Common Challenges in Managing Online Systems

…and What You Can Do About Them

by Bill Greenbaum

September 17, 2013

Purpose

We will examine common challenges to managing online systems.

Those challenges come from companies having a common set of aims, practices, and assumptions to manage online systems in a time of rapid technological, social, and environmental change.

If we refresh our assumptions, we will find new opportunities in the change around us.

We are like bicylists on the road of time

We are like bicylists on the road of time

We are like bicylists on the road of time

Signal →

Noise →

My Specific Goals

- Stimulate your thinking about how you could turn some challenges of managing online systems into opportunities.
- Show you some great OLD methods for systems analysis that really work!
- Use very few bullet lists!

Key Idea

The strongest management of online systems will come from managements with a deep understanding of organizational psychology & change, systems theory, theory of knowledge about particular systems, and knowledge about variation. (That won't happen overnight or by accident.)

These are the four points of W. Edwards Deming's System of Profound Knowledge.

Common Challenges come in a time of change

Migration to online payments, email, SMS.

Smart phones (not cheaper!)

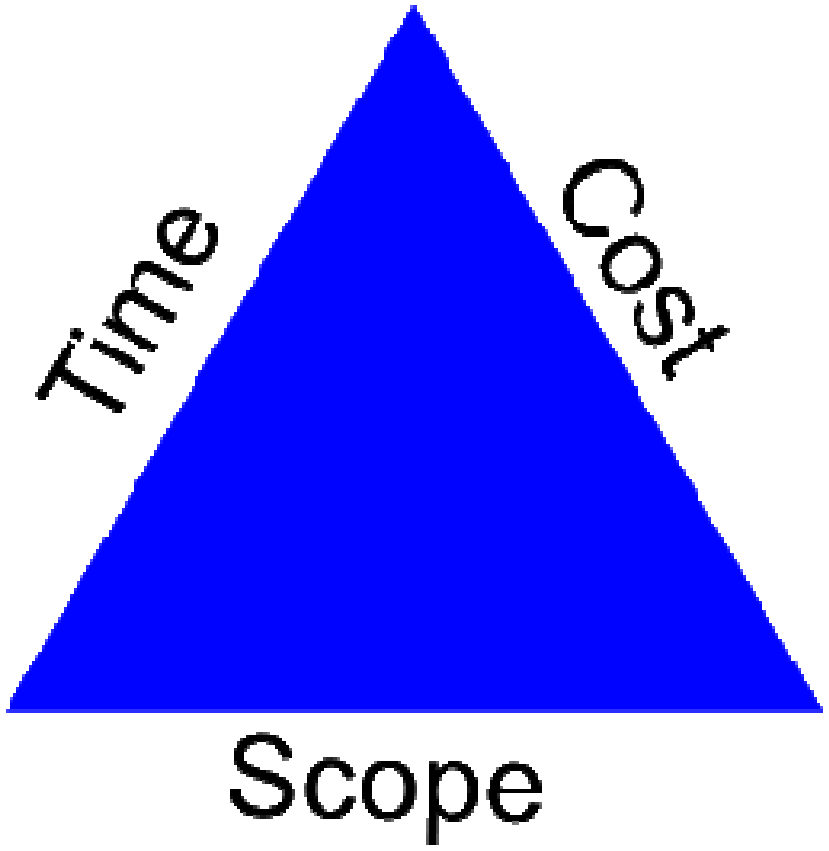
Faster, cheaper processors & storage, new sources

- 2000: $3,000 for IBM PC, ? MB RAM, 50 GB hard drive
- 2012: $1,000 for Dell Laptop, 2.4 GB Twin Core Processor, with 4 GB RAM, 450 GB hard drive

Common Challenges come from similar goals & practices for online systems

Goals	Practices
Compete for users' attention on the Web.	SEO, UI, UX
Gain loyalty of customers with a successful user experience.	Functional & Nonfunctional requirements, SLAs
Collect and give access to data via a user interface.	Database layer interacts with UI, business rules
Find records and deliver goods & services.	Backend and network integration
Load funds, merchandise records, etc, and maintenance	Batch processes and maintenance

Common Challenges come from using established Bodies of Knowledge.



