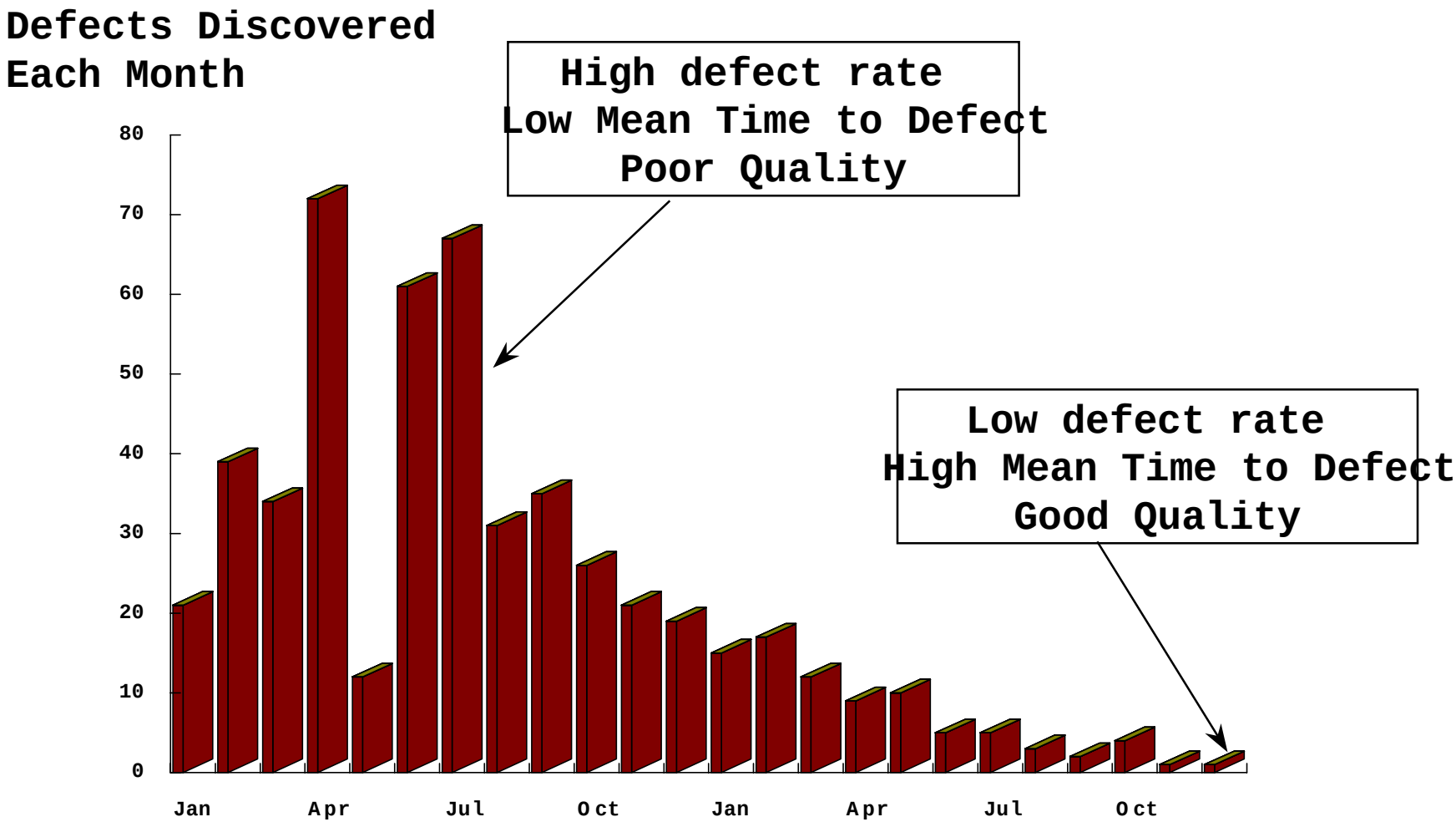
OURS:

- Why do we care about this?
- What do we really need & why?

THEIRS:

- What are their concerns, constraints?
- Why do they want to do it this way?

On SW Projects - Interests Can Sometimes Boil Down to...



