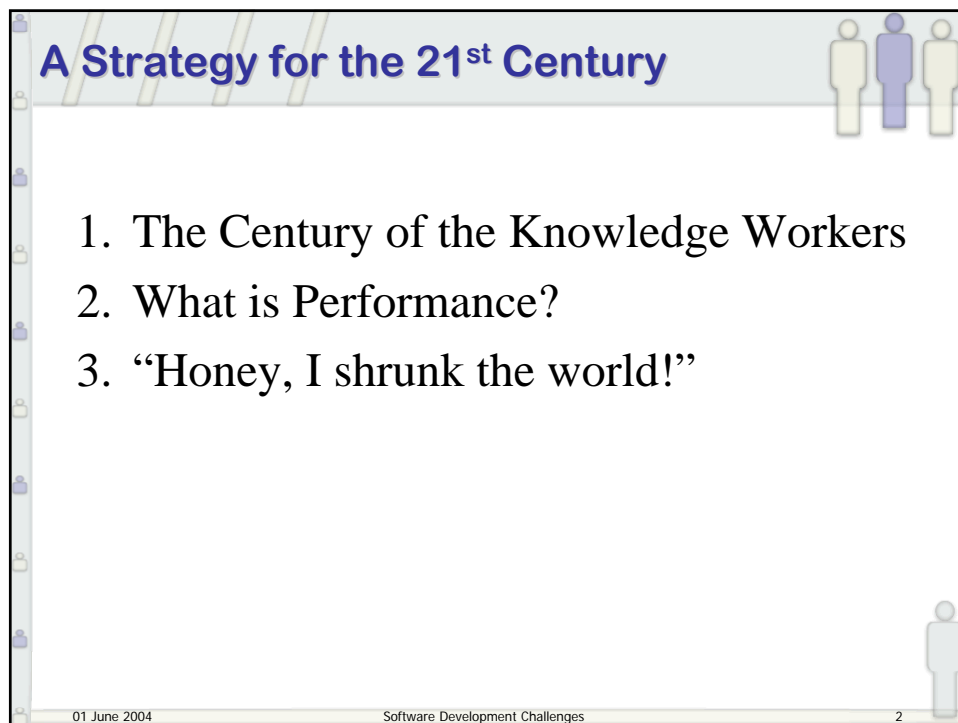


**Software Development  
Challenges  
for the  
21<sup>st</sup> Century**

**Steven Teleki**  
Vice President, Software Engineering, Y&L Consulting, Inc.  
Chairman, IEEE Computer Society, Austin Chapter

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**A Strategy for the 21<sup>st</sup> Century**

1. The Century of the Knowledge Workers
2. What is Performance?
3. “Honey, I shrunk the world!”

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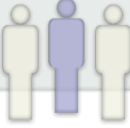
## The Goal of this Presentation

To challenge the way you think!

*“We cannot solve the problems that we have created at the level of thinking that we have created them.”*

- Albert Einstein

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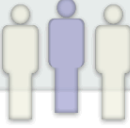
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## A Word from the Weary

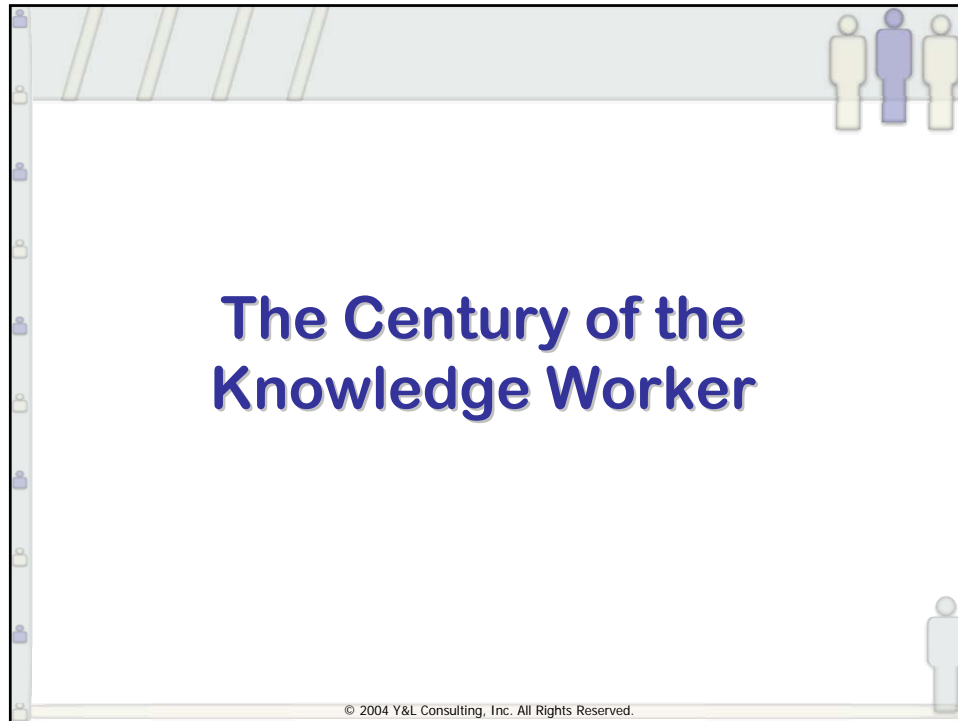
*“You can be sure our plan was perfect. It's just our **assumptions** were wrong.”*