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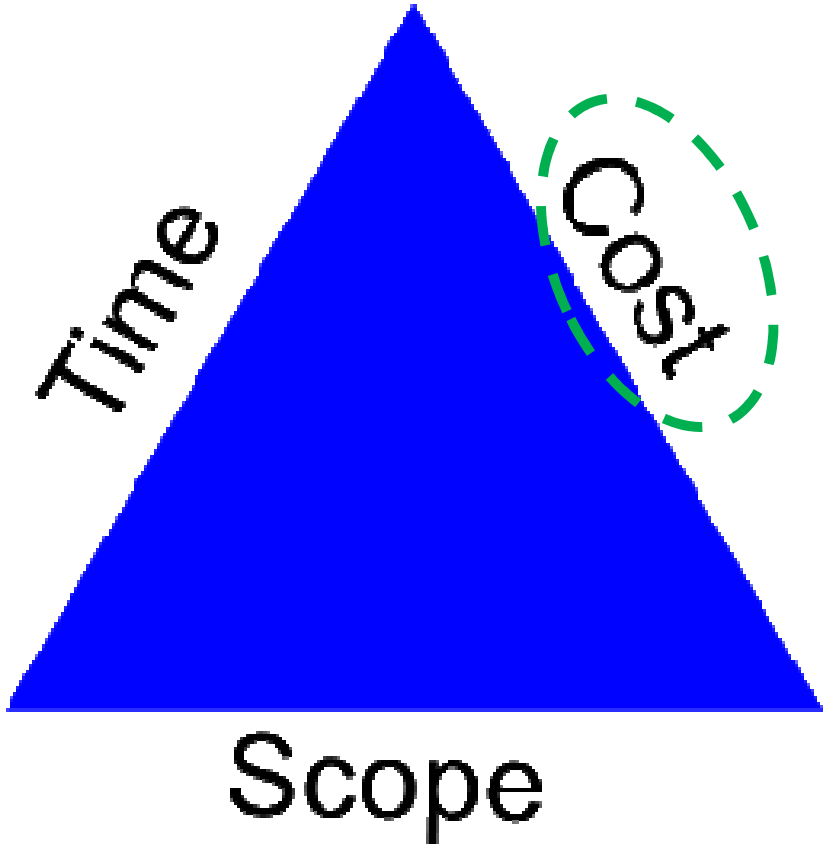
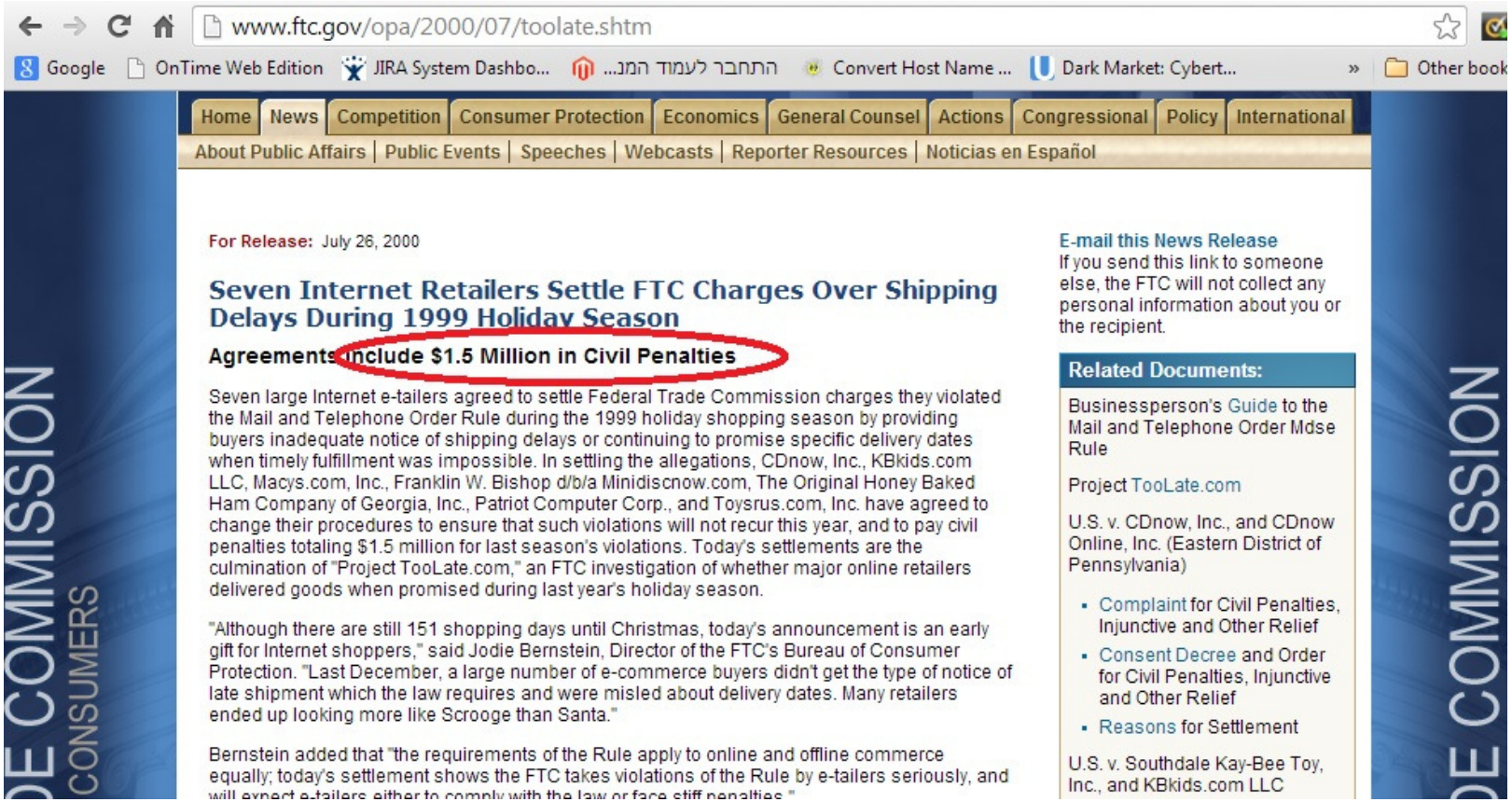


"Maintenance can be **75% of total ownership costs.**"

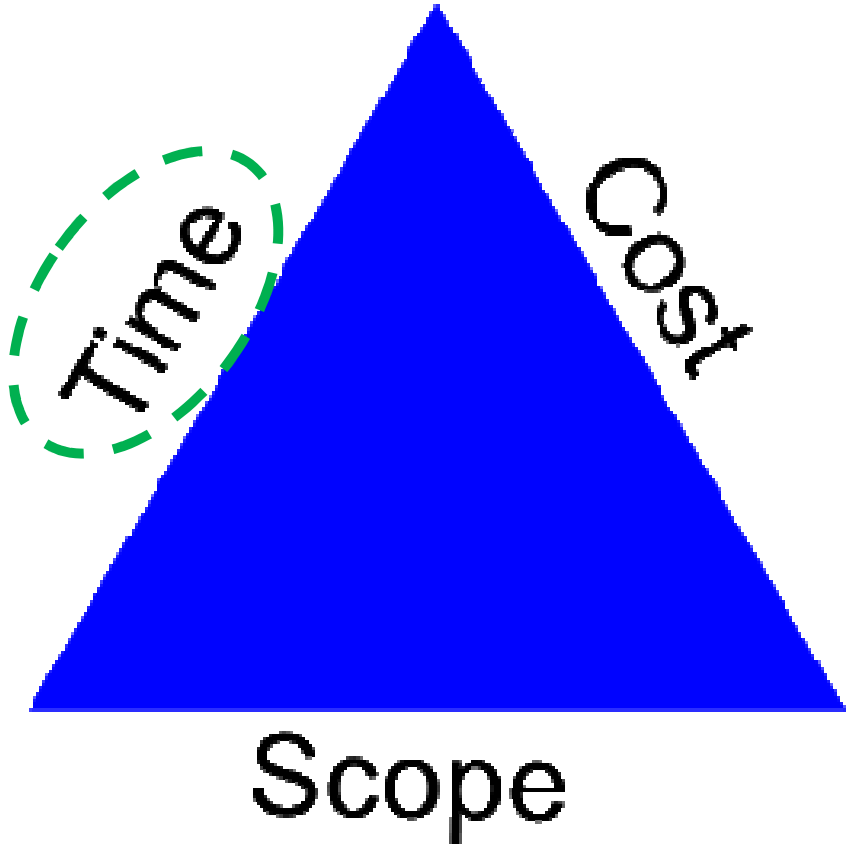
- Dan Galorath, in Total Cost of Ownership: Development is(Only) Job One

So, let's focus on management's challenges after online systems that go to production.

