Six Sigma in a software products environment

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NYC SPIN, March 11th, 2009

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Agenda

- Fiserv introduction
- Introduction of Six Sigma
- How it applies to a software products environment
- Examples/Case Studies
- References

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But first a word from my sponsor…

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Providing Scale Advantages And Differentiation

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Financial Strength

$3.68 Billion Revenue as of 3Q 2008

$7.75 Billion Market Cap as of 3Q 2008

17.97% Operating Margin as of 3Q 2008

High recurring revenue and strong operating margins

Consistent double digit revenue and earnings growth

Strong free cash flow generation ($465 Million as of 3Q 2008)

Leading Market Position

Managed Accounts

Transaction Processing

Solutions

Integrated Solutions

Core Processing

Internet Banking

Bill Payment & Presentment

Debit/EFT Processing

Risk Management

By The Numbers

25,000 Employees

250 Locations Around the World

Over 18,000 clients

Over 20 Billion Transactions Processed Annually

Serve All Top 100 Banks, with 6,000 Core Relationships

2007 FORTUNE 5 HUNDRED

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Strategic Framework

Vision

A global leader in transaction-based technology solutions

Mission

To provide integrated technology and services solutions that enable best in class results for our clients

Values

Clients • Integrity • Respect • Innovation • Teamwork

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Introduction and History of Six Sigma

What Does It Do?

Reduce

- Defects
- Mistakes
- Wasted effort
- Delays
- Scrap

Improve

- Customer satisfaction
- Quality
- Service
- Cost savings
- Productivity
- Time compression

Result: Customer expectations met then exceeded

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Six Sigma is a process

Define	Identify what is important to the customer and define the project scope.
Measure	Select key characteristics; Define performance standards; Validate a measurement system
Analyze	Establish a process capability; Define improvement objectives; Identify variation sources
Improve	Screen potential causes for variation; Discover variable relationships b/w causes; Establish operating tolerances
Control	Validate a measurement system; Determine the ability to control vital steps; Implement process controls on vital steps

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Six Sigma -- What's it based on?

Customer

*Anyone Who **Receives***
Product, Service or Information

Opportunity

*Every **Chance** to Do Something*
Either "Right" or "Wrong"

Successes vs. Defects

Every Result of an Opportunity Either
*Meets the **Customer Specification** or it*
Doesn't

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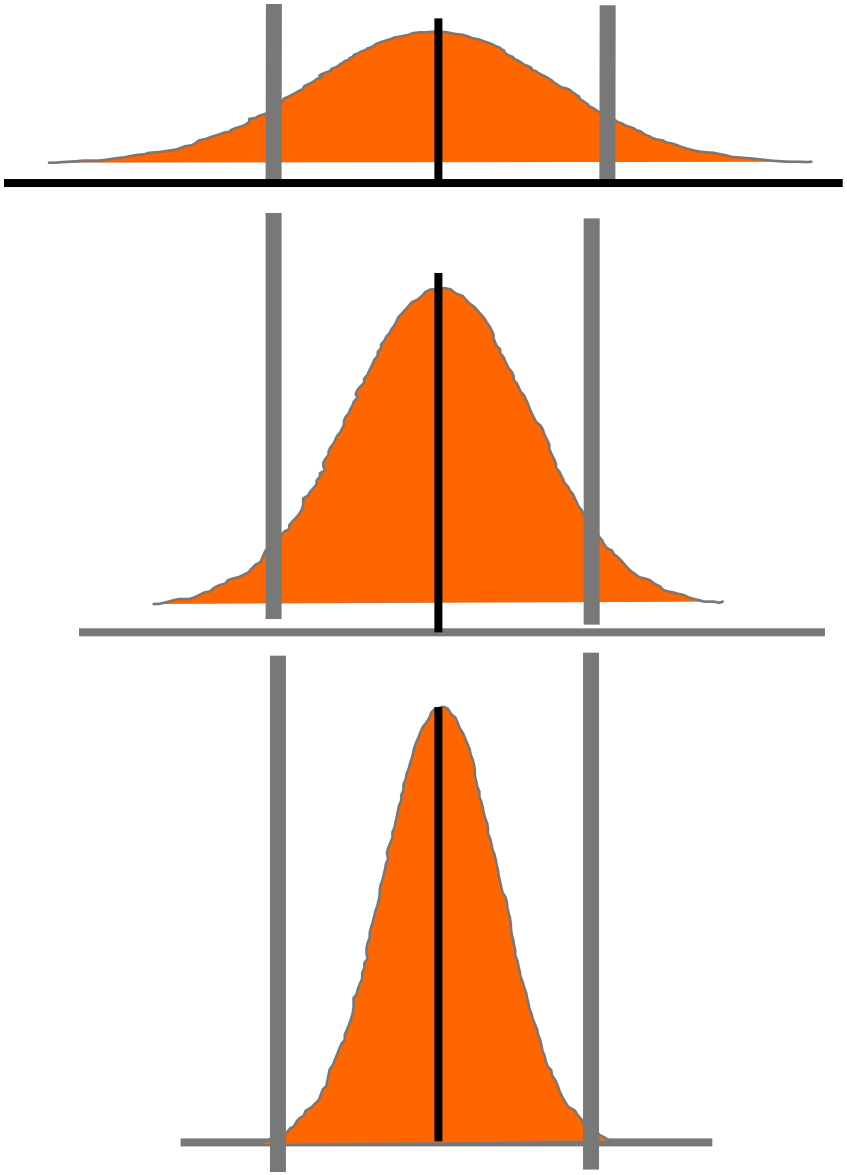
Variation -- less is better:



Less Variation (x's). .