– Ken Olsen, 1991 (founder and president of DEC for 35 years)

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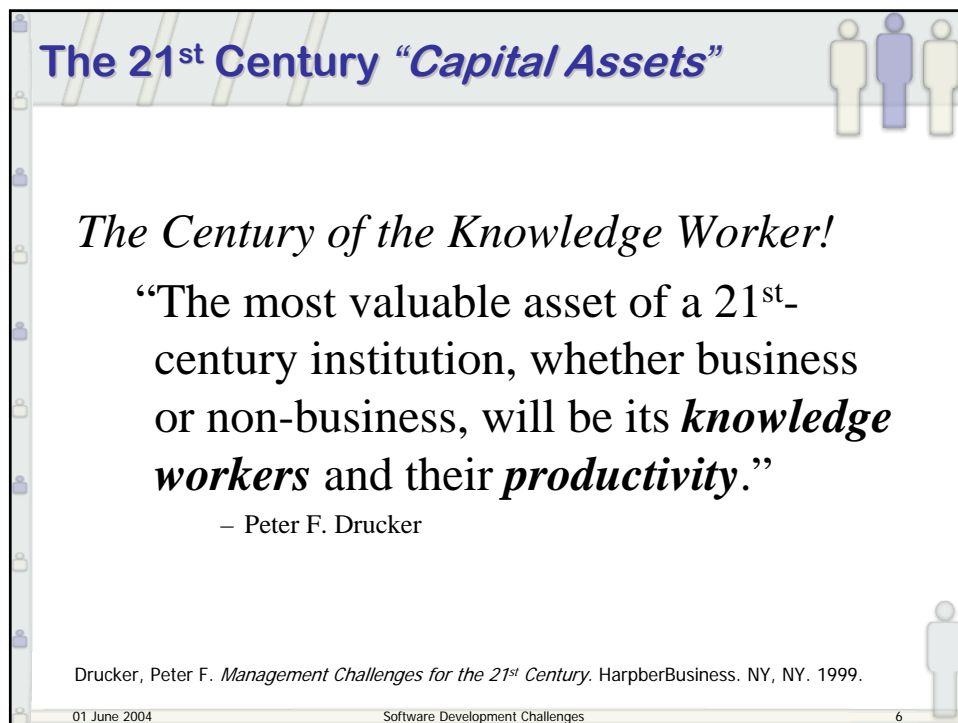
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The Century of the Knowledge Worker

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This slide features a decorative header with a light blue background and diagonal lines, containing three stylized human figures (two yellow, one purple). The main content area is white with the title 'The Century of the Knowledge Worker' in a large, bold, blue font. The footer is a light blue bar with a small grey figure icon on the right and the copyright notice '© 2004 Y&L Consulting, Inc. All Rights Reserved.' in the center.



The 21<sup>st</sup> Century *“Capital Assets”*

*The Century of the Knowledge Worker!*

“The most valuable asset of a 21<sup>st</sup>-century institution, whether business or non-business, will be its **knowledge workers** and their **productivity.**”

– Peter F. Drucker

Drucker, Peter F. *Management Challenges for the 21<sup>st</sup> Century*. HarperBusiness. NY, NY. 1999.