Maintenance and Operations hold the most Cost Risk and Revenue, too.



Common Challenges: Many companies are trying Agile methods to work faster.



Lean, Agile Scrum, XP, etc. aim to…

Start development earlier

Smaller, hyperproductive teams

Release product early and frequently

Welcome change

Lower risk

A Story about Time and Human Nature

Aggressive Scheduling Conflicts with Team Performance & Ethical Behavior

	% Who Helped	% Who Did Not Help
All Participants	40%	60%
Degree of Hurry		
Low Hurry	63%	37%
Medium Hurry	45%	55%
High Hurry	10%	90%

Source: Darley & Babson, Study of Situational and Dispositional Variables in Helping Behavior, Journal of Personality & Social Psychology, 1973, #27, pp 100-108

"[Just] thinking about norms does not imply that one will act on them."

	% Who Helped	% Who Did Not Help
All Participants	40%	60%
Assignment		
Helping Theme	53%	47%
Task Theme	29%	71%

Source: Darley & Babson, Study of Situational and Dispositional Variables in Helping Behavior, Journal of Personality & Social Psychology, 1973, #27, pp 100-108

Common Challenges come from working in hierarchical organizations

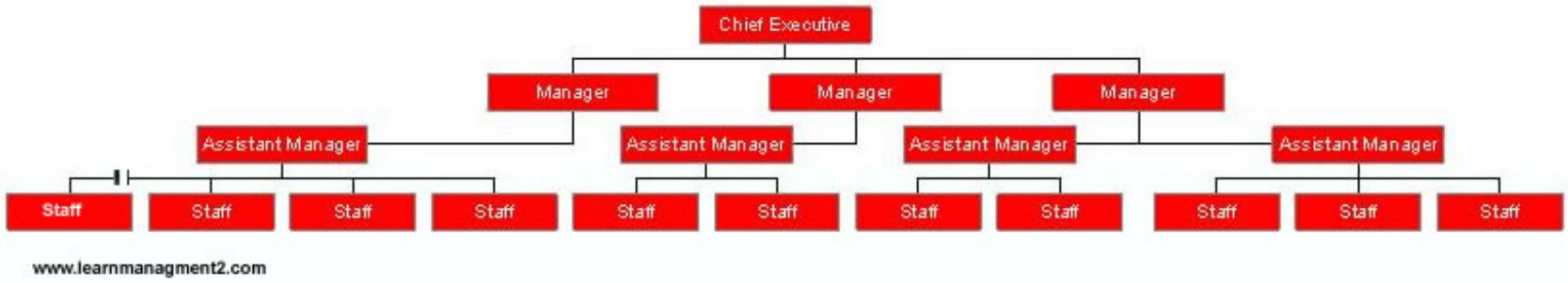
Extreme Example:

Amazon.com: **9** Board Members

11 N-1 Level Officers

19 N-2 Level Officers

97,000 Employees



Hierarchical Organizations Can Develop Two Minds: “Business” & “Technology”

The Business Mind aims to

produce more with less

- On Time/”Faster”
- On Budget/”Lower Cost”
- Full Scope & Quality/”Better”

These Hierarchical Organizations Can Develop Two Minds: “Business” & “Technology”

The Technology Mind aims to

produce less with more

- More Time
- More Funds & Resources
- Get It Right, Get it Done, Hand It Off

The System will thrive if Management exploits the Synergies between The Two Minds

The Business Mind aims to

produce more with less

- On Time/"Faster"
- On Budget/"Lower Cost"
- Full Scope & Quality/"Better"

