Ben Rockwood
Director of Systems Engineering
Joyent, Inc.

# The DevOps Transformation

From here to there and why

# What is DevOps?

# DevOps is a *cultural* and *professional* movement.

Adam Jacob

# It's not a tool (thing).

# It's not a title (person).

It's not just dev & ops.

# *dev*ops*

# CAMS

- Culture

- Automation

- Measurement

- Sharing

John Willis

It's a banner for change.

# Re-envisioning the IT World



"We are the music makers,
And we are the dreamers of dreams,"

Arthur O'Shaughnessy (1874)

The world is changable, if we only have the courage to break with the status quo (overcome inertia)

# Pro Tip #1

DevOps is a journey
of discovery,
not a destination.

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DevOps is a journey
of discovery,
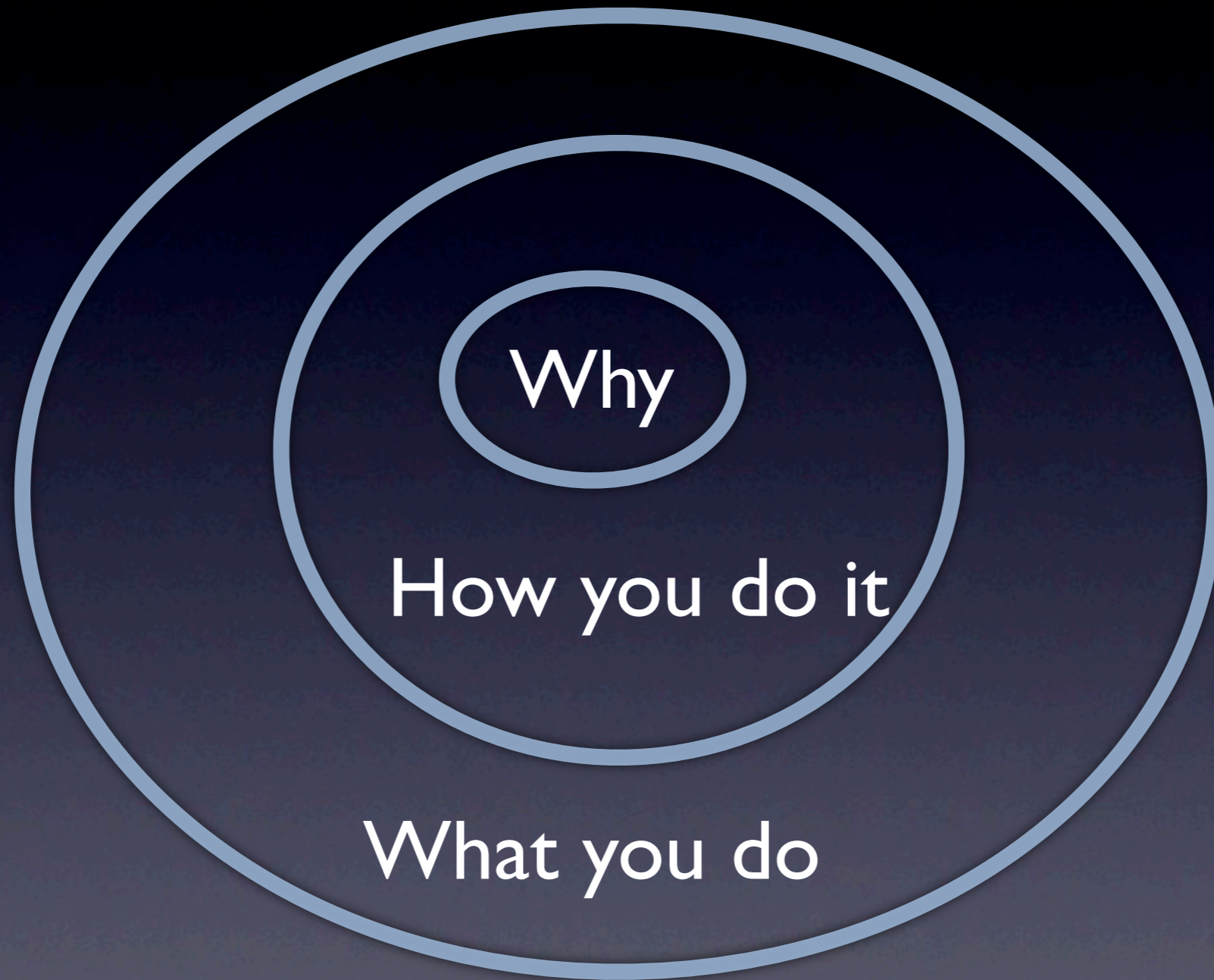not a destination.

## *Please join the global conversation!*

# DevOps Deconstruction

- Collaboration of People

- Convergence of Process

- Creation & Exploitation of Tools
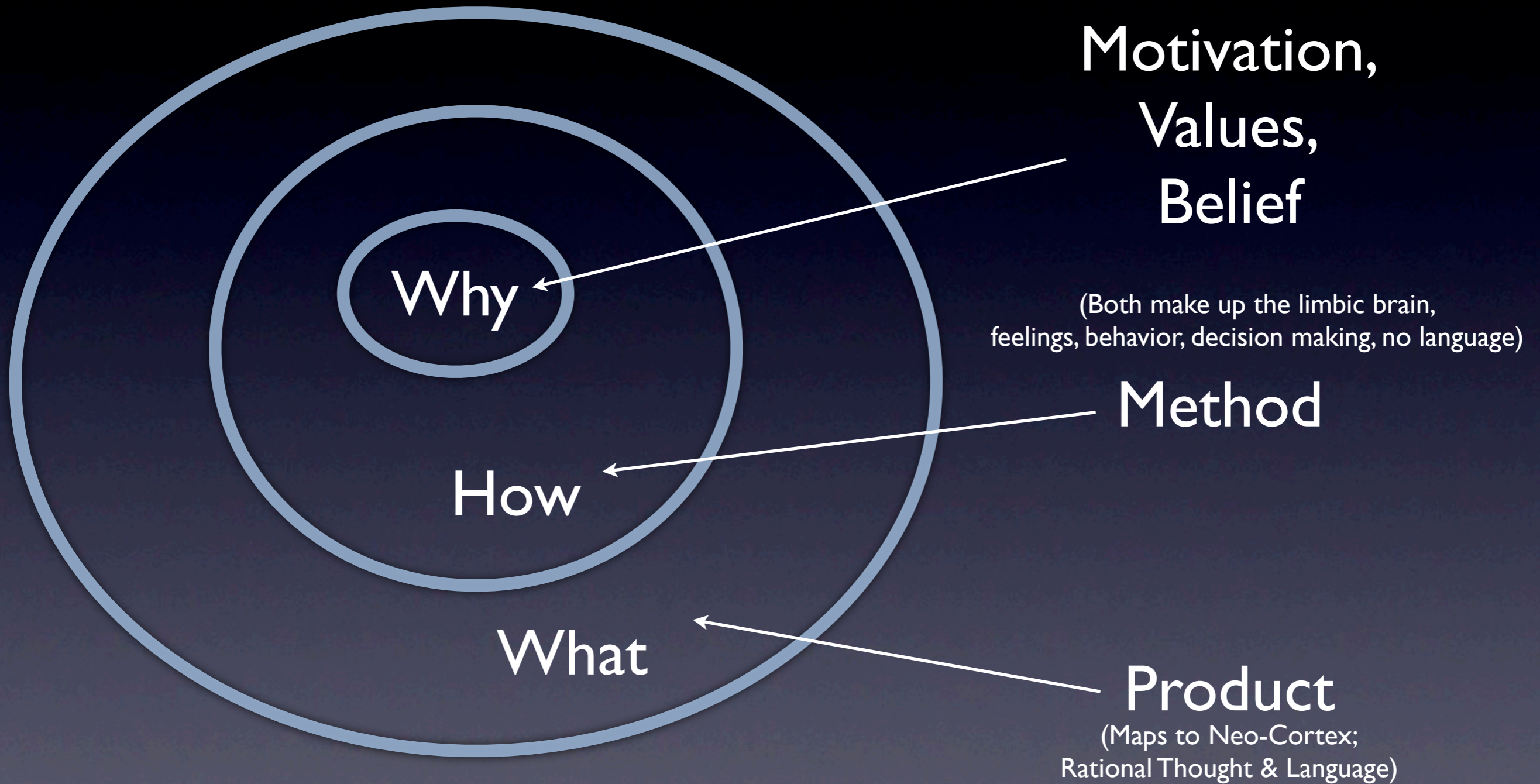
*In that order, not the reverse.*