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This slide features a decorative header with a light blue background and diagonal lines, containing three stylized human figures (two yellow, one purple). The main content area is white with the title 'The 21<sup>st</sup> Century “Capital Assets”' in a blue font. Below the title is a quote in italics: 'The Century of the Knowledge Worker!' followed by a larger quote: '“The most valuable asset of a 21<sup>st</sup>-century institution, whether business or non-business, will be its **knowledge workers** and their **productivity.**”'. The quote is attributed to Peter F. Drucker. Below the quote is a reference: 'Drucker, Peter F. *Management Challenges for the 21<sup>st</sup> Century*. HarperBusiness. NY, NY. 1999.' The footer is a light blue bar with the date '01 June 2004', the title 'Software Development Challenges', and the page number '6' on the right, along with a small grey figure icon.

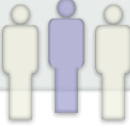
**“From the neck down...”**

“It wasn’t that long ago that we referred to the workers at my father’s factory as ‘hands’.”

“They hired me from the neck down.”

Senge, Peter. *The Fifth Discipline*. Currency Doubleday. New York, NY. 1990.

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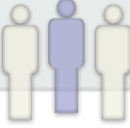
**Cost vs. Assets**

“Economic theory and most business practice sees manual workers as a *cost*. To be productive, knowledge workers must be considered a *capital asset*.”


“*Costs* need to be controlled and reduced. *Assets* need to be made to **grow**.”

Drucker, Peter F. *Management Challenges for the 21<sup>st</sup> Century*. HarperBusiness. NY, NY. 1999.

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**“Orphans Preferred”**



*“Wanted: Young, skinny, wiry fellows not over 18. Must be expert riders willing to risk death daily. Orphans preferred. Wages \$25 per week.”*

– Pony Express advertisement, 1860.

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McConnell, Steve. *After the Gold Rush*. Microsoft Press. 1999.

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**Anything changed in over 140 years?**



*“We realize the skills, intellect and personality we seek are rare, and our compensation plan reflects that. In return we expect **TOTAL AND ABSOLUTE COMMITMENT** to project success—overcoming all obstacles to create applications on time and within budget.”*

– Software Developer Advertisement, Seattle Times, 1995.

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McConnell, Steve. *After the Gold Rush*. Microsoft Press. 1999.

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**Plant the seeds now, harvest later...**

“In every human activity, the *Law of the Farm* governs.”

“There is no cramming on the farm.”

Covey, Stephen. *First Things First*.

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**“The Law of the Farm governs...”**

performance

time


Learning Starts

Learning is Complete

The “Silver Bullet” Syndrome

Don't Quit Here!

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## “I’m a fast learner...”

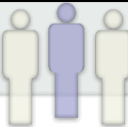
**Crawl, walk, run!**  
*An accomplished walker doesn’t think about the mechanics of the steps anymore.*

**Learning Dilemma**  
*We learn best from experience but we never directly experience the consequences of many of our most important decisions.*

Senge, Peter. *The Fifth Discipline*. Pg. 23. Currency Doubleday. New York, NY. 1990.




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## What does it mean “to know?”

- **0th Order of Ignorance: Lack of Ignorance.** You know.
- **1st Order of Ignorance: Lack of knowledge.** You know the question. **Uncertainty.**
- **2nd Order of Ignorance: Lack of awareness.** This is a real problem: not only you don’t know the answer, you don’t even know what the question is. **Ambiguity.**
- **3rd Order of Ignorance: Lack of process.** You don’t have a process to find out what it is that you don’t know.
- **4th Order of Ignorance: Meta Ignorance.** You don’t know about the orders of ignorance. You are past this. ☺