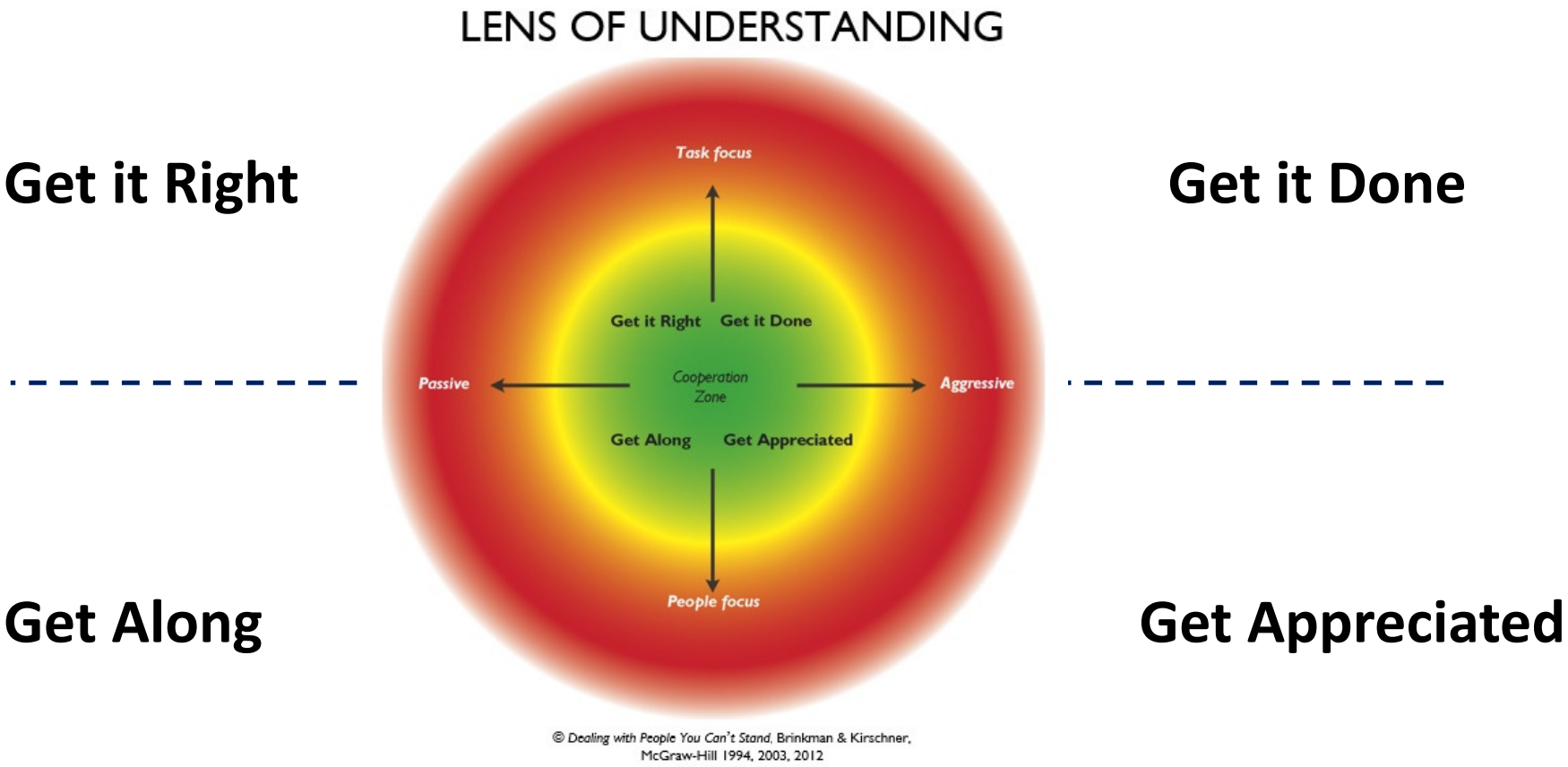
= C= =O= =N= =F= =L= =I= =C= =T=

The Technology Mind aims to

to **produce less with more**

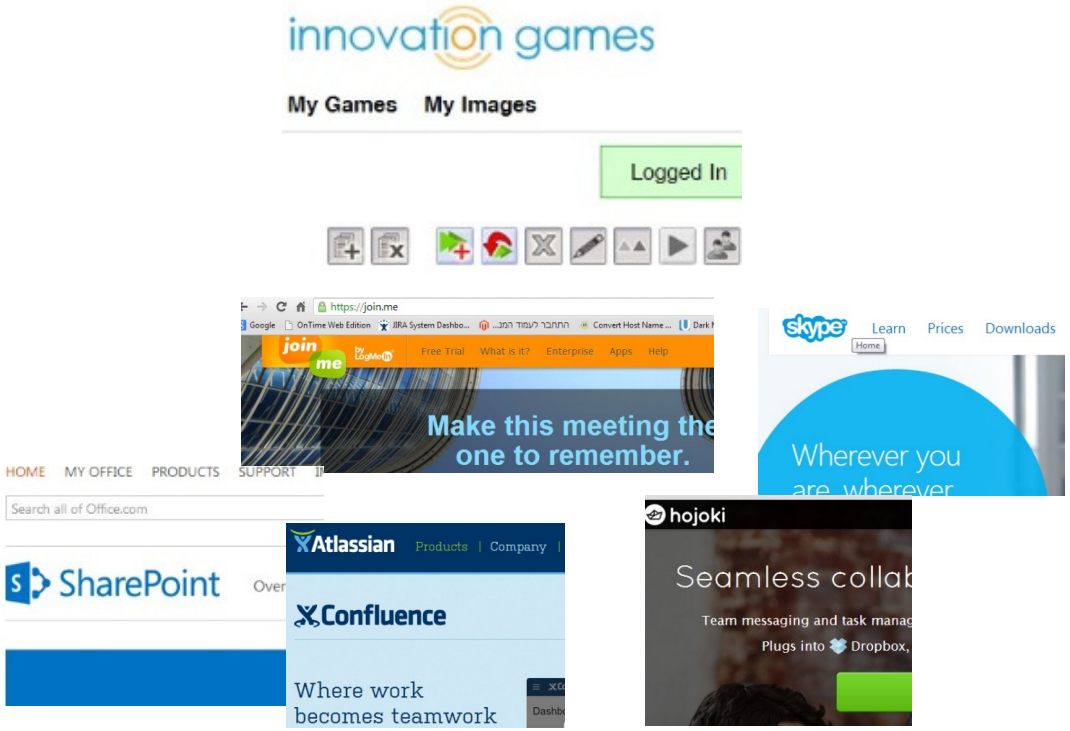
- More Time
- More Funds & Resources
- Get It Right, Get it Done, Hand It Off

Solution a: Study psychology to appreciate personal differences. Learn to work with others who are different than you.