# Simon Sinek's Golden Circle
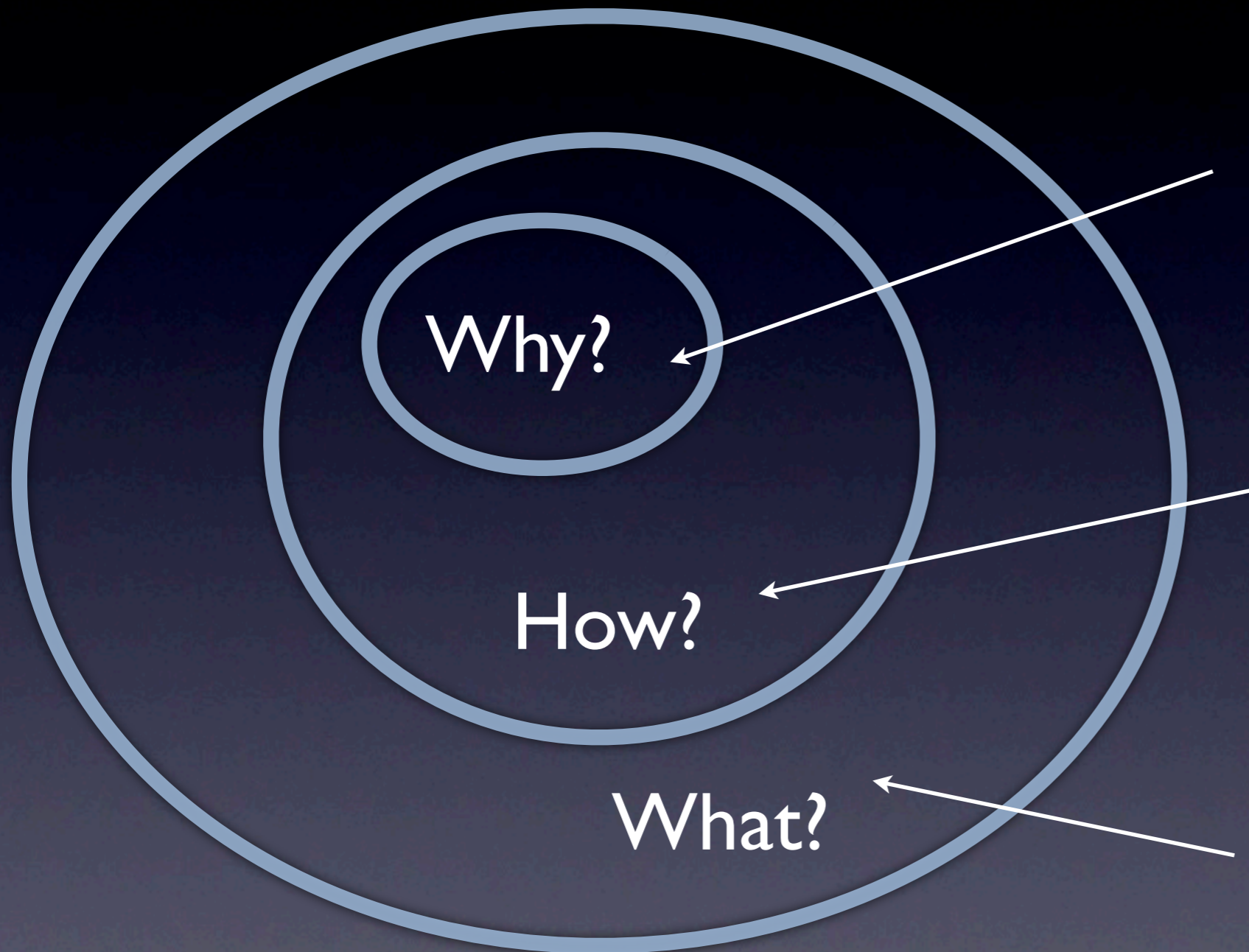


Why

How you do it

What you do

Ted Talk: Simon Sinek: How great leaders inspire action"

# Simon Sinek's Golden Circle

Why

How

What

Motivation,
Values,
Belief

(Both make up the limbic brain,
feelings, behavior, decision making, no language)