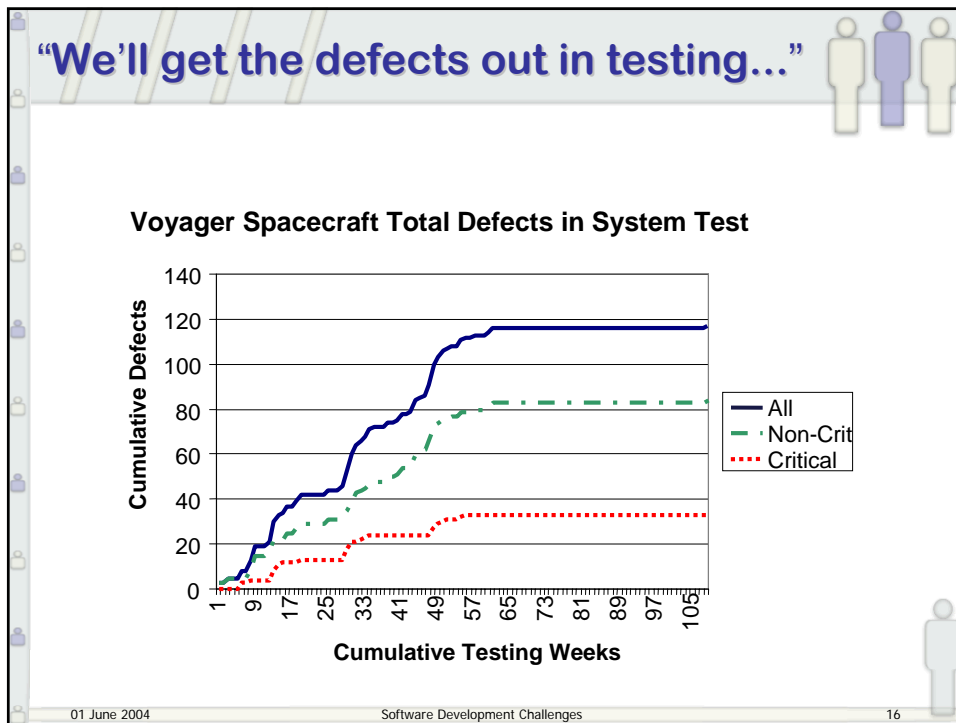
Armour, Phillip G. *The Five Orders of Ignorance*. Comm. of the ACM. Vol.43. No.10. Oct. 2000.