Means fewer defects (y's)

(if centered)

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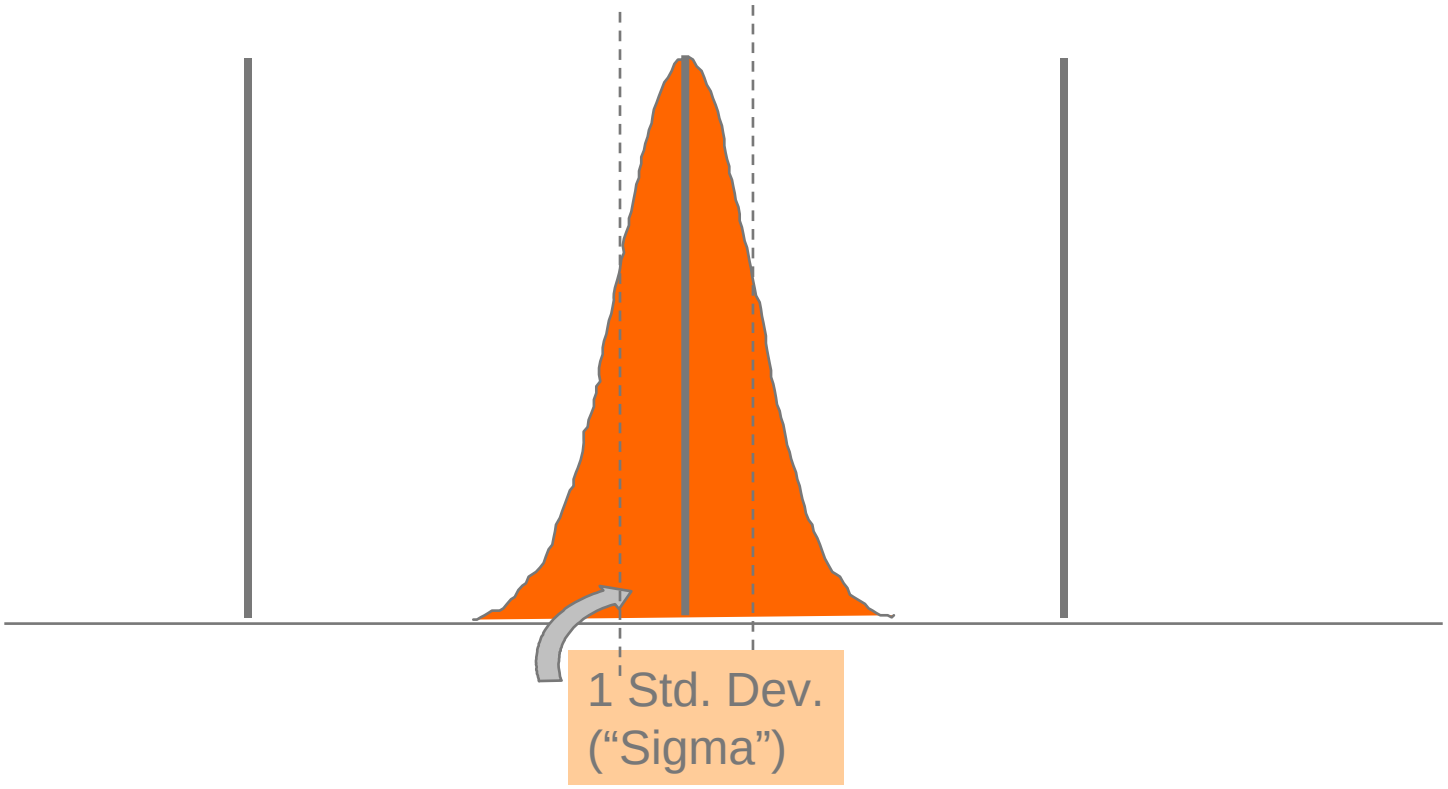
Standard deviation:

A metric that displays variation from it's "target".



One standard deviation around the mean is about 68% of the total "opportunities" for achieving success!