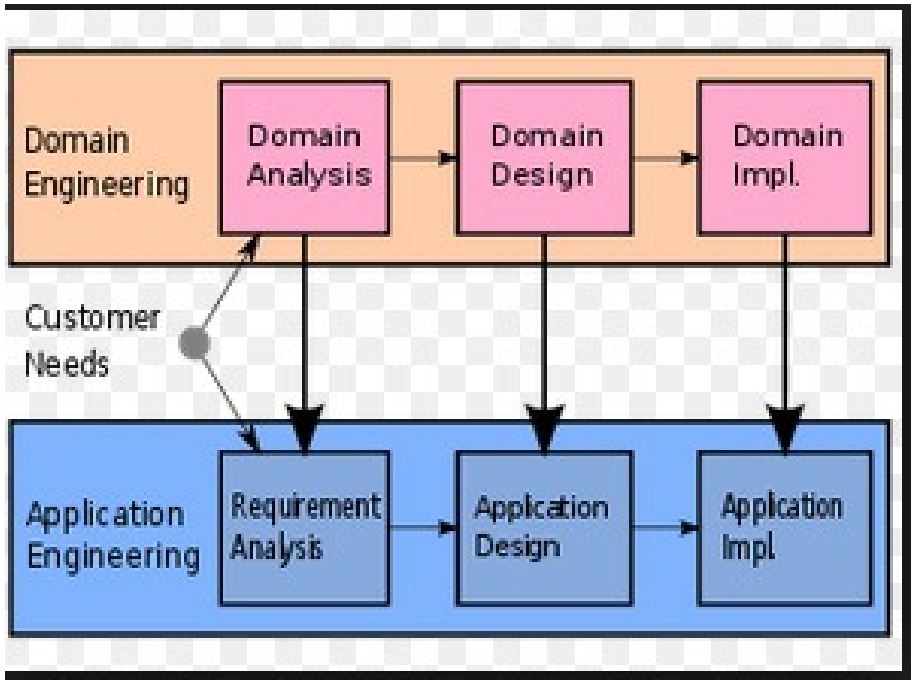


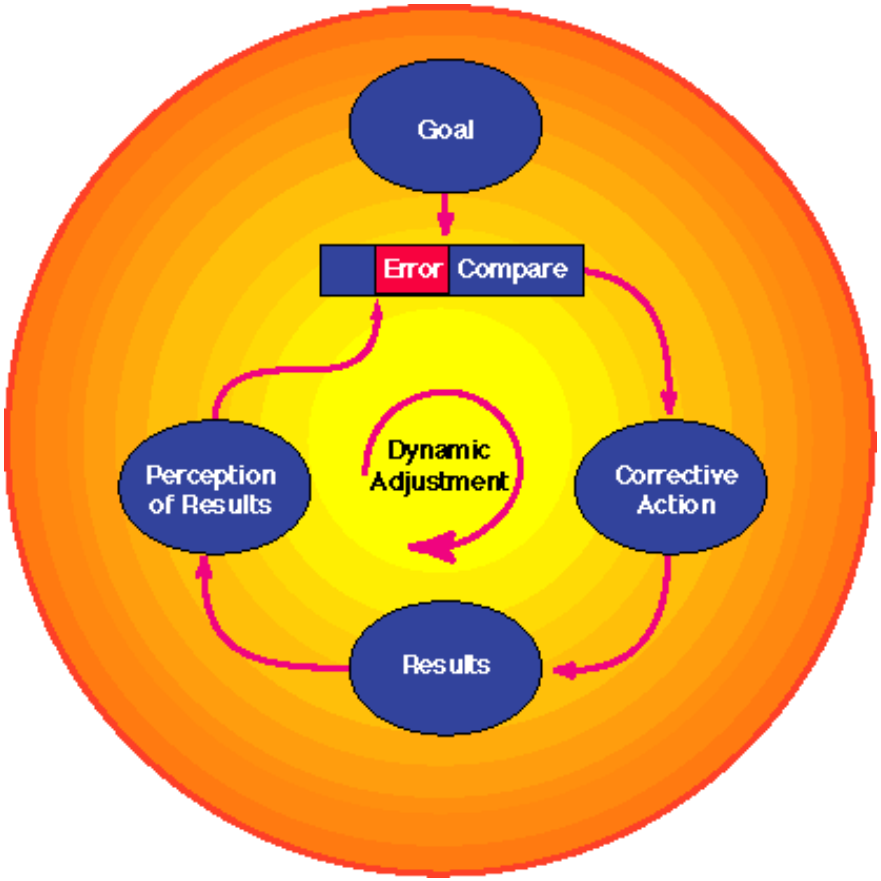
Solution b: Try new ways to collaborate to jointly attack problems or create new products

- Innovation Games
- Join.me
- Skype
- Sharepoint
- Confluence, Hojoki



Knowledge of systems is critical.





Systems in Statistical Control are Predictable

Left to themselves, systems fall into chaos. For a system to reach a state of statistical control, it must be *managed.*

-W. Edwards Deming, Out of the Crisis, 1986

Systems in statistical control have dynamic equilibrium

“I’ve always had *air awareness*.”

Jim Wilson/The New York Times

The snowboarder on a trampoline at his family's home.

www.nytimes.com/imagepages/2013/09/15/sports/dogMCMORRISjp3.html

The New York Times September 15, 2013

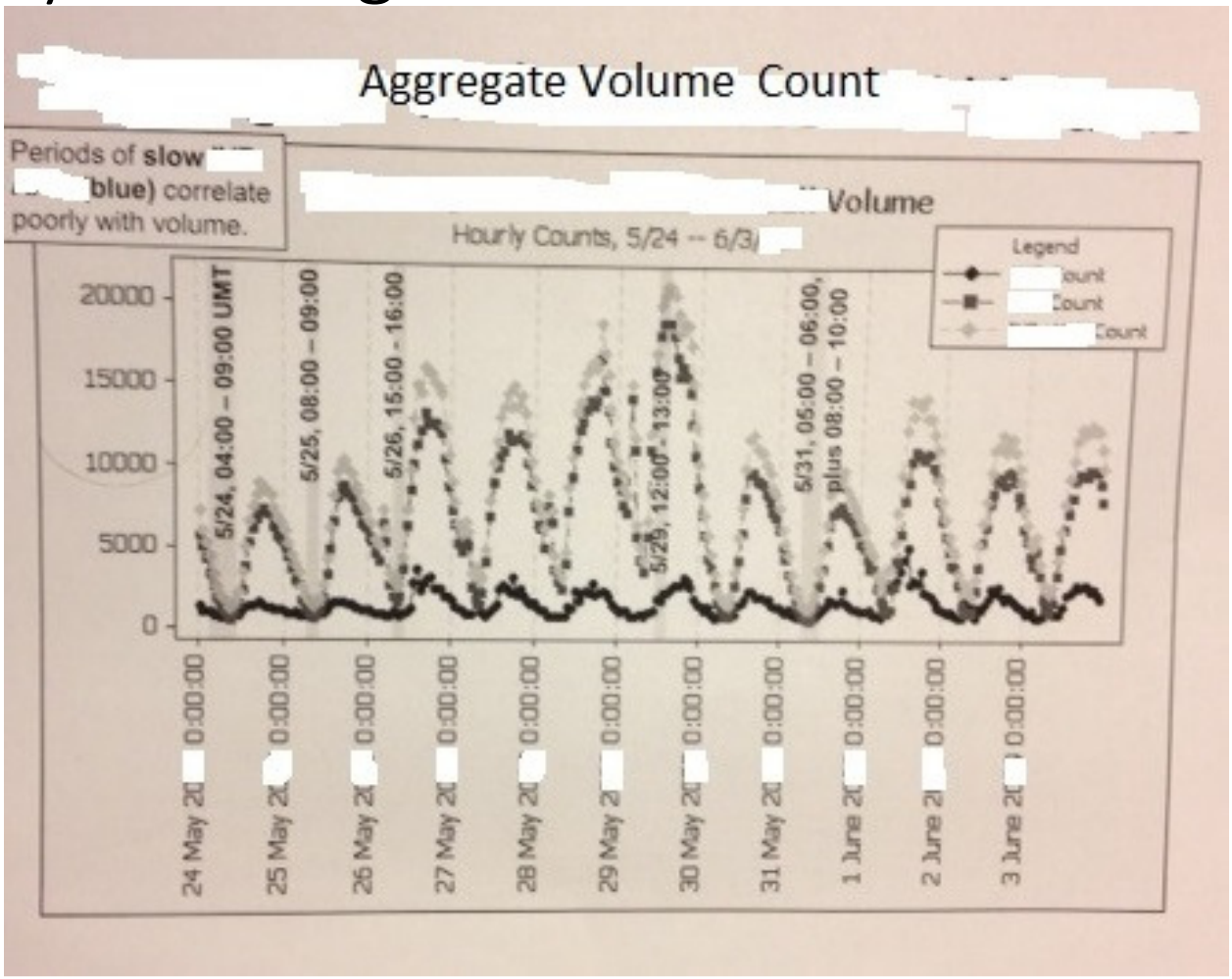
Theory of Knowledge tests assumptions and hunches about a system.