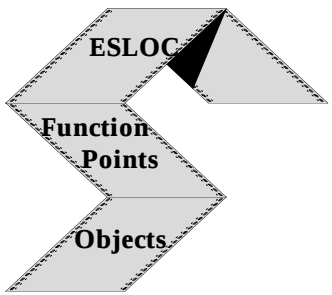
7 Elements - Options

Invent OPTIONS for mutual gain

- Jointly brainstorm multiple options before deciding which is best
- Separate inventing and creativity from deciding
- Present possible solutions, not problems
- Break up “decisionmaking”
  - Option generation
  - Option evaluation / refinement
  - Commitment to an option

The "Software Equation" Conceptual Form for Estimation

PRODUCT SIZE



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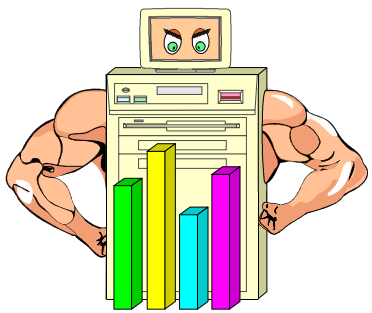
PROCESS PRODUCTIVITY



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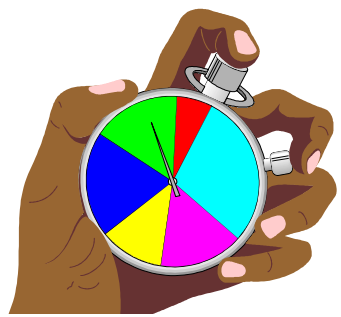
TIME



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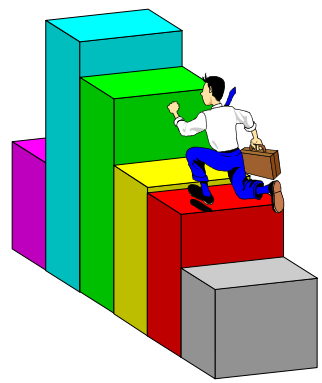
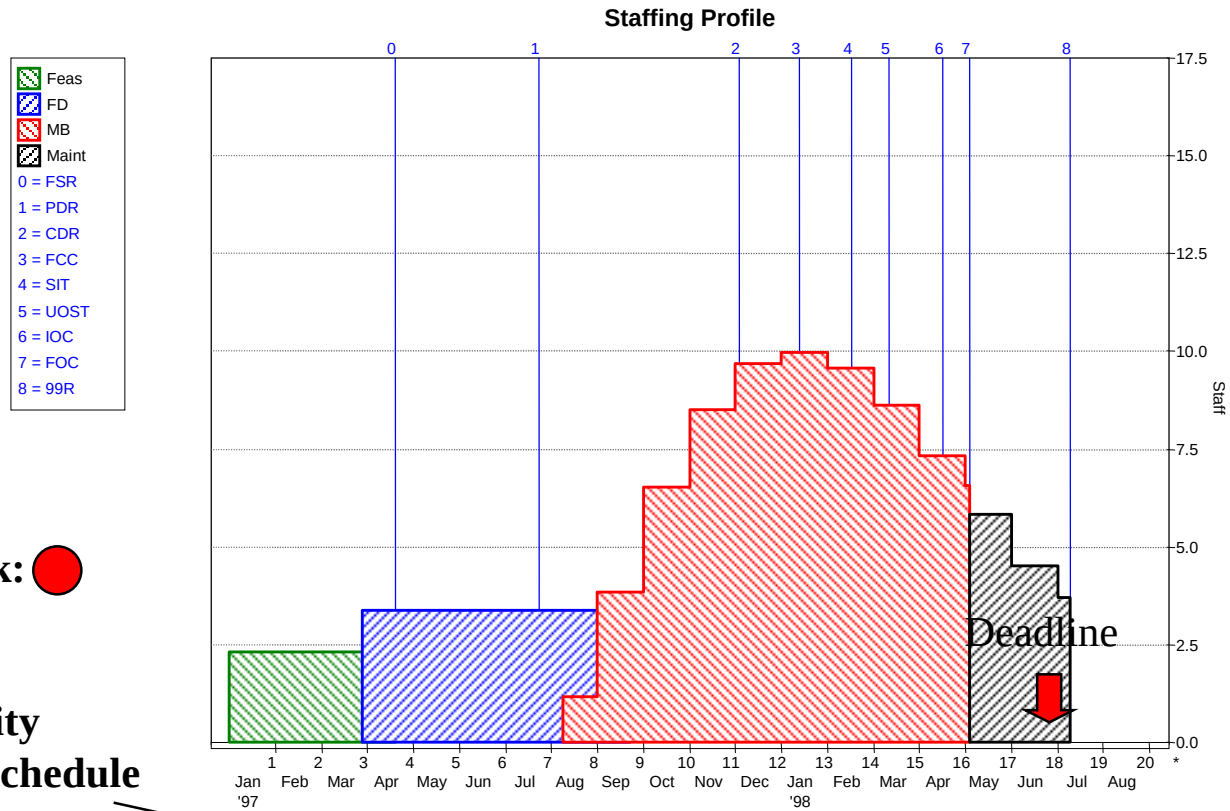
EFFORT