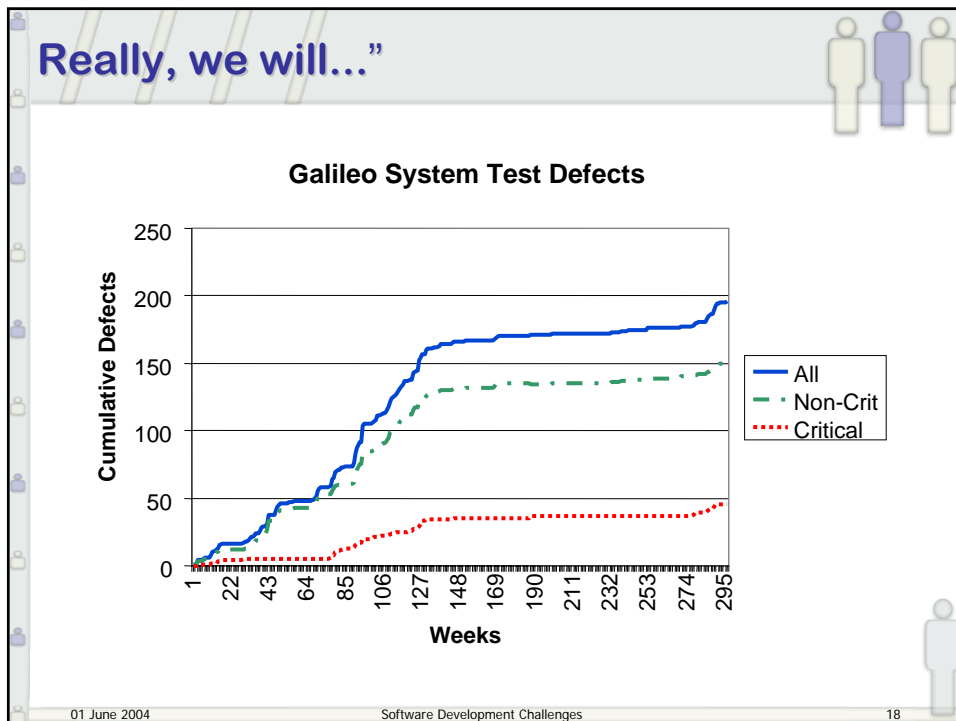
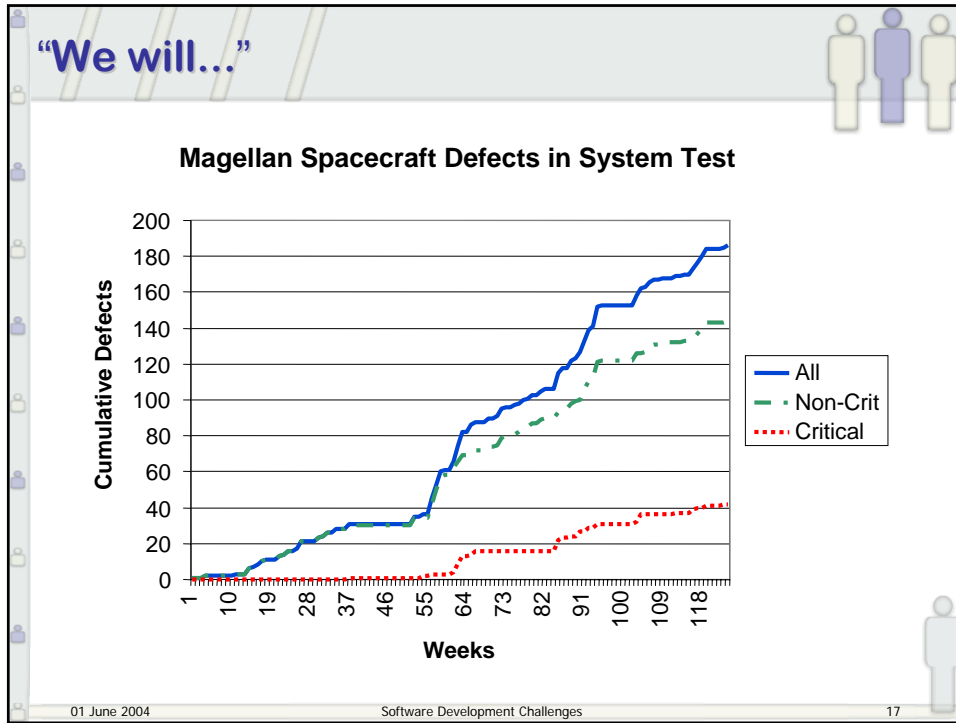
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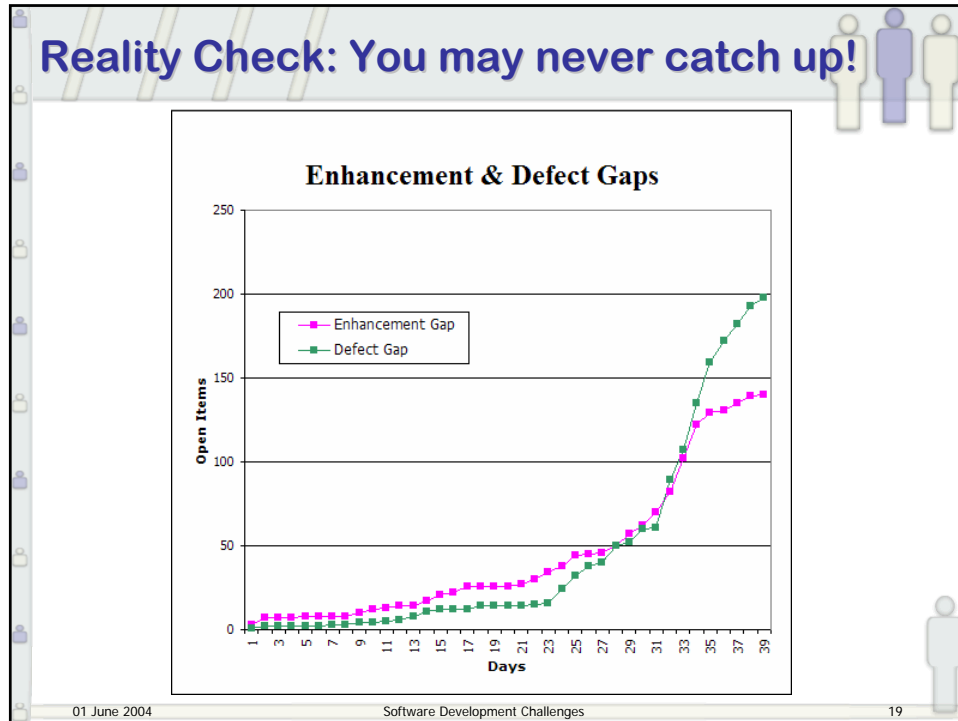
# What is Performance?

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## The lessons of a long-ago disaster...

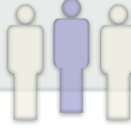
What do you know to be *important* but are *unable* to measure?