"Ways of Knowing"	**…that We Know**	**…that We Don't Know**
We Know…		
We Don't Know…		

Common Assumption #1

"Latency must come from sudden, unexpected surges in user requests to the application."

Sometimes latency is *not* result of surge in user requests. Find out by checking the data.



Answer:

Someone dedicated to an application must track the online usage patterns proactively. If the system serves a community, it will have a pattern. All communities have rhythms.

If latency does not coincide with a surge in volume, then start a process to rule out sub-optimized code, system configuration, memory, or network issues.

Common Assumption #2

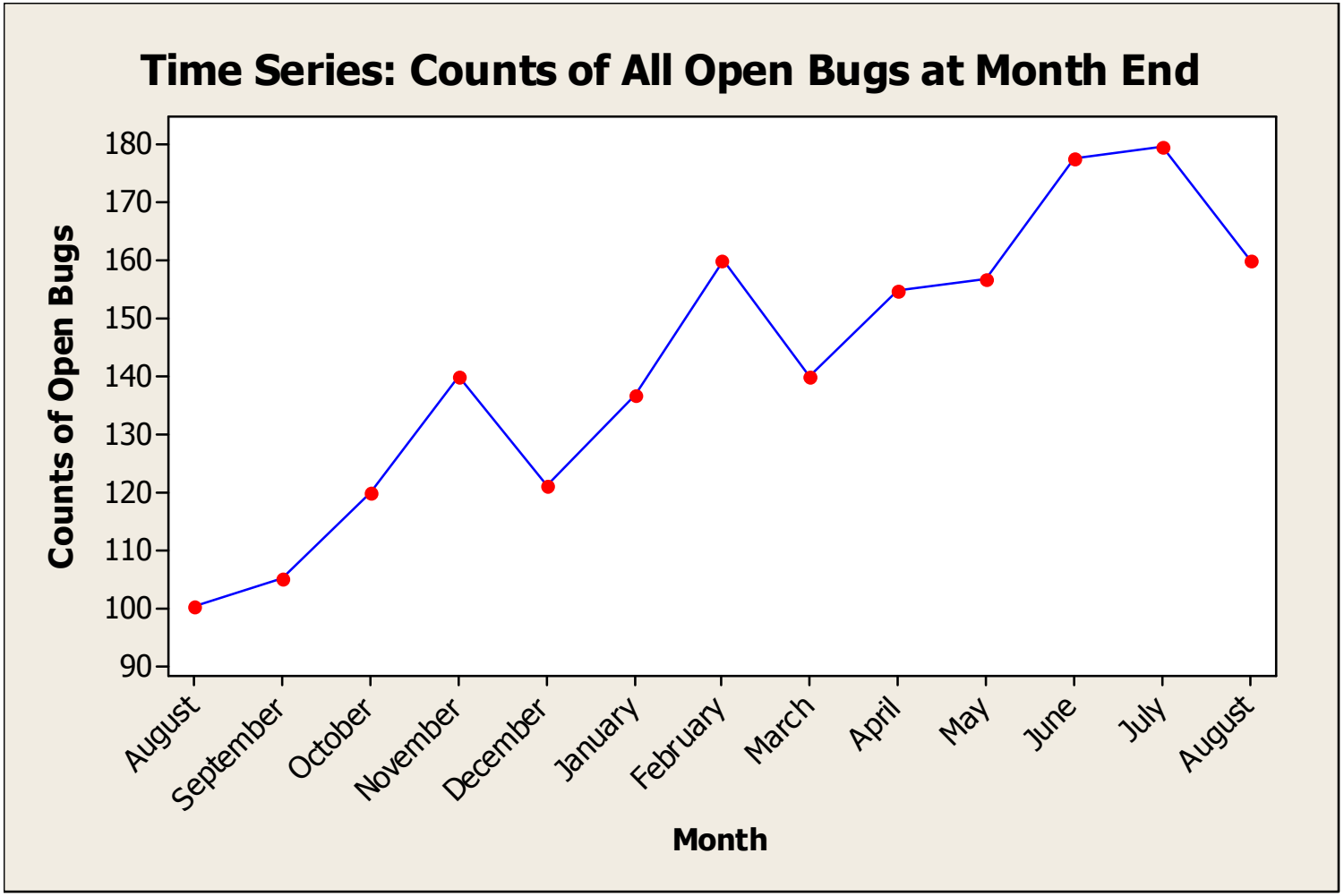
“The biggest threat to system availability is from unusual online requests from users.”