Method

Product
(Maps to Neo-Cortex;
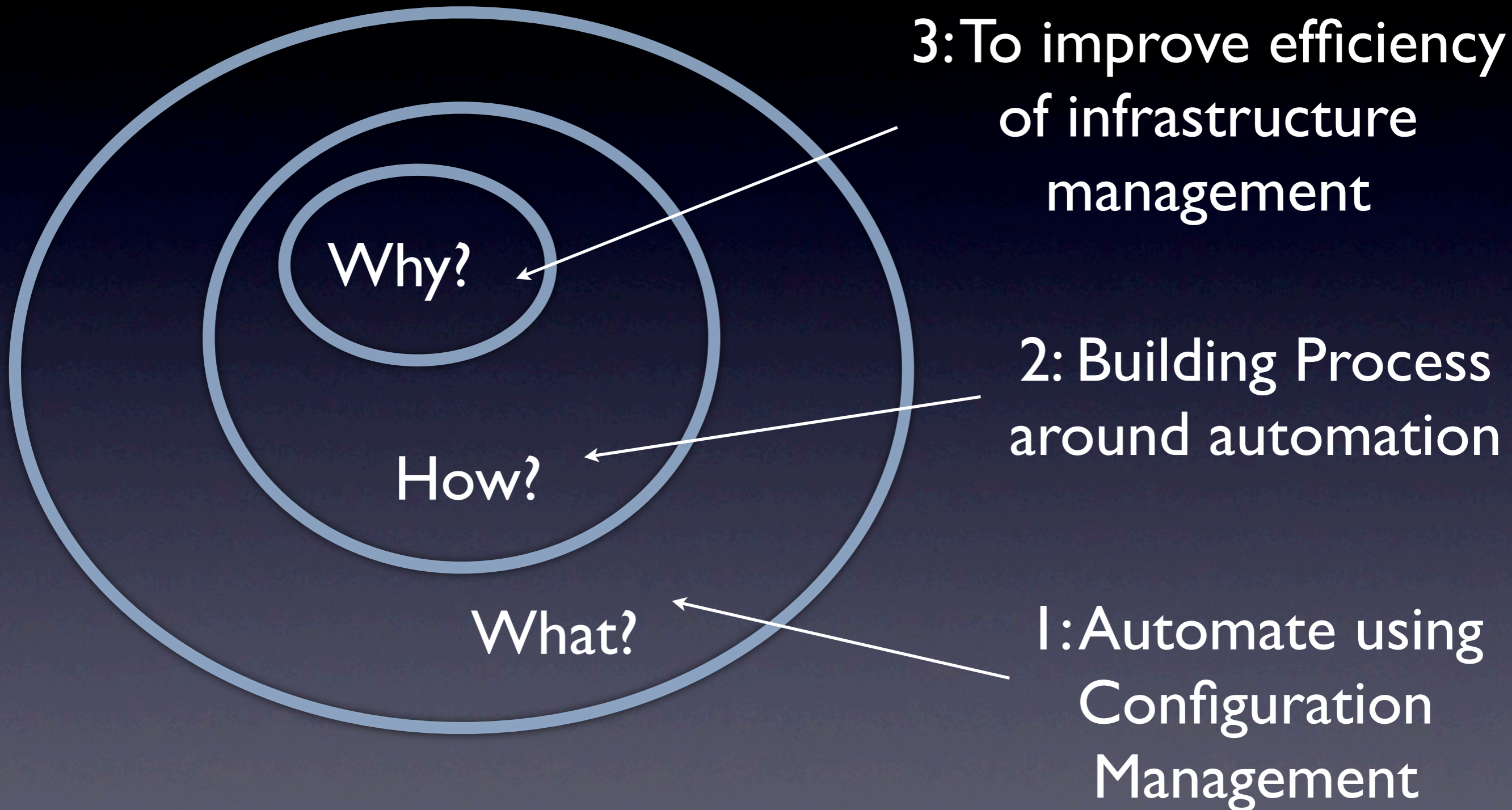Rational Thought & Language)

# Golden Circle in DevOps

Why?

How?

What?

1: Quality through Collaboration is our motivation

2: Process & Tools is how

3: Build awesome services

# DevOps Done Wrong

3: To improve efficiency of infrastructure management

Why?

2: Building Process around automation

How?

What?

1: Automate using Configuration Management

"Why is the only true source of power. Without it you are powerless."

# Ackoff's 5 Contents of the Mind

| |
|---|
| Wisdom |
| Understanding |
| Knowledge |
| Information |
| Data |

Architect — Wisdom — Insight

Systems Engineer — Understanding — Why

— Knowledge — How to

Jr SA/Support — Information — Who, What, When, Where How much..

Data

# Systems Thinking

| Synthesis | Wisdom | Insight |
| | Understanding | Why |
| Analysis | Knowledge | How to |
| | Information | Who, What, When, Where How much.. |
| | Data | |

# Systems Thinking

- Systems Thinking is concerned with the interaction of the parts to form a whole

- Systems Dynamics is concerned with the feedback loops between the parts

- "A system can not understand itself." -W. Edwards Deming

# Pro Tip #2

DevOps starts with why,
with a holistic vision,
and supports that vision with
process and tools.

Dev

Ops

Should be this.

Dev        Ops

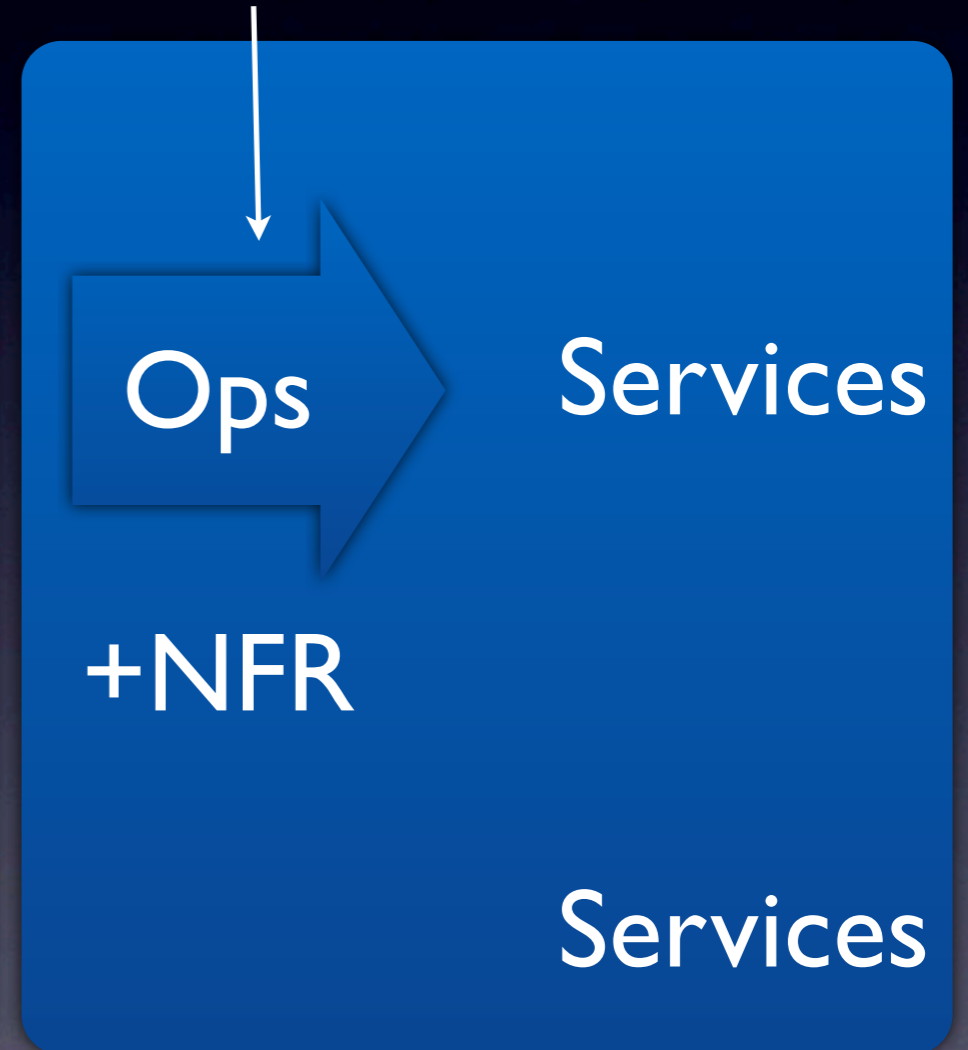The reality is usually this.