Inventing Project Options

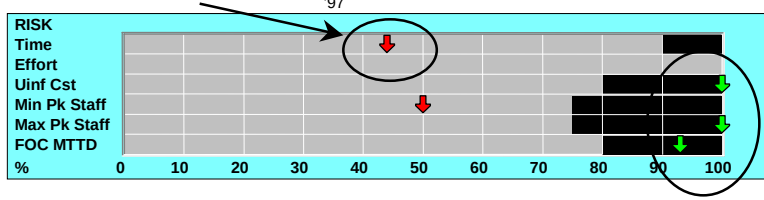
- There is never just “one answer”
- Inventing options is best done on the same side of the table (as opposed to opposite sides)
- When inventing options, use conversational inquiry to understand underlying interests
- Options on software projects have to be legitimate (i.e. Don’t violate “Brooks’ Law”)
- Explore trade-offs. Consider trades on schedule, functionality, cost, and reliability

Risk Analysis and Time-Boxing



Overall Project Risk:
Red (High Risk)

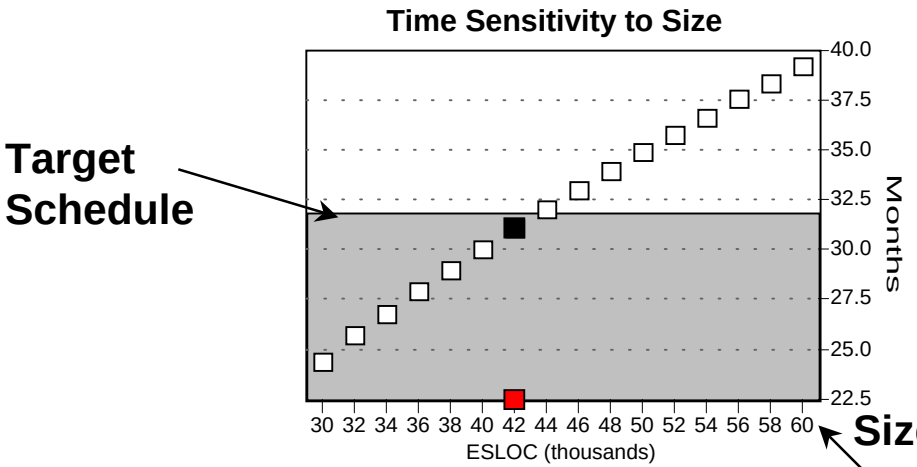
Only 45% Probability of Meeting Target Schedule

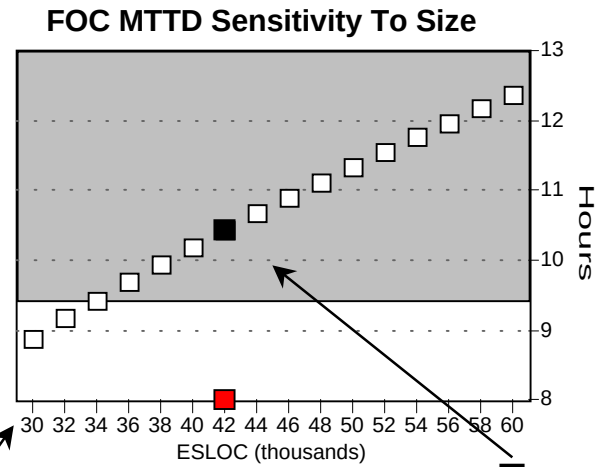


Cost and Quality - High Probability

	MB	Life Cycle		
Time	8.82	18.29	Months	Size
Effort	65.33	104.34	PM	46473
Uinf Cst	599	956	$ 1000	ESLOC
Pk Staff	10.00	10.00	People	
MTTD	2.05	8.88	Days	MBI 3.3
Start	8/9/97	1/1/97	Date	PI 16.0