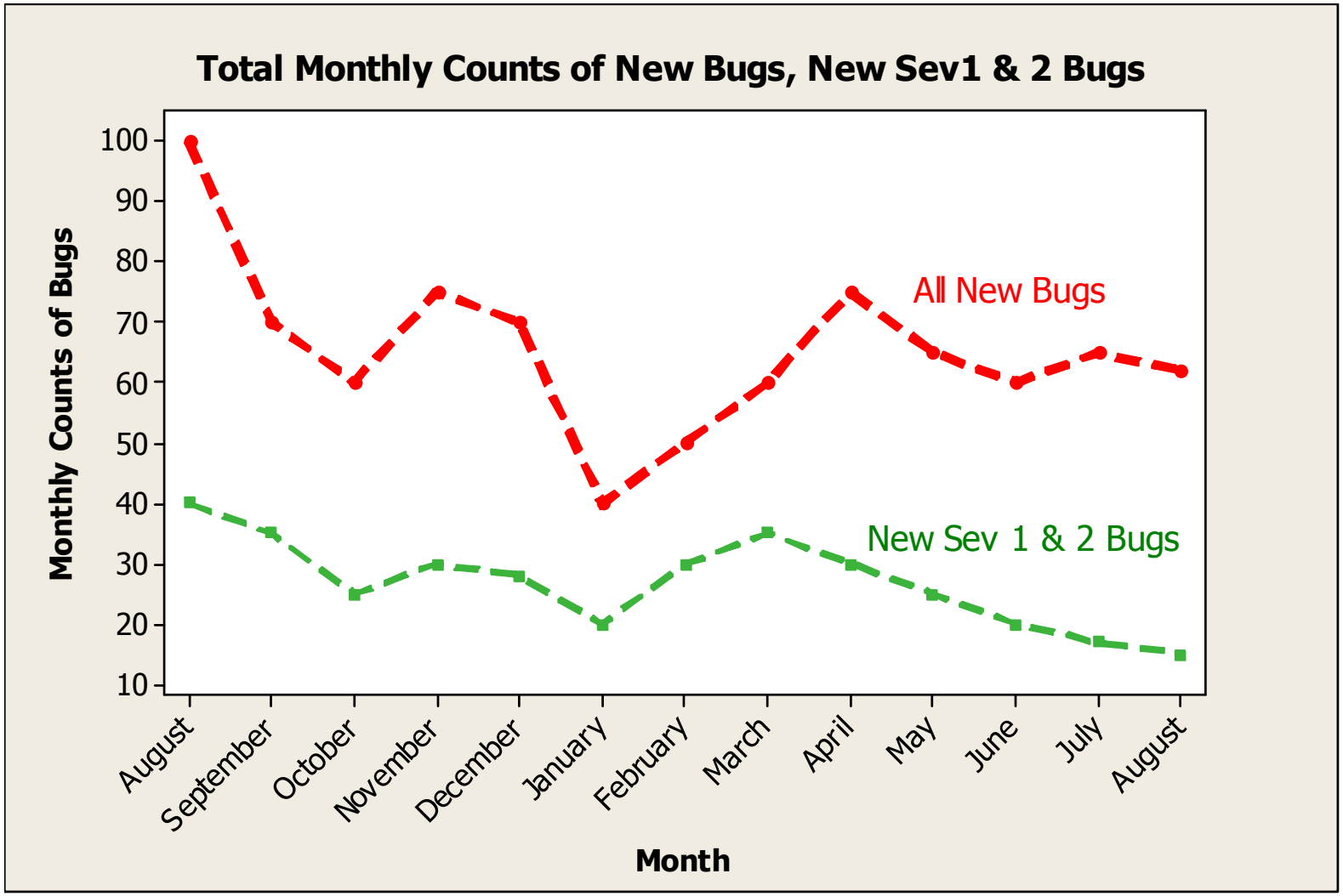
Answer:

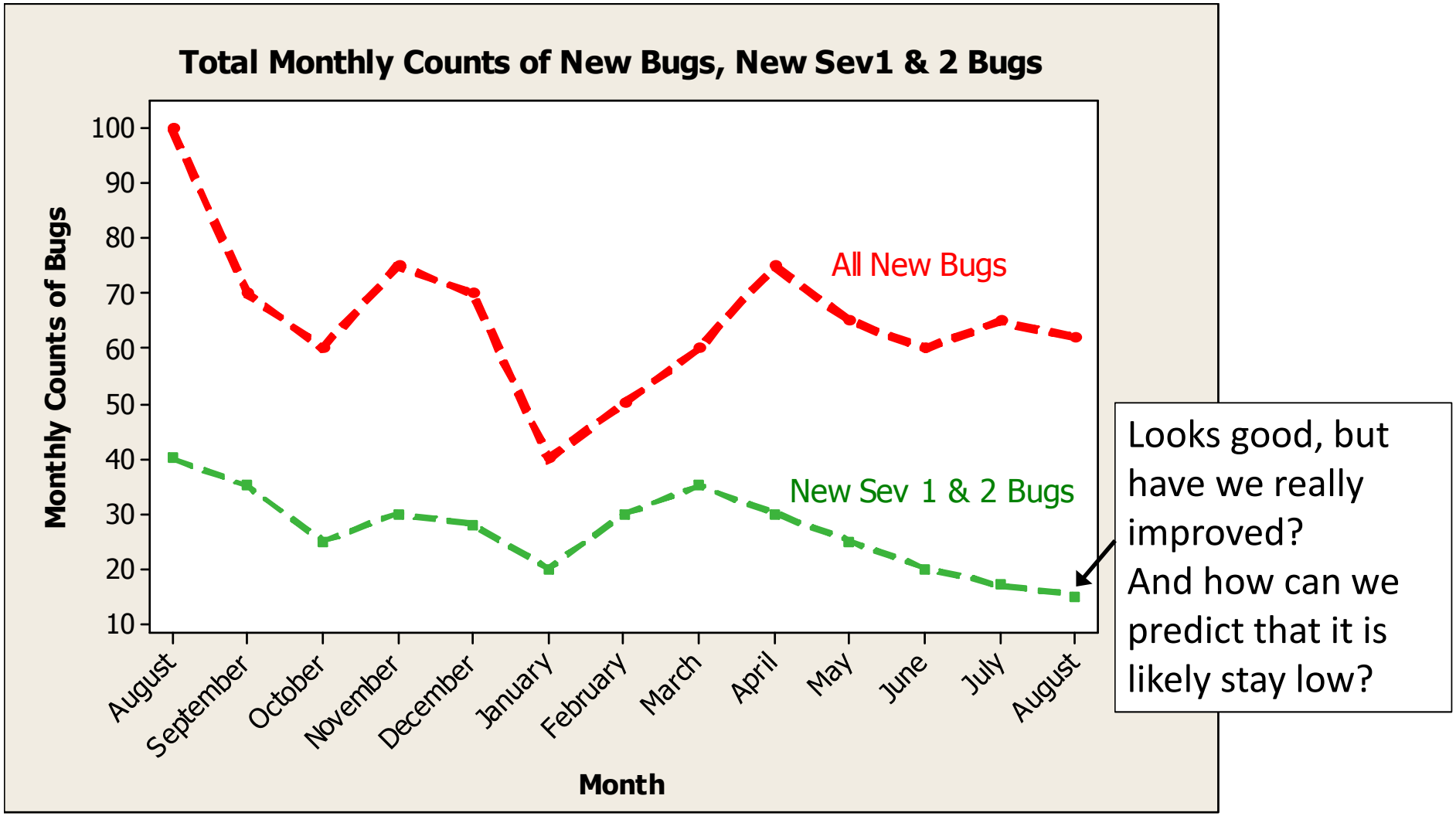
Late renewals of software licenses and SSL certificates are a very likely threat to system availability. Complex systems have many licenses to track and renew. Often renewal is a manual process. This is guaranteed to bring down your system or crucial applications *for days at a time*, if you're not going to manage it indefinitely, 365 days a year.