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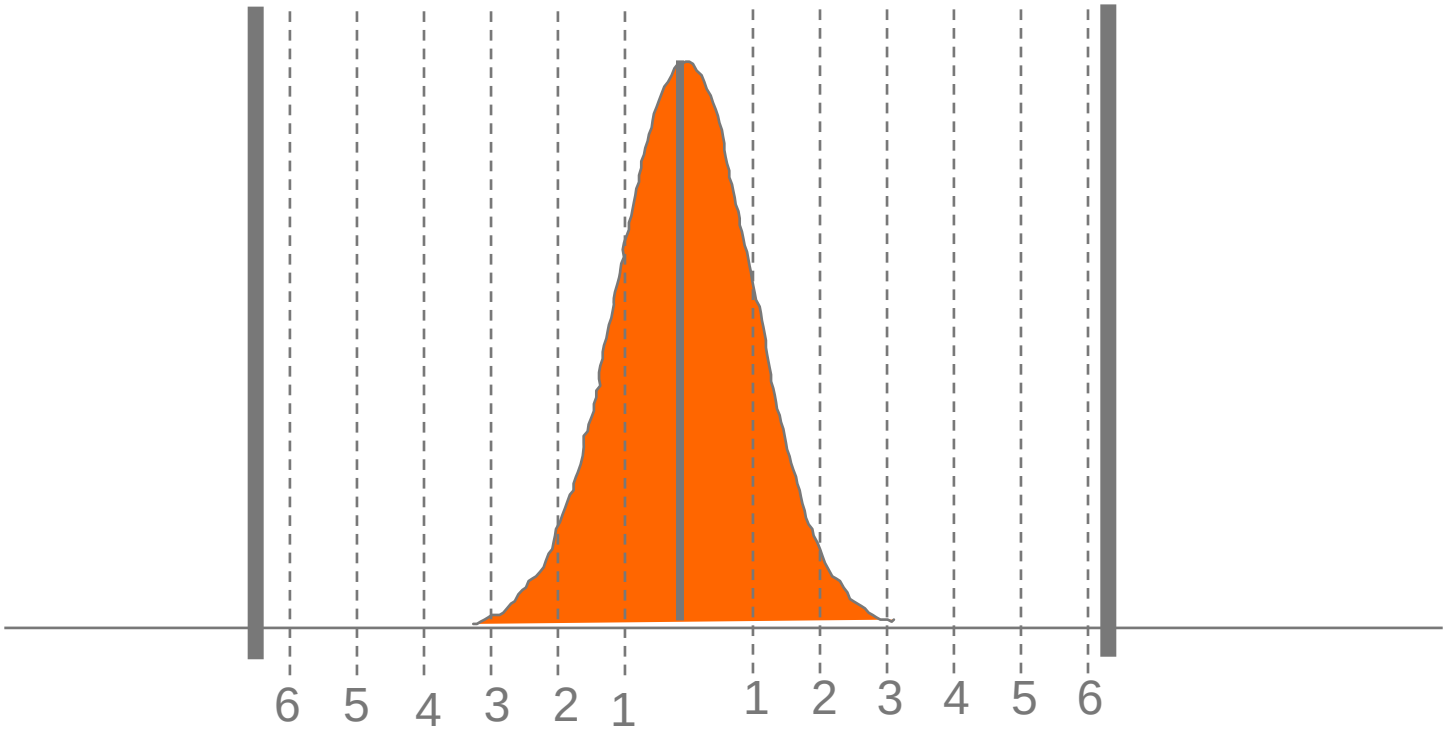
If we can *squeeze* six standard deviations in between our target and the customer's requirements . . .



then: 99.99966% of our "opportunities" are included!

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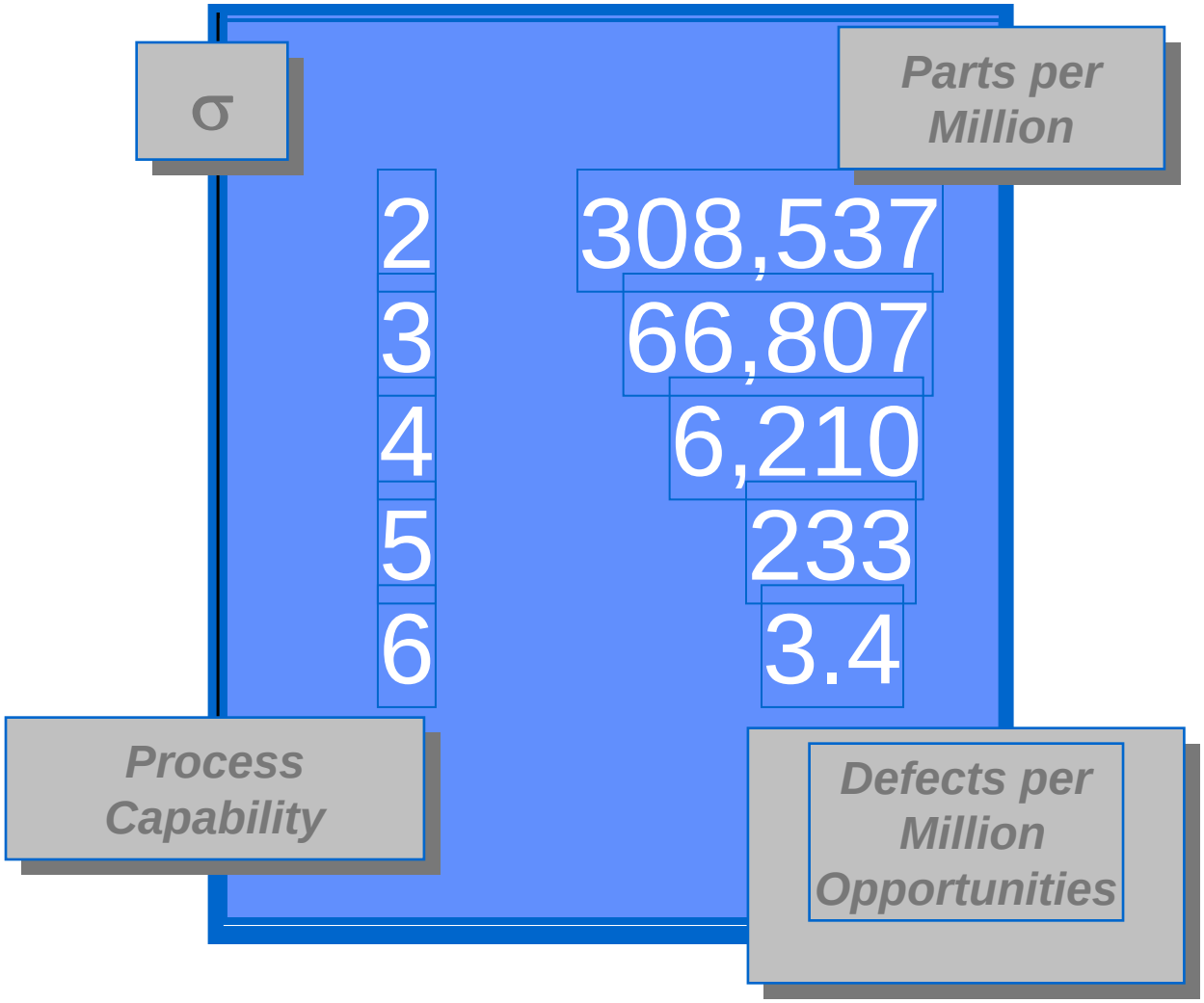
Six Sigma... the analytical goal:

(DPMO Distribution Shifted ± 1.5σ)



Sigma is a statistical unit of measure which reflects process capability. The sigma scale of measure is perfectly correlated to such characteristics as defects-per-unit, parts-per million defective, and the probability of a failure or error.

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Isn’t 99% Good Enough?

A 99% level of performance would mean:

- 20,000 lost articles of mail per hour by the United States Postal Service
- 5,000 incorrect surgical operations per week in the United States
- 200,000 wrong drug prescriptions each week in the United States
- No electricity for almost 7 hours each month
- 12 Newborns will be given to the wrong parents daily
- 315 entries in Webster’s Dictionary will be misspelled
- 3,065 copies of tomorrow’s Wall Street Journal will be missing one of the three sections

From the book by Ed Scannell, Games Trainers Play, 2000 And Garden State Focus October 2001 Edition

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What are some applications to software products?

- Focus on maximizing value-added time in a Systems Development Life Cycle process (time is money) and minimizing re-work and waste
- Reduce bugs – either in production or by phase
- Reduce document revisions – BRDs, FSDs, TSDs, Test Cases, etc.
- Improve business requirements gathering by identifying the critical few items that matter most
- Understand operational performance

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Example 1: Improve turn-over to a QA group

What is wrong?	New builds are often delivered from the development team to QA without enough information, such as details of changed functionality and installation instructions. This leads to extra hours spent tracking down this information and extends the cycle time of the QA process.
Where does the problem occur?	The problem occurs at the point in the Software Development Life Cycle when a new build is delivered to the QA team from the Development team.
When does the problem occur?	This problem occurs when a new delivery of the code is received by the QA team
To what extent does the problem occur?	Approximately 90% of new deliveries have this problem