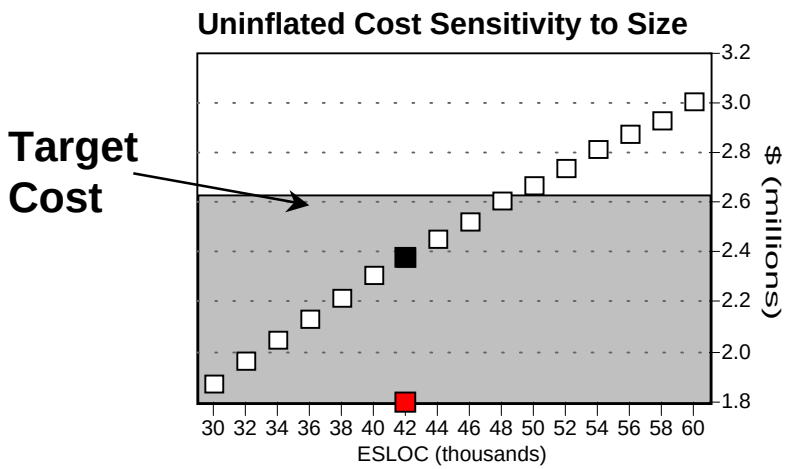
When Schedules/Resources are Fixed - Assess Functionality





Size Range to Test

Target Quality

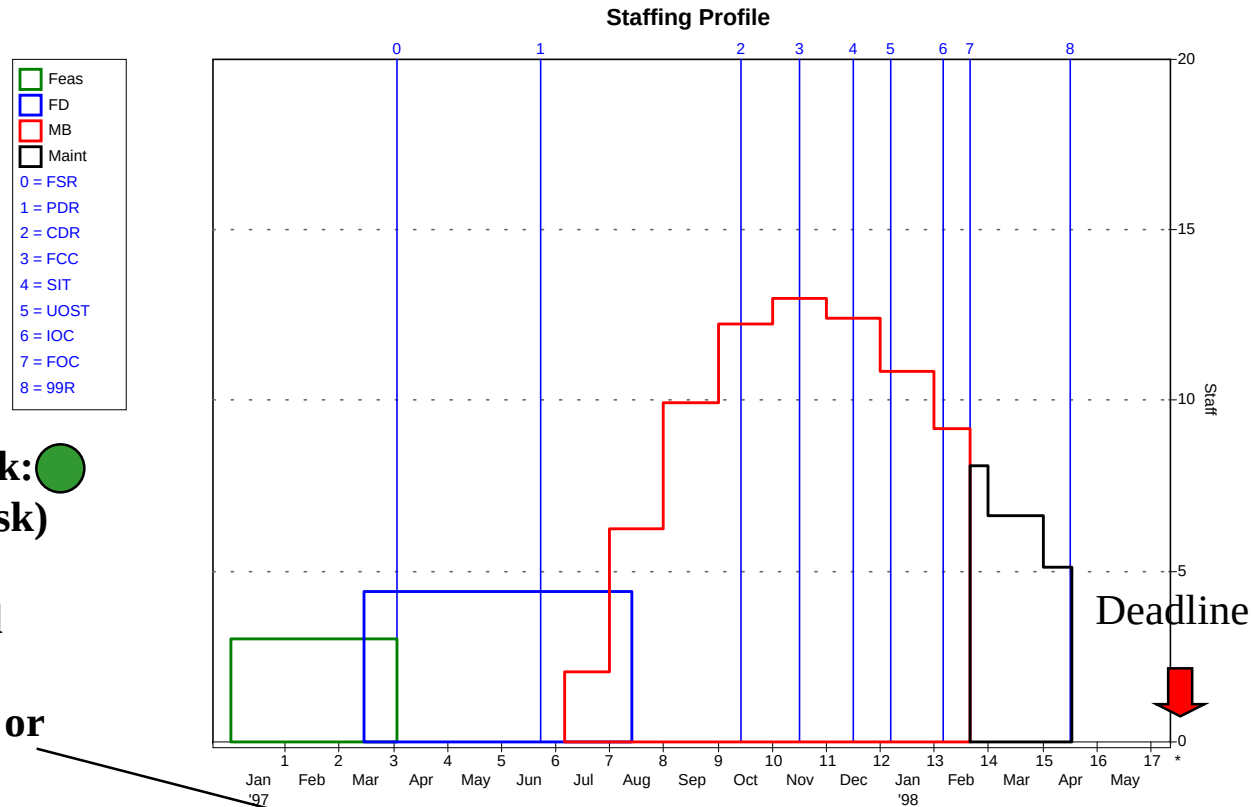


Life Cycle			
Time	31.03	Months	
Effort	259.80	PM	
Uinf Cst	2382	$ 1000	
Pk Staff	15.00	People	
MTTD	10.44	Hours	MBI 2.0
Size	42000	ESLOC	PI 10.5