- Back in October of 1707 it was **longitude**
- Longitude: How far east or west you are?
  - ✓ Guessing average speed, or dropping a log over the side of the boat and measuring time of travel from bow to stern.
- Admiral Cloudisley Shovell misjudged longitude.
  - 4 warships and 2,000 lives were lost

Buckingham, Marcus, Curt Coffman. *First, Break All The Rules*. Simon & Schuster. NY, NY. 1999.

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## What is Your Software Development Performance?




Have you been thinking about it before?

- Do you know your “*batting average?*”

*Software Development Performance is the complexity of all activities that an individual or team does in order to create software.*

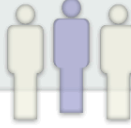
An **understanding** of your performance is the basis of making good estimates.



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## How Do You Improve Productivity & Quality?




1. Reduce Rework
2. Reduce or eliminate delays
3. Create a practice environment.

*“Everybody already does his best!”*

*“Best efforts require guidance.”*

Deming, W. Edwards, Dr. *The Deming Videos*. MIT. Cambridge, MA. 1991.



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### That's different! That's crazy!

*“We should do something when people say it is crazy. If people say something is ‘good,’ it means someone else is already doing it.”*

» Hajime Mitarai, president, Canon

Peters, Thomas J. *The Circle of Innovation, You Can't Shrink Your Way To Greatness.* Vintage Books. New York, NY, 1997.

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### Healthy vs. Pathological Project

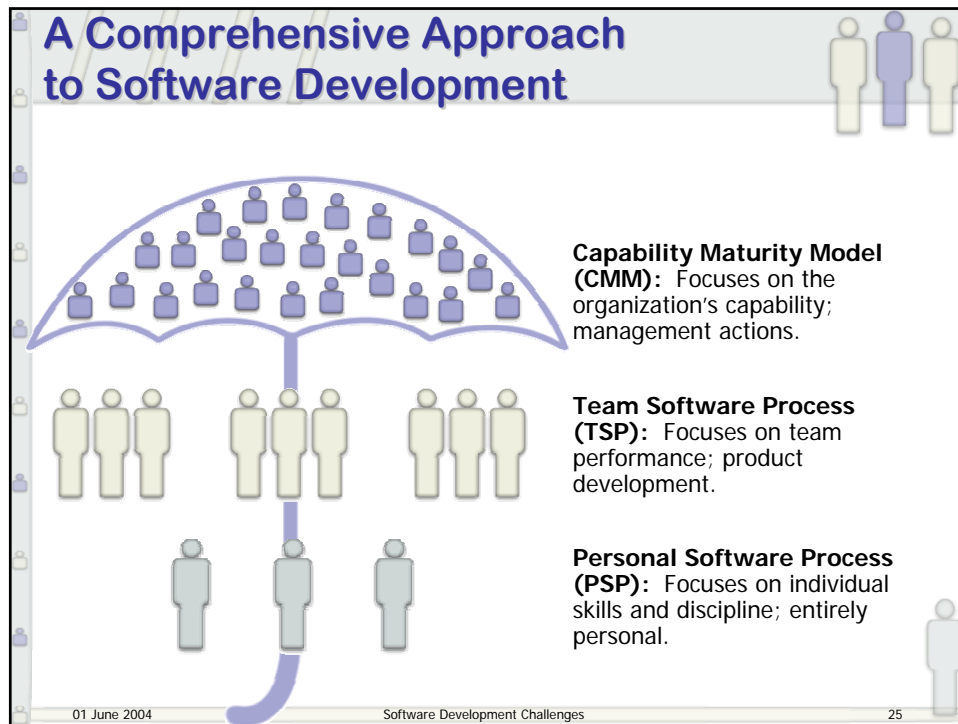
Relative Effort on a Typical vs. an Advanced Project

Project Phase	Typical Project (Relative Effort)	Advanced Project (Relative Effort)
Requirements Analysis	Low	Low
Architecture	Low	Low
Detailed Design	Low	Low
Construction	High	Medium
Testing and Debugging	Very High	Low

Advanced software development approaches require more work during the early stages of the project to eliminate enormous amount of unnecessary work in the later stages of a project.

McConnell, Steve. *After the Gold Rush.* Microsoft Press. 1999.