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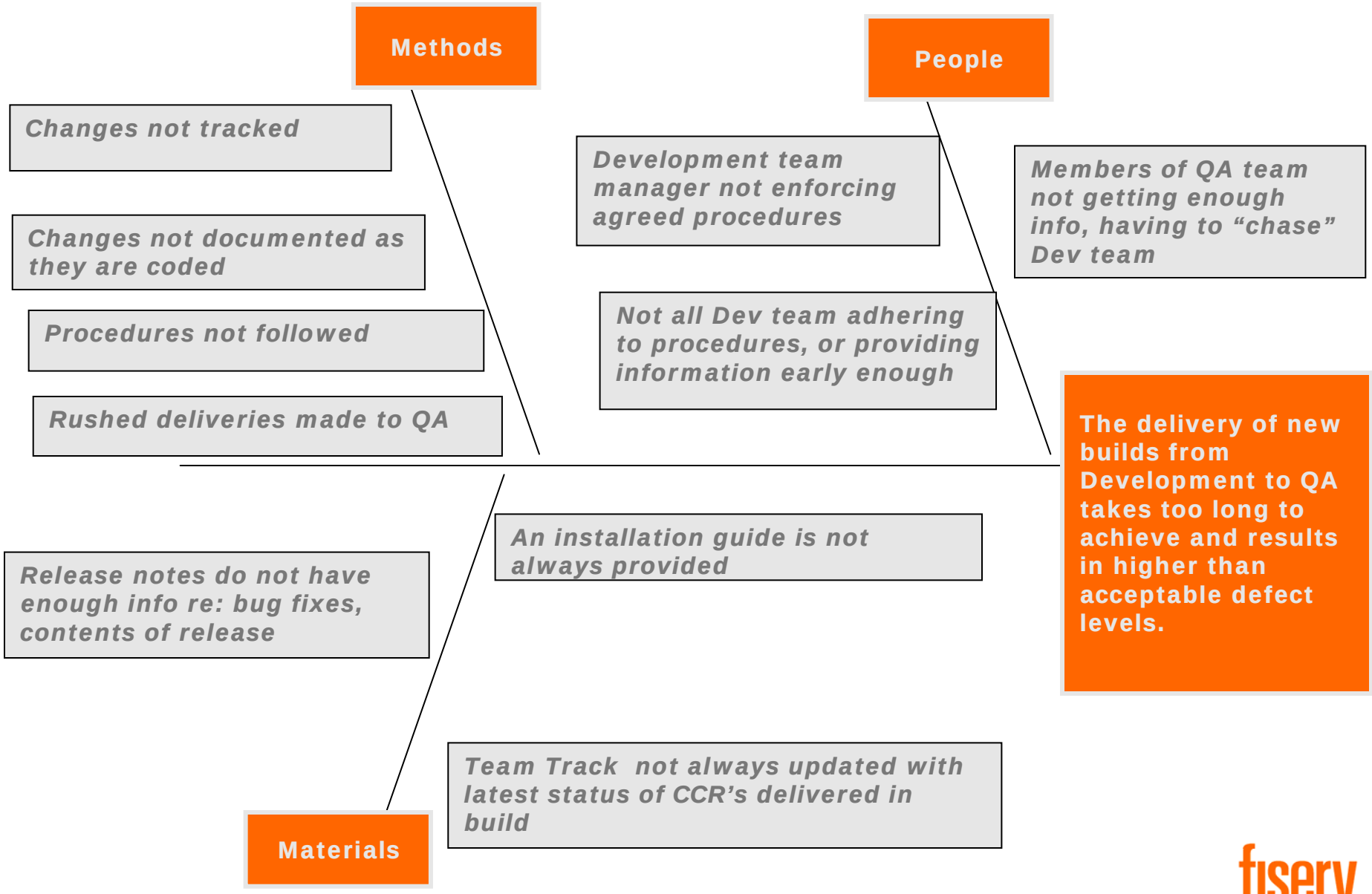
Cause & Effect Diagram



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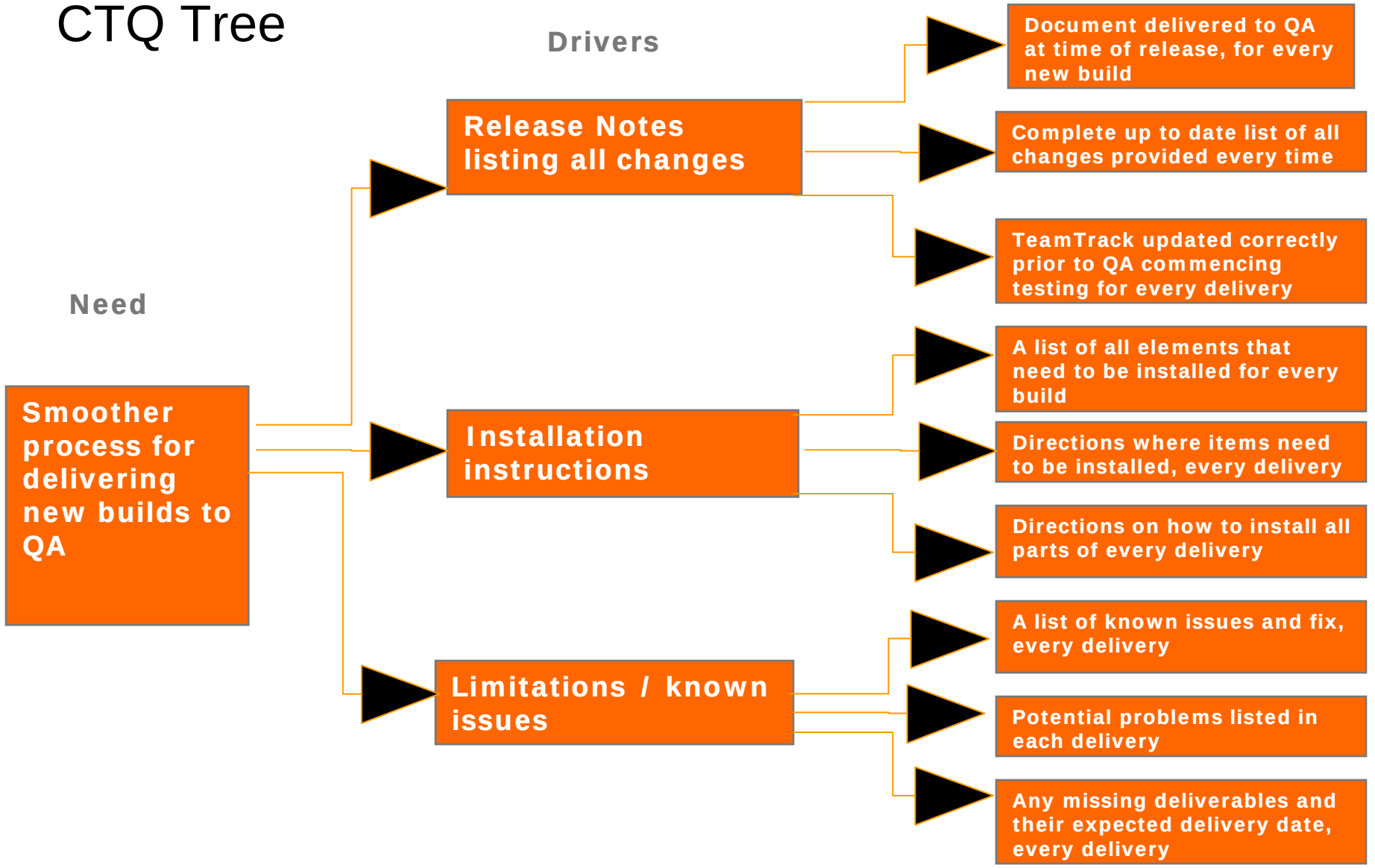
CTQ Tree