# The Value Stream

Requirements  **Dev** →  Software  **Ops** →  Service

# Silo'ed Priorities

Get it out on time, no defects.

Get it up.  Keep it up.  Cheap.

Requirements

Dev ➔ Software

Ops ➔ Services

+NFR

Goods

Services

# Who's responsible for quality?

# What is Quality?

- ISO-9000:  "Degree to which a set of inherent characteristics fulfills requirements."

- Dr. Juran: "Fitness for use."

- Crosby: "Conformance to requirements."

- 6 Sigma: "Number of defects per million opportunities."

And you wonder how we used waterfall so long....

# What is quality really?

- The degree to which a good or service is what the customer expects it to be.

- Examples: The Big Mac, Velveeta, Steak

# Quality Software

- Does what it purports to do

- Is intuitive and easy to use

- Is quick and responsive; given the task

- Observable ("Whats it doing?!")

# Quality Service

- Does what it purports to do

- Is intuitive and easy to use (Friendly)

- Is quick and responsive; given the task

- Observable ("Whats it doing?!")

- Available

- Self-Service if possible

"Efficiency is doing things right; effectiveness is doing the right things."

Peter Drucker

# Pro Tip #3

Quality is a result *effectiveness* of the *interactions* across the entire value stream.

# Agile Manifesto

**Individuals and interactions** over processes and tools
**Working software** over comprehensive documentation
**Customer collaboration** over contract negotiation
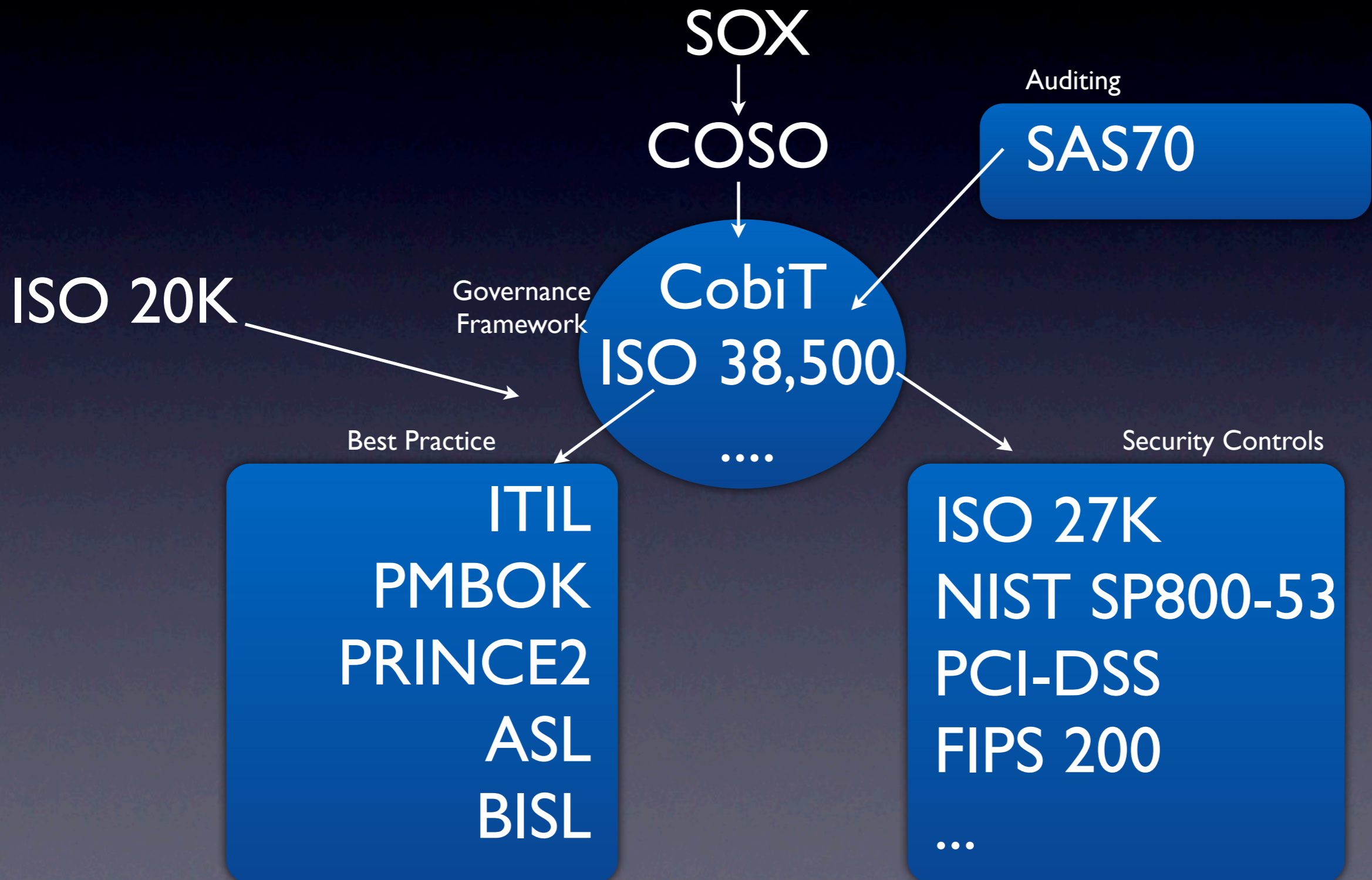**Responding to change** over following a plan

2001

# Agile Advantages

- Non-Prescriptive

- Simple philosophy became an umbrella

- Applies to both the developer and the product management alike

- Widely known and easy to grok.

# IT Service Management

- Control Objectives for Information and related Technology (CobiT)

- Capability Maturity Model Integration (CMMI) for Service

- IT Infrastructure Library (ITIL)

- ISO Standards: 20K, 27001, 38500

- NIST SP800-53, PCI DSS, FIPS 200, TIA-942

# Making Sense of ITSM

SOX

COSO

Auditing

SAS70

ISO 20K

Governance
Framework

CobiT
ISO 38,500

....