■ Current Solution □ Alternative Solutions Acceptable Solution Region

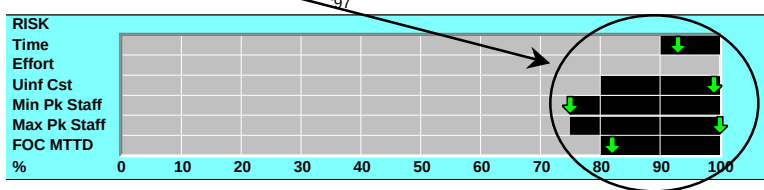
Life Cycle includes R&D, C&T, I&P

Risk Analysis and Time-Boxing



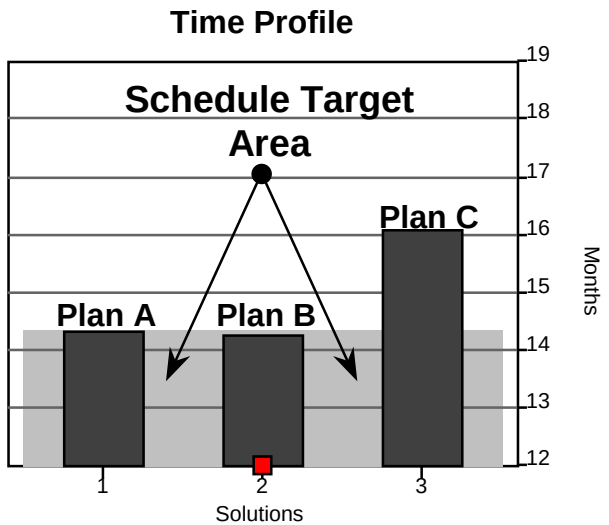
Overall Project Risk: Green (Minimal Risk)

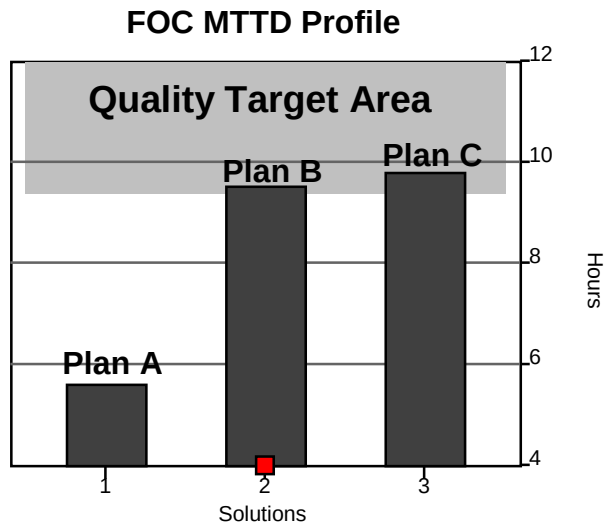
Schedule, Cost, and Quality Targets all at 80% Probability or Better

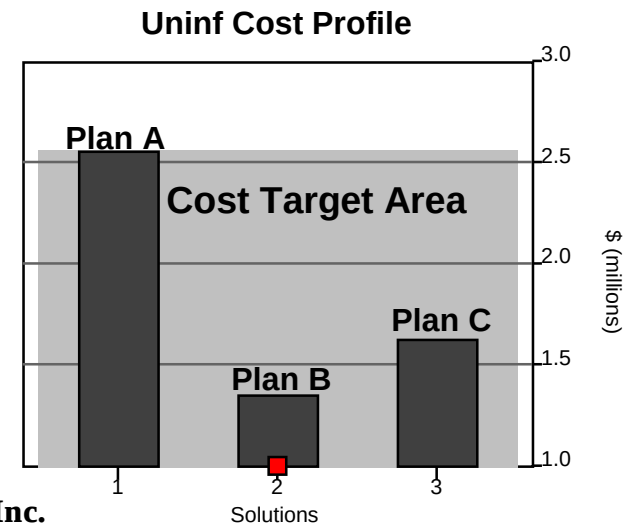


	MB	Life Cycle		Size
Time	7.49	15.50	Months	
Effort	72.14	115.21	PM	39473
Uinf Cst	661	1056	$ 1000	ESLOC
Pk Staff	13.00	13.00	People	
MTTD	1.46	6.32	Days	MBI 4.2
Start	7/6/97	1/1/97	Date	PI 16.0

Review and Assess Multiple Plans Simultaneously







Plan A – All functionality, Misses quality
Plan B – Makes date, budget, quality Scaled back functionality
Plan C – All functionality, under budget, makes quality Misses target date

7 Elements - Legitimacy

Standards of LEGITIMACY

- Focus on why an option is fair or how it is defensible
  - Use criteria as a "sword" – "Let me show you why"
  - Use criteria as a "shield" – "Why?" "Based on what?"
- Look for fairness
- Use the Test of Reciprocity
- Be sure you are open to persuasion