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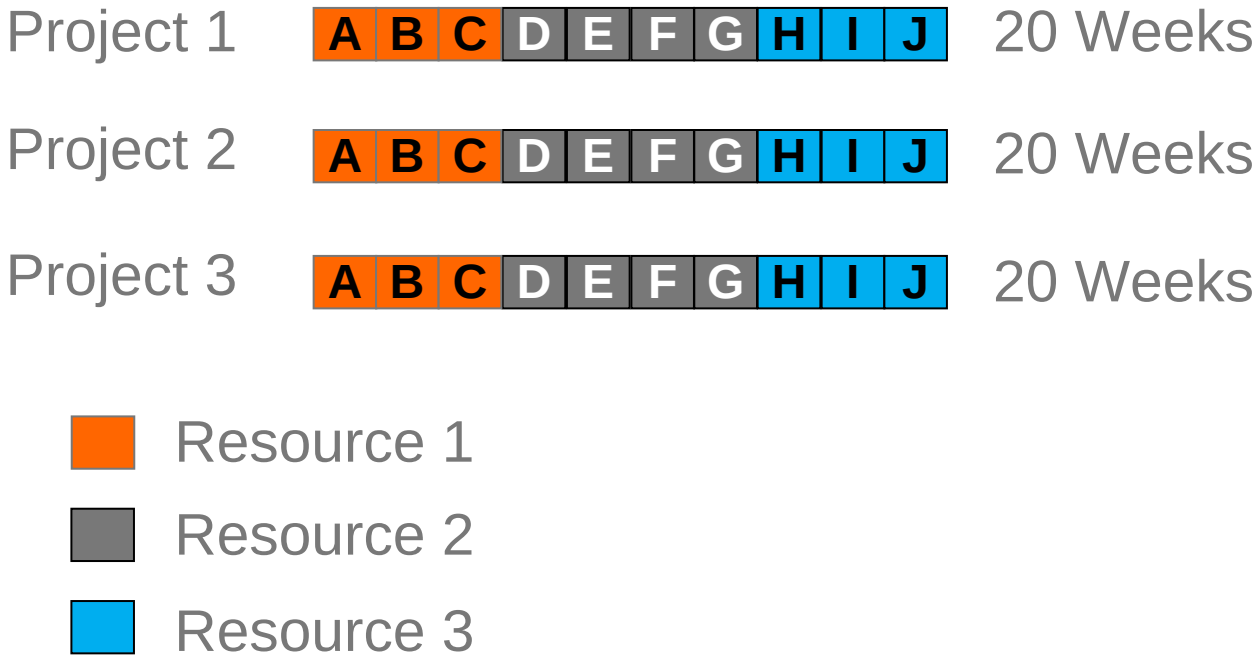
Example 2: Theory of Constraints – 3 Projects



From the book by Kai Yang, Design for Six Sigma for Service

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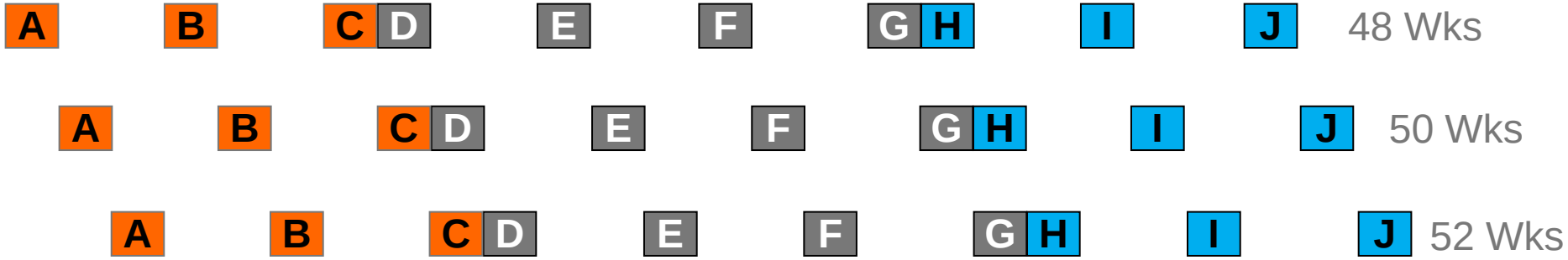
Scenario 1 – Multi-tasking