Best Practice

ITIL
PMBOK
PRINCE2
ASL
BISL

Security Controls

ISO 27K
NIST SP800-53
PCI-DSS
FIPS 200
...

# Problems with ITSM

- Compliance Driven

- Security Focused

- Complex, Complicated, and Bureaucratic

- Pushed down from the top on already over-burdened staff

- Consultant Heavy

- Hard to grok.  Most info 2nd hand.

# IT Infrastructure Library
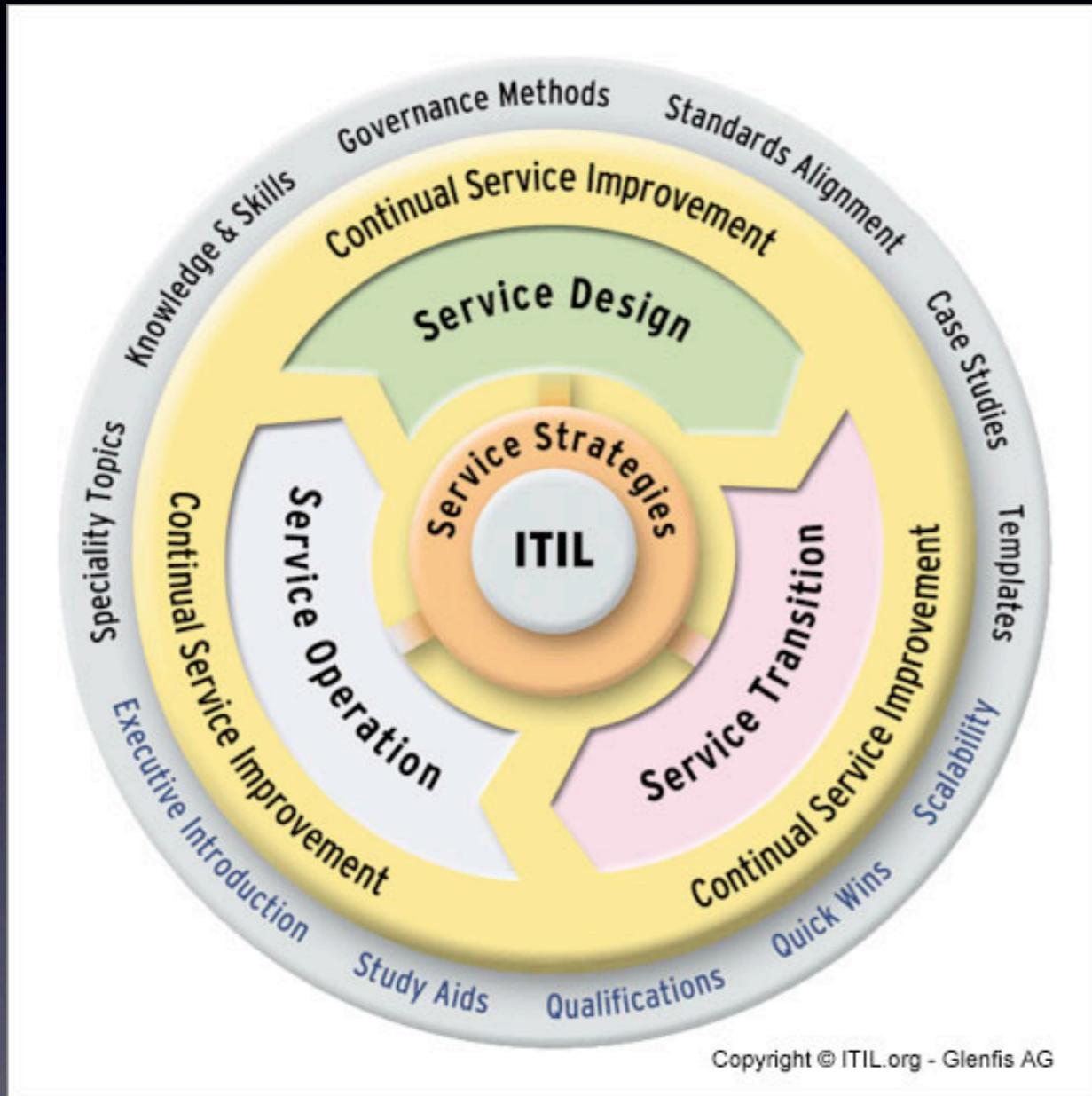
# ITIL Advantage

- Most complete & respected pattern for IT

- Source for Change Management, Event/ Incident/Problem Management, CMDB, etc.

- Provides a common terminology for IT

- Chock full of good ideas! Why reinvent the wheel?

*Guru session on ITIL, Thursday @ 3:30!*

# *Visible Ops*

# The rules don't make RPGs fun...
# the DM does.

It's all about how you use the rules.

# ITSM in Perspective

- No idea should be rejected without consideration

- Don't view it as "all in" or "all out"

- Educate yourself on them (many are free) and use it however is most appropriate for your team/organization

# Ars Gratia Artis

- Art for the Sake of Art

- Only satisfies a select few


The Fountain by Marcel Duchamp

# Pro Tip #4

Agile & ITSM are both sources from which to draw strength, but never at the expense of your vision.

# Cloud Changed the Game

# IT Paradigm Shifts

- Virtualization stops being about consolidation and begins enabling self-service, automated infrastructure without bare metal constraints

- HPC becomes less interesting

- Role of the OS changes

- Broad platform standardization becomes realistic

# Dev Paradigm Shifts

- Dev can bypass IT at will

- Dev has more experience with the APIs that drive cloud than IT (typically)

- The Great Leveler; anyone can be a player

- SCRUM, Continuous Integration, etc. speed up rate of deployment

# "The Rift" Surfaces

- Increased awareness of IT and "Web Operations" sub-culture rift

- Migration of services from heavy iron into virtualized environments changes more than expected

- Over-specialization becomes an issue

- X86 Management is different

# Rise of the Tools

- Commercial & Open Source "Build your own cloud" solutions speed up

- Puppet & Chef arrive alongside CFengine to tame the new complexity

- "Infrastructure As Code" starts looking realistic, as tools are more about CM than deployment

- SaaS allows IT teams to offload undesirable or complex components. (ex: PagerDuty)

# Vagrant

- Create test/dev environments on your laptop

- Configure with CM

- An excellent method for using Operations "Infrastructure as Code" to empower dev, ops, qa, etc.

# Pro Tip #5

The Cloud is here to stay,
and its awesome.