Use Legitimacy to Decide

- Legitimacy means seeking an outcome that is "fair" based on external standards

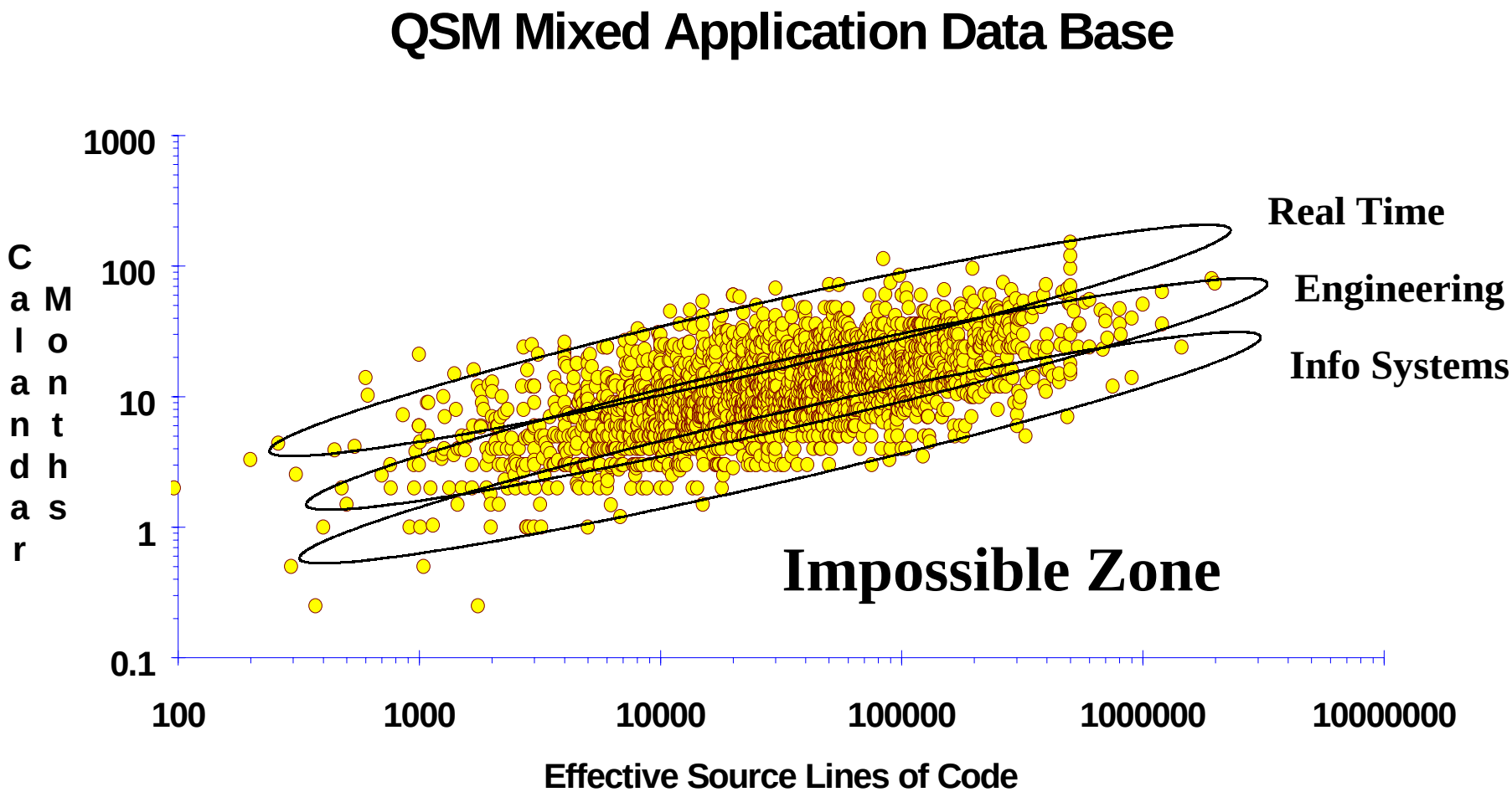
- Examples of standards:
  - What the contract says
  - What precedent suggests
  - Past performance
  - Industry benchmarks and baselines
  - What a third party recommends