Scenario 2 – No Multi-tasking

The scenario without multi-tasking had the longest project still finish before the first project in Scenario 1

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Example 3: Statistics and the Big Picture

Initial Data Set

Month	Group A	Group B
January	246892815	365531726
February	3727620	64928143
March	35333728	121037324
April	14783580	120060748
May	200088057	330451936
June	42873564	140971494
July	2713200	17214090
August	17214744	61318874
September	52820769	24431587
October	204834032	198444380
November	77549408	37849317
December	36868750	1261106748

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The analysis – Pearson product moment correlation coefficient (a.k.a. Pearson coefficient)

Correlations: Group A, Group B

Shows very little correlation

Pearson correlation of Group A and Group B = 0.143

P-Value = 0.658

Implies no statistical significance

But we should always seek to understand the data graphically and not just mathematically – otherwise we can't see the forest for the trees

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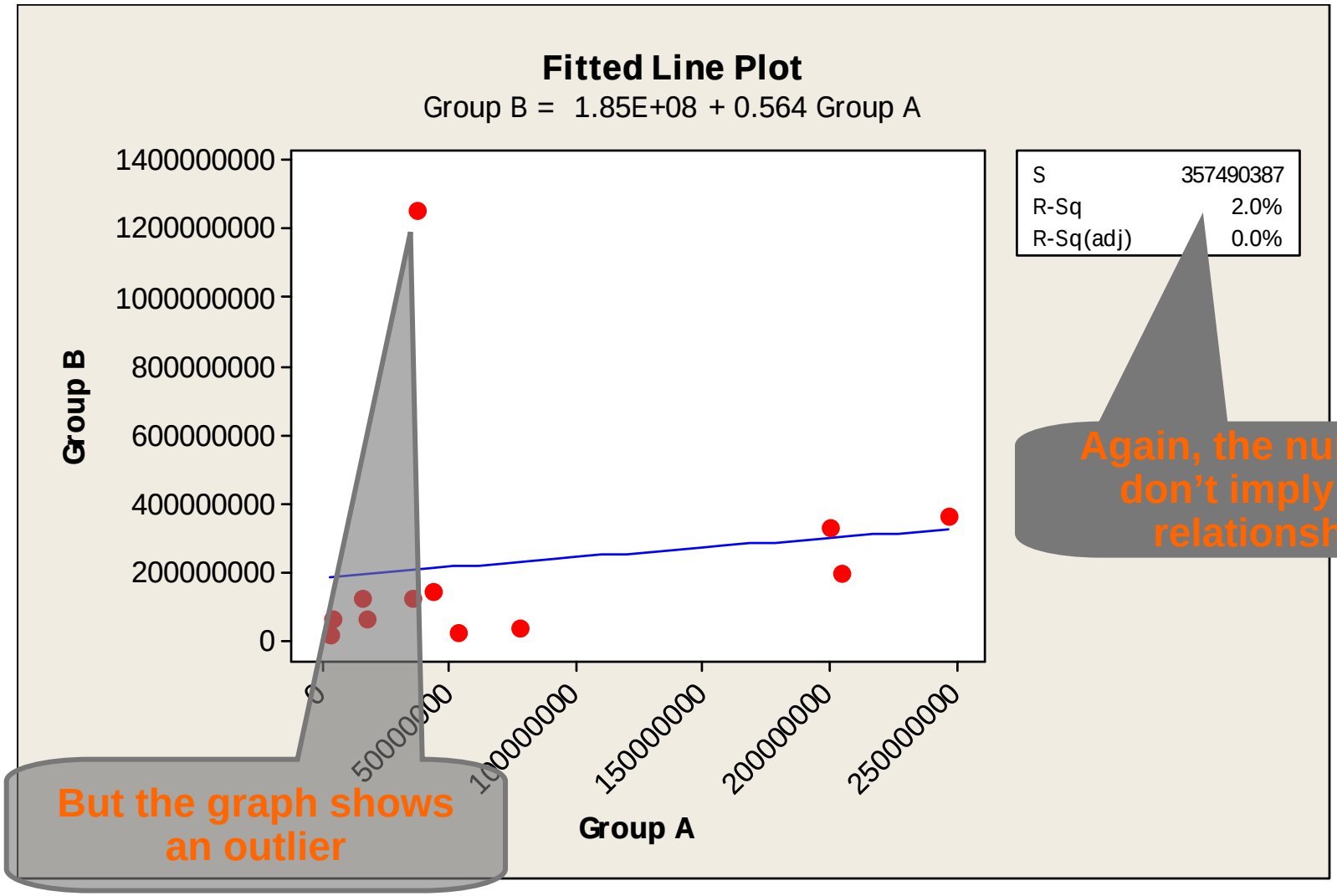
A more intelligent review – Regression analysis with a graphic