Contrary to popular belief, it will
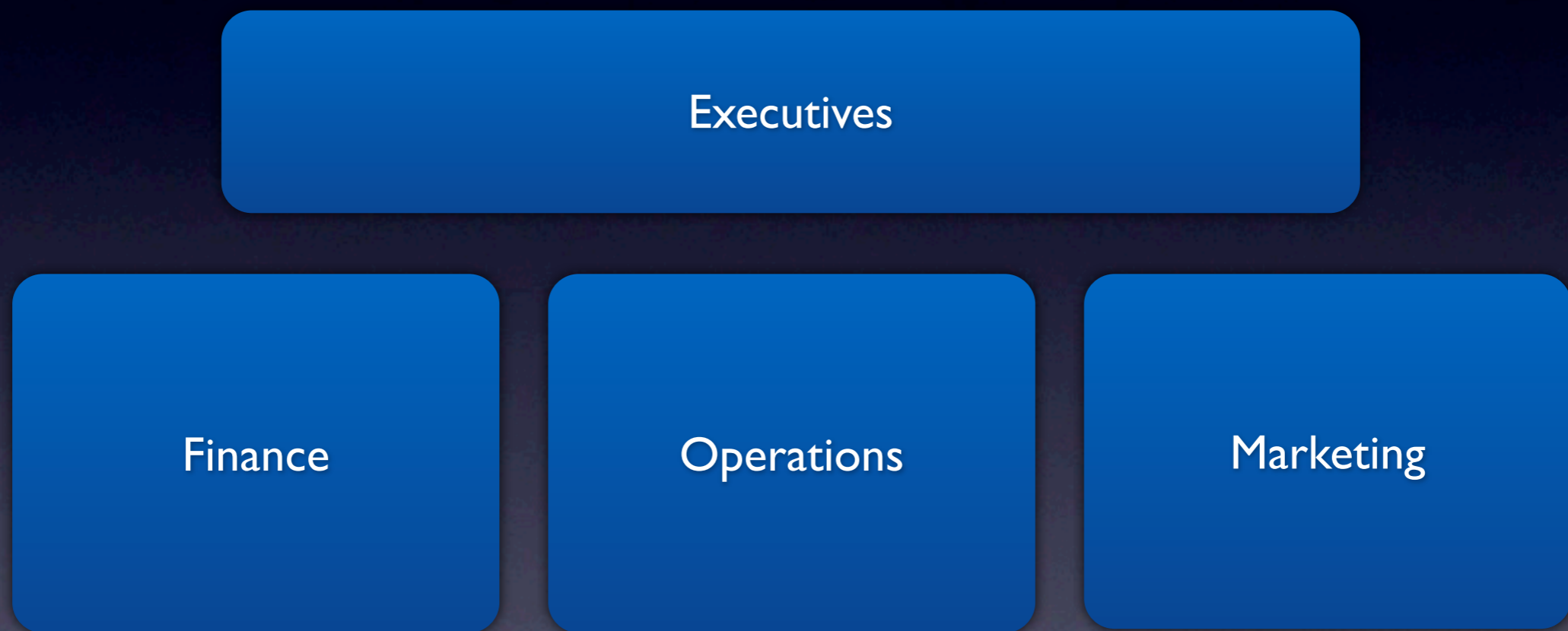generate MORE demand for SA's,
not less.

# Operations Management

"Operations management is an area of management concerned with overseeing, designing, and redesigning business operations in the production of goods and/or services."

Wikipedia

# OM Subjects

- Operations Strategy

- Product & Service Development

- Project Management

- Process Measurement

- Financial Analysis

- Quality Management

- Forecasting

- Wait-Line Theory

- Scheduling

- LEAN

- Six Sigma

- TOC ...and more.

# A Brief History of Operations Management

*Understanding the genesis of the ideas we now take for granted as common sense.*

# Fredrick Winslow Taylor



- "The Principles of Scientific Management" (1911)

- Applied scientific method to work.

- Generally blamed for everything.

# Henry Ford



- Father of "Mass Production"

- Built the Model T from 1908 ($850, $20K) to 1927 ($290, $3K).

- No formal education, worked at Edison Co from 1891 to 1899.

# Alfred Sloan

- President of GM in 1923

- Did for big management what Ford did for manufacturing

- Involvement with MIT later became the Sloan Business School.

- BS EE from MIT

# Sakichi Toyoda



- Started Toyoda Automatic Loom Works 1927

- Invented Jidoka (autonomous automation) [Fault Management], and "5 Whys"

- Started making cars in 1933

# W.A. Shewhart



- Invented PDSA Continuous Improvement Cycle

- Worked at Bell Labs from 1925 to 1956

- Father of Statistical Process Control

- PhD in Physics

# W. Edwards Deming



- Student of Shewhart

- Sent to Japan after WW2 and taught the Japanese (1950)

- Father of the Quality movement

- Ignored in US until late 1970's

- BS EE, MS/PhD Math

# Taiichi Ohno

- Created the Toyota Production System in late 1940's, refined through the 1950's

- Father of Just-in-Time, Kanban, etc.

- Learned from Ford's book "Today & Tomorrow" & Deming

# Shigeo Shingo



- Technical man behind TPS

- Father of SMED, Poka-Yoke ("mistake-proofing"), "Zero Quality Control", etc.
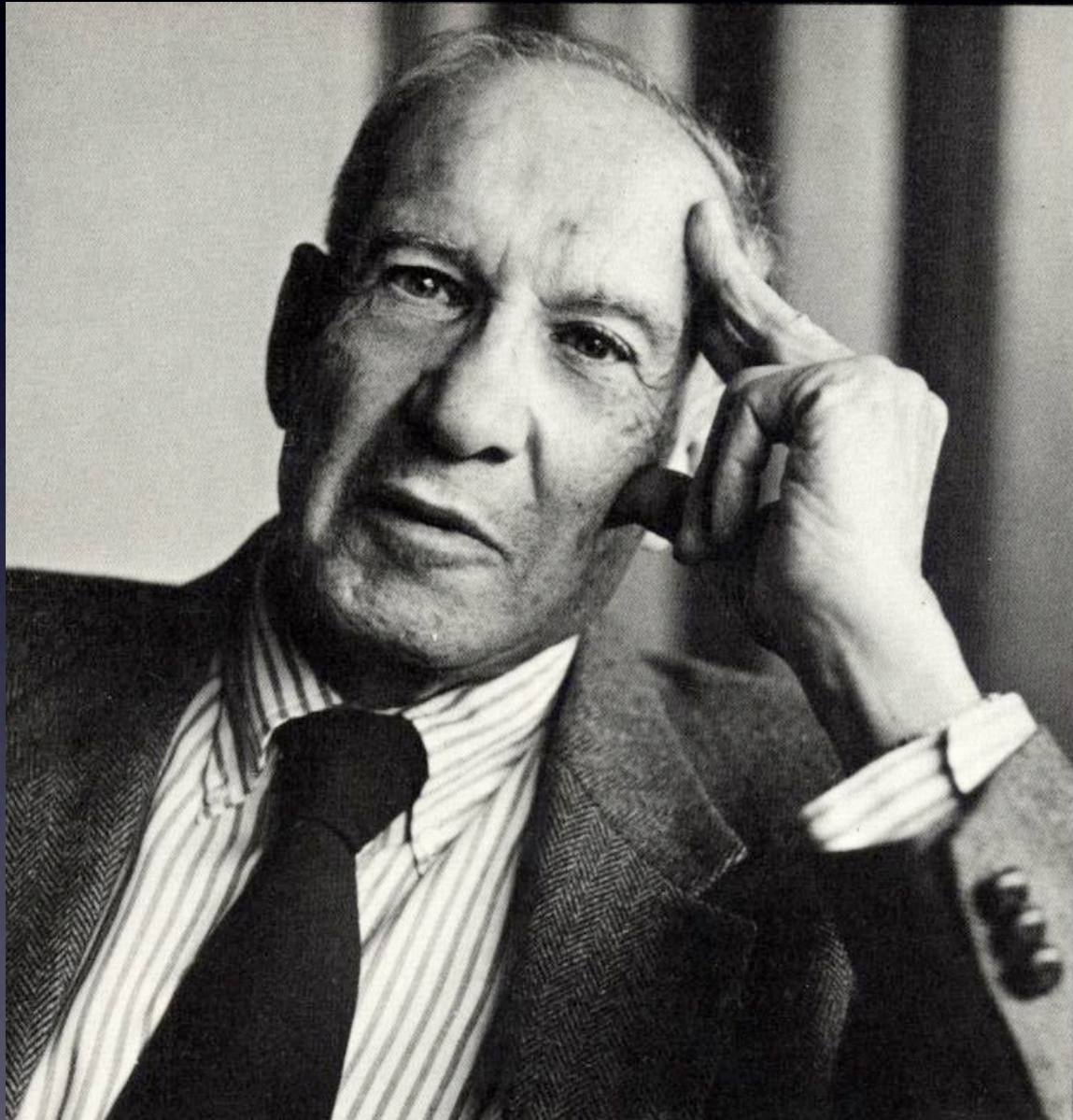
Damon Edwards                    Israel Gat