Common Assumption #3

"The data we are using is the right kind of data to make decisions about managing quality of our system."


Time Series: Counts of All Open Bugs at Month End
Counts of Open Bugs
180
170
160
150
140
130
120
110
100
90
August
September
October
November
December
January
February
March
April
May
June
July
August
Month


Total Monthly Counts of New Bugs, New Sev1 & 2 Bugs
Monthly Counts of Bugs
100
90
80
70
60
50
40
30
20
10
All New Bugs
New Sev 1 & 2 Bugs
August
September
October
November
December
January
February
March
April
May
June
July
August
Month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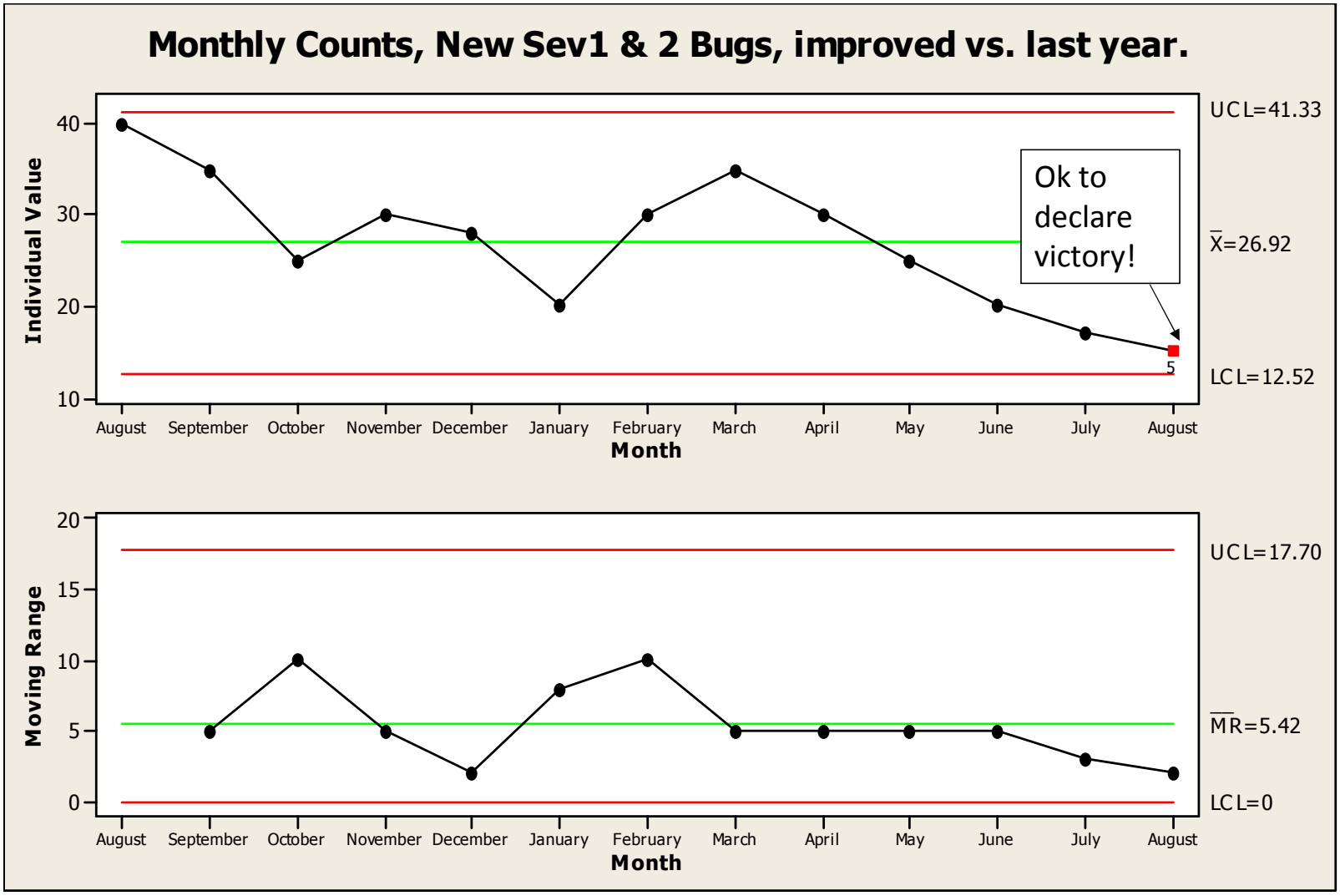
100
90
80
70
60
50
40
30
20
10
All New Bugs
New Sev 1 & 2 Bugs
August
September
October
November
December
January
February
March
April
May
June
July
August
Month
Looks good, but have we really improved?
And how can we predict that it is likely stay low?

Common Assumption #4

“Execution is all that really matters. It’s not worth it to invest time in us or our reports studying theory.”

Solution:

Theory of knowledge assumes growing knowledge of how to help the system achieve its goals. That knowledge can only be developed with theories, things we don’t really know for sure. They form the basis of hypotheses to test on the system.


Monthly Counts, New Sev1 & 2 Bugs, improved vs. last year.
Individual Value
40
30
20
10
UCL=41.33
X̄=26.92
LCL=12.52
Ok to declare victory!
5
August
September
October
November
December
January
February
March
April
May
June
July
August
Month
Moving Range
20
15
10
5
0
UCL=17.70
MR̄=5.42
LCL=0
August
September
October
November
December
January
February
March
April
May
June
July
August
Month

Conclusions

Management with a deep understanding of organizational psychology & change management, systems, theory of knowledge (about their systems), and variation will be well armed to lead a company in a changing economic landscape.

Common assumptions about sources of latency, risks of downtime, and risks from unusual user requests can all be validated with data. Going forward, new uses for online systems will evolve. Using the approach outlined here, we are confident we will evolve with them.

Contact

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