Metrics and Legitimacy

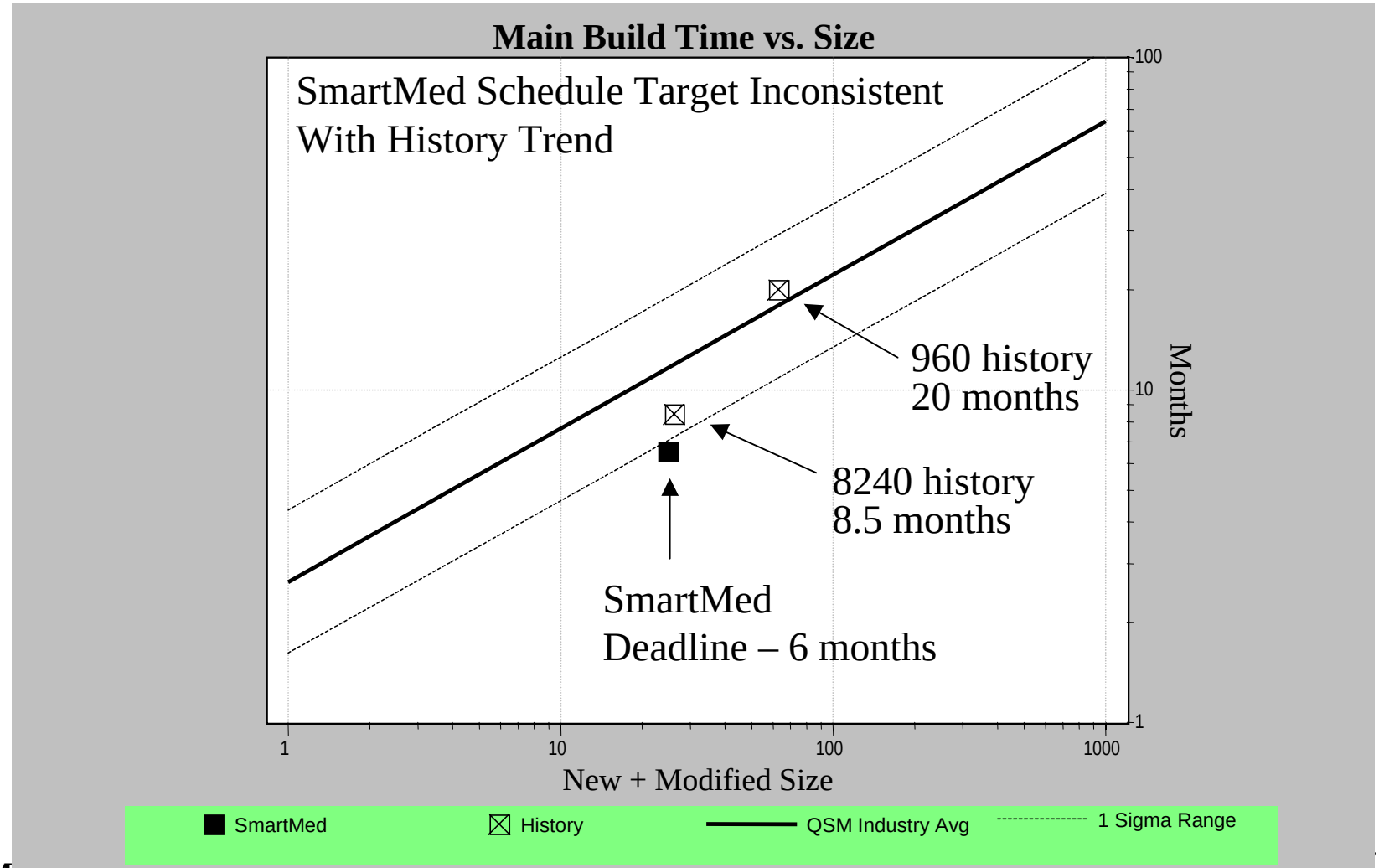
"Without metrics, you're just another person with a different opinion."

Stephan Leschka
Hewlett-Packard

Are Deadlines/Plans in the "Impossible Zone"?



Example - Benchmarking the Deadline vs. History



7 Elements - Alternatives

Acknowledge BATNA(*) as a choice

- Reality test theirs
  - How well does it satisfy their interests?
- Use discussions about BATNA as an opportunity:
  - To learn about interests
  - To create options jointly that are better than your BATNAs

* ***Best Alternative to a Negotiated Agreement***

Key Question:

- During both initial negotiation and subsequent implementation, always ask:

"If they don't agree to terms that work, or they don't do what they said they'd do, what can WE do?"