http://dev2ops.org/blog/2011/8/11/full-video-of-israel-gat-interview-agile-in-enterprise-devop.html

# Peter Drucker



- Father of Modern Management

- Wrote 39 management books between 1939 and 2005

# Ludwig von Bertalanffy

- Father of Systems Theory

- Wrote "General Systems Theory", published in US following WW2.

# Russell Ackoff



- Friend of Deming

- Pioneer in Operations Research (OR) in 1957 and Systems Theory

- (imho, the Feynman of OR)

- BS Architecture, PhD Philosophy of Science

# Armand V. Feigenbaum



- Coined the term "Total Quality Control" (1961), which later became "Total Quality Management" (TQM)

- Together with Deming and others ideas, became basis for ISO-9000

- PhD Econ MIT

# The US Decline

- 1973 Oil Crisis deals a nasty blow to the US Mass Production system

- Japanese weather the storm thanks to Kanban (Just in Time; Toyota Production System)

- In 1980's Japanese quality puts US to shame

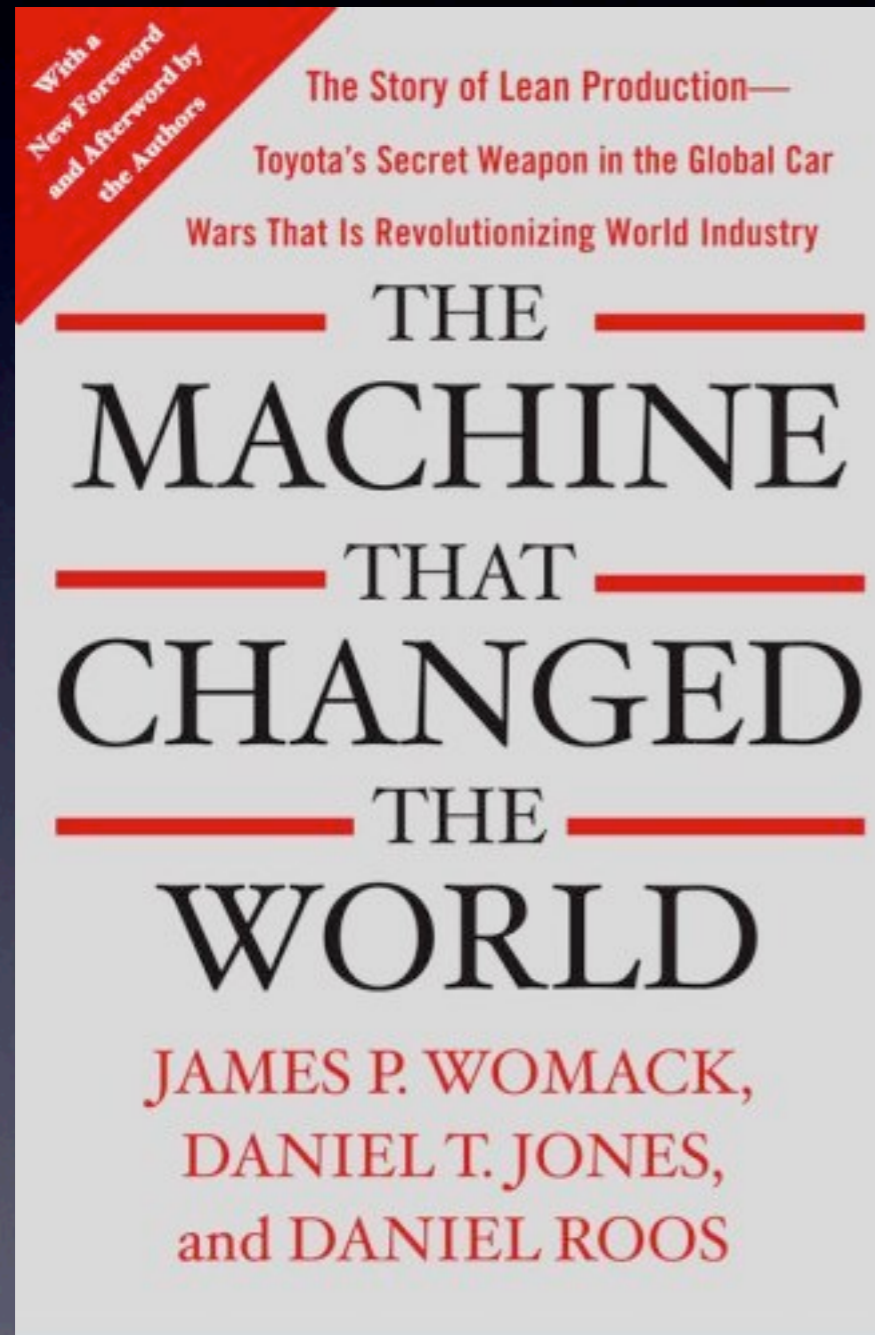- Deming in NBC documentary in 1980, publishes first book in 1983