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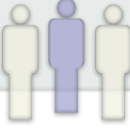


## **LOW PRODUCTIVITY KILLS!**

***“However low its wages, a business [...] is unlikely to survive, let alone prosper, unless it measures up to the standards set by the leaders in its field, anyplace in the world.”***

Peter F. Drucker

## Focus on Talents



What is a **talent**?


*“A talent is a recurring pattern of thought, feeling, or behavior that can be productively applied.”*

Every role performed *at excellence* requires talent.

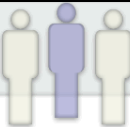
*“Michelangelos of housekeeping.”*

Buckingham, Marcus, Curt Coffman. *First, Break All The Rules*. Simon & Schuster. NY, NY. 1999.  
Peters, Thomas J. *The Circle of Innovation*. Random House. New York, NY. 1997.

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## Make Non-Talents Irrelevant




*“People don’t change that much. Don’t waste time trying to put in what was left out. Try to draw out what was left in. That is hard enough.”*

– wisdom from great managers

Team up people with complimentary talents.

Buckingham, Marcus, Curt Coffman. *First, Break All The Rules*. Simon & Schuster. NY, NY. 1999.

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**“Honey, I shrunk the World!”**

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**The Death of Distance**

“I’m no more then 2 tenths of a second away (measured by the speed of light) from anybody in the world.”

Peters, Thomas J. *The Circle of Innovation*.

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This slide features a light blue header with three stylized human figures (two yellow, one purple) in the top right corner. The main content area is white with the title in large, bold, blue font. The quote is in black font. A vertical sidebar on the left contains several small blue icons. A single grey human figure icon is positioned in the bottom right corner. The footer contains the date, title, page number, and a vertical copyright notice on the right side.

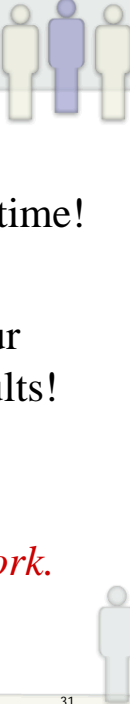
## What is Enough Process Change?

*Continuous and Discontinuous* at the same time!

You need to **know** and understand what your process **is** before you can improve your results!

*Improvement isn't possible if your process doesn't change; "working hard" doesn't work.*

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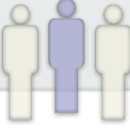
## **DISTINCT ... OR EXTINCT!**

***"If there is nothing very special about your work, no matter how hard you apply yourself, you won't get noticed and that increasingly means you won't get paid much, either."***

Michael Goldhaber, *Wired*



## Why Focus on Yourself?



**You are special!**


Think of yourself as:

# Me, Inc.

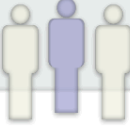
– Even if you happen to be on somebody's payroll at the moment!

Peters, Thomas, J. *Brand You 50: Fifty Ways to Transform Yourself from an "Employee" into a Brand that Shouts Distinction, Commitment, and Passion.* Knopf/Random House, 1999.

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## Conclusion




- Going from manual work to knowledge work changes the game.
- Your thinking guides your actions.
- If you want different results, you must change the way you think, in order to have different actions.
- Like it or not, your competition is no longer the fellow next door...

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## Knowledge Worker Productivity




*“The most important, and indeed the truly unique, contribution of management in the 20<sup>th</sup> century was the fifty-fold increase in the productivity of the MANUAL WORKER in manufacturing.*


*“The most important contribution management needs to make in the 21<sup>st</sup> century is similarly to increase the productivity of KNOWLEDGE WORK and the KNOWLEDGE WORKER.”*

Drucker, Peter F. *Management Challenges for the 21<sup>st</sup> Century*. HarperBusiness. NY, NY. 1999.

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## Embrace The Stockdale Paradox



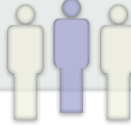
Retain faith that you will prevail in the end, regardless of the difficulties. **AND at the same time** Confront the most brutal facts of your current reality, whatever they might be.

Collins, Jim. *Good to Great*. Harper Business. NY, NY. 2001.

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**Sage Advice...**



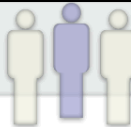
*“Expose yourself to the best things humans have done and then try to bring those things into what you are doing.”*

—Steve Jobs, President, Apple Computer

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**Thank You!**



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For a software development reading list please visit:  
**<http://pseng.net/reading/>**

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