What is "Plan B"? - Answer needs to be specific and definite

Alternatives are a source of last resort

- Damage the relationship
- Must be willing to go to your alternatives to be credible
- Need to remember that the same relationship dynamics may await with others

7 Elements - Commitments

Make COMMITMENTS with care, <u>after</u> learning all you can

- Commit early to process
- Commit to substance at the end of the process
- As you decide, keep your definition of a Good Outcome in mind
- Make sure you and they both know exactly what you are committing to
  - Review your understanding
  - Ask yourselves if it has the necessary detail to be implemented

Capture Commitments

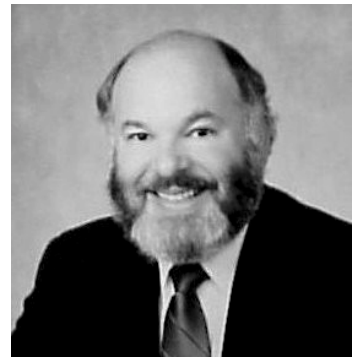
- Changes in standard practices need to be captured:
  - for use as future standards
  - to give others ideas for how these issues have been handled successfully
  - to protect both parties from being held to an "outdated" agreement

What if They Don't Follow the Script?

Reframe, Reframe, Reframe

Positions	→	Interests Options Criteria
Threats	→	Alternatives Criteria
Attacks, Accusations	→	Feelings, Impact Contributions

Rifkin's Criteria: Software Estimation Tools



1) The underlying algorithm is published in the public domain
2) It accurately estimates completed projects
3) I don't want to subjectively "guess" at the values of variables
4) The assumptions of the tool mirror my realities (It is applicable to my application type)
5) The tool will not generate an impossible schedule
6) The tool takes into account the effects of schedule compression
7) I want a range, not a point estimate, and the probability of achieving it

*** Stan Rifkin, Master Systems Inc. (formerly with Carnegie Mellon SEI)**

Other Useful Criteria: Software Estimation Tools

1) Can you build your own database of historical projects?
2) Is the tool “calibratable”?
3) Can estimates be validated against your own history and against industry trends?
4) Can the lifecycle phases and milestones be customized to your own terminology and used as templates?
5) Are multiple techniques available for sizing?
6) Is it possible to generate “what if” estimates, and compare them side by side?
7) Is it easy to use?

In Closing

- No more “Death March” Projects
- Playing the game means losing the game for everyone involved
- Outsourcing it may not be the answer
- Changing the game means reliable and agile estimating, and negotiating fairly and effectively
- Two intersecting skills where the whole is greater than the sum of the parts – One alone will not suffice
- It’s about quality of work and quality of life

Info Sources on the Web

- **Software Measurement, Estimation, Control**
  QSM Associates - www.qsma.com
- **Negotiation, Relationship Management, Managing Difficult Conversations**

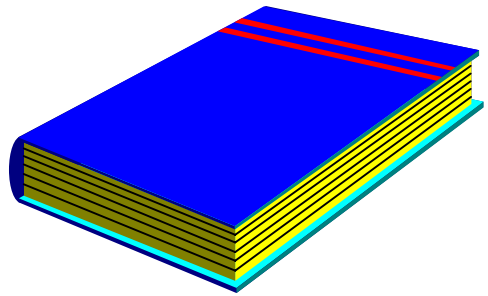
Program on Negotiation at Harvard Law -
www.pon.harvard.edu

Workshops from QSM Associates/Triad Consulting -
www.qsma.com/education.html

Acknowledgements:

Vantage Partners - www.vantagepartners.com
Triad Consulting – www.triadcgi.com

Recommended Reading - Negotiation



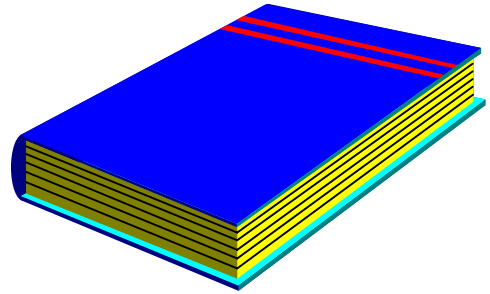
- Fisher, Roger, William Ury and Bruce Patton, *"Getting to YES, Negotiating Agreement Without Giving In" Penguin 1981.*

- Ury, William, *"Getting Past NO"* Bantam 1993.

- Fisher, Roger and Alan Sharp, *"Getting It Done, How to Lead When You're Not in Charge"* HarperCollins 1998.

- Heen, Sheila, Doug Stone and Bruce Patton *"Difficult Conversations - How to Discuss What Matters Most"* Viking / Penguin 1999.

Recommended Reading



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- Putnam, Lawrence H., and Myers, Ware, *"Industrial Strength Software – Effective Management Using Measurement"* © 1997 IEEE Computer Society Press.

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