# Eliyahu Goldratt
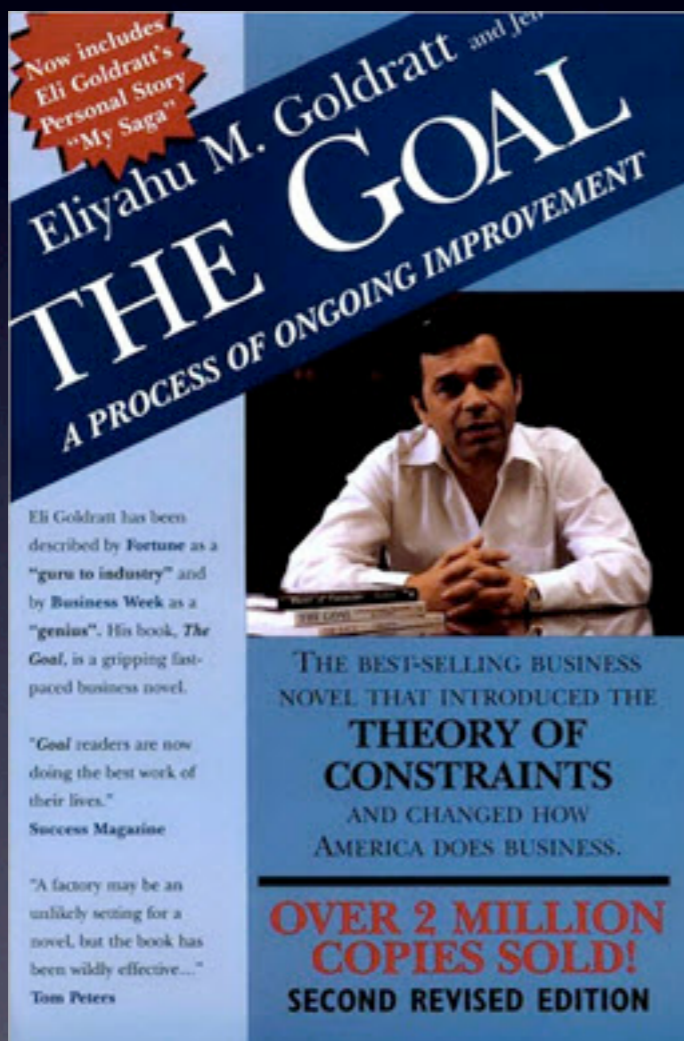


- Created the "Theory of Constraints"

- Published in his novel "The Goal" (1984)

- Applied TOC to other areas such as project management ("Critical Chain"), sales ("Mafia Offer"), etc.

# James Womack, et al



The Story of Lean Production—
Toyota's Secret Weapon in the Global Car
Wars That Is Revolutionizing World Industry

**THE MACHINE THAT CHANGED THE WORLD**

JAMES P. WOMACK,
DANIEL T. JONES,
and DANIEL ROOS

- Coined "Lean" in 1988 HBR Article.

- Becomes "The Machine that Change the World" (1990) which brought TPS to the masses.

# On the Shoulders of Giants

- There is a continuous chain of ideas being condensed and re-applied again and again throughout the 20th Century.

- Today its largely rolled into "Lean"

- Many of our "new" ideas are not new at all, they are new applications of proven ideas that are simply new to this field.

- Many of the OM pioneers were geeks.
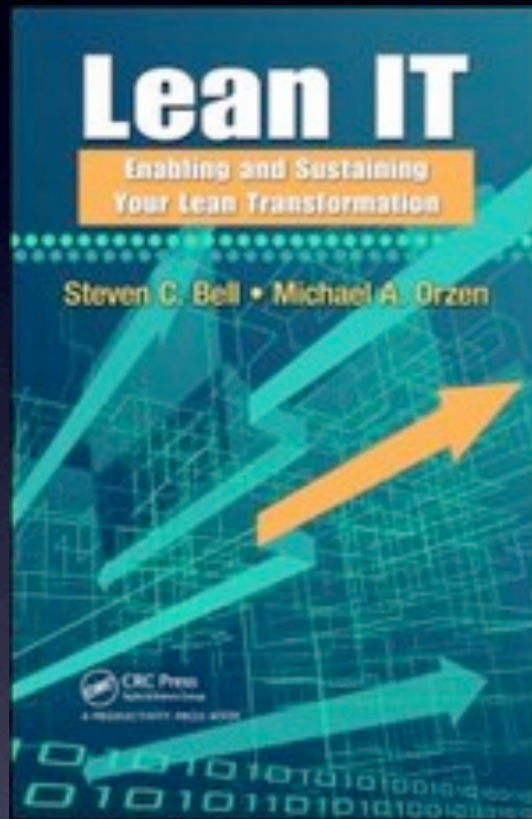
# Pro Tip #6

"Those who cannot remember the past
are condemned to repeat it"

George Santayana

These things aren't going away,
a little education will serve you for years to come.

# The 3 Aspects of DevOps

dev>**OPS**

**DEV**<ops

**DEV**<>**OPS**

# dev>OPS

- Operations centric focus on DevOps

- Adopts "Infrastructure as Code" ideal

- Considers SCRUM, Kanban, and Agile Operations Concepts

- Gets serious about metrics and holistic/ qualitative monitoring

# DEV<ops

- Development centric focus on DevOps

- Adopts continuous deployment

- Embedded metrics and increased focus on operational performance

- Dev's learn about operational challenges

# DEV<>OPS

- Full collaboration between teams

- Boundaries between them blur

- Both teams are accountable, full participation in emergencies and postmortem meetings

- Dev access to prod environment

- Joy.

# Transitioning

- If at all possible, go directly to DEV<>OPS and grow together

- If not, do what you can to set the stage, measure results and make allies to build a case for management support.

# The Most Powerful Tool in the DevOps Arsenal?

# Other Tools to Start

- Office Hours

- Sit together

- Join the other teams meetings

- Ask lots of questions

- Implement the "No Asshole Rule"

- Have fun

# Pro Tip #7

If it ain't fun,
it ain't workin'.

Collaboration of People

Convergence of Process

Creation & Exploitation of Tools

* Measure Everything
* Have a systems view
* Focus on effectiveness & quality
* Learn from others and the past
* Encourage pride of workmanship (fun)

# Thank You.

# Join the Conversation!

Twitter:
@patrickdebois
@botchagalupe
@damonedwards
@allspaw
@RealGeneKim
@jordansissel
@portertech
@lusis     @LordCope
@jamesurquhart
@puppetmasterd
@netik
@atl    @markimbriaco
@adamhjk
@ernestmueller
@ripienaar
@markimbriaco
@MikeOrzenLeanIT

Websites:

http://dev2ops.org
http://devopscafe.org
http://planetdevops.net