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Re-do without the outlier

Correlations: Group A_1, Group B_1

Pearson correlation of Group A_1 and Group B_1 = 0.868
P-Value = 0.001

Implies statistical significance

Shows high positive correlation

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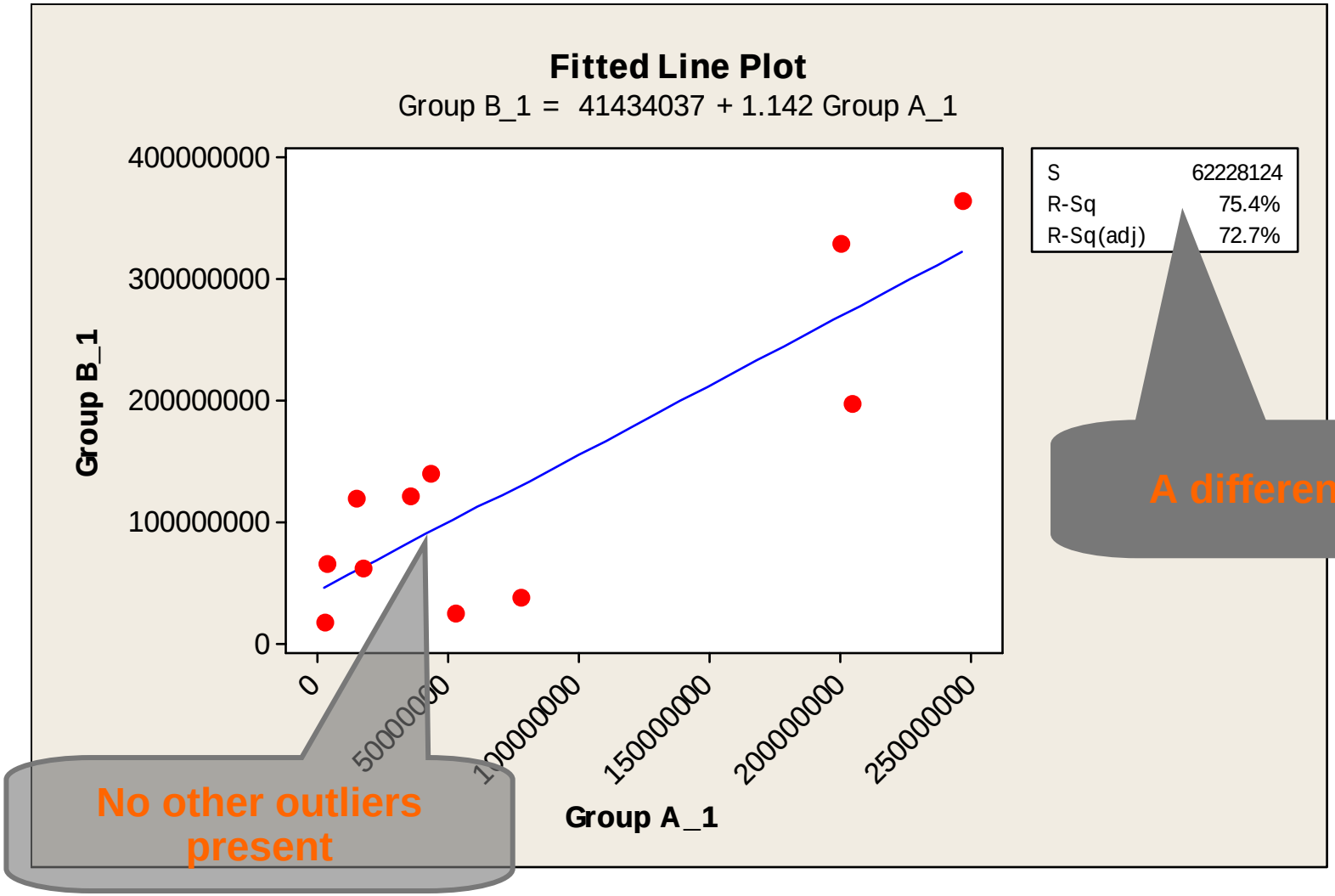
The regression analysis shows this as well



Worth examining further if this correlation is not desired

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Conclusion

- Six Sigma applied to software products should fit form to function (not all manufacturing best practices apply)
- Apply the methodology and toolset when it adds value to the business outcome and client experience
- Like all tools, Six Sigma exists to assist the business not the other way around - use common sense
- True fundamentals of Six Sigma should be honored:
  - Top down leadership
  - Define quality in the eyes of the client – what are they willing to pay for?
  - Define the problem before solutions
  - Data driven decision making – but not paralysis by analysis
  - **Quality** is not a separate function but **a building block of all functions**

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References

What is Lean Six Sigma – Mike George, Dave Rowlands, & Bill Kastle

iSixSigma http://www.isixsigma.com/; Software and IT channels

- David L. Hallowell
- Bruce J. Hayes

SEI @ Carnegie-Mellon University http://www.sei.cmu.edu/ (type Six Sigma under search)

ASQ – http://www.asq.org/six-sigma/index.html

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Thank You!

Questions?

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