

# **Beyond Cloud: Implications for the Industrialization of IT and the 3rd Era of Computing**

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# Key Takeaways

1. Changes in scale drive changes in architecture
2. Cloud Computing = IT + Ford + Taylor + Lean Production for the digital era.
3. Enables encapsulation, re-composition and global distribution, of economically valuable services
4. Sufficiently abstracted services replace work and tasks of existing employees
5. A 3rd Era of computing is already emerging with profound challenges and implications

# Scale & Architecture

1,000s	Mainframe/Mini
1,000,000s	Servers
1,000,000,000s	PC/Mobile
1,000,000,000,000s	IoT
1,000,000,000,000,000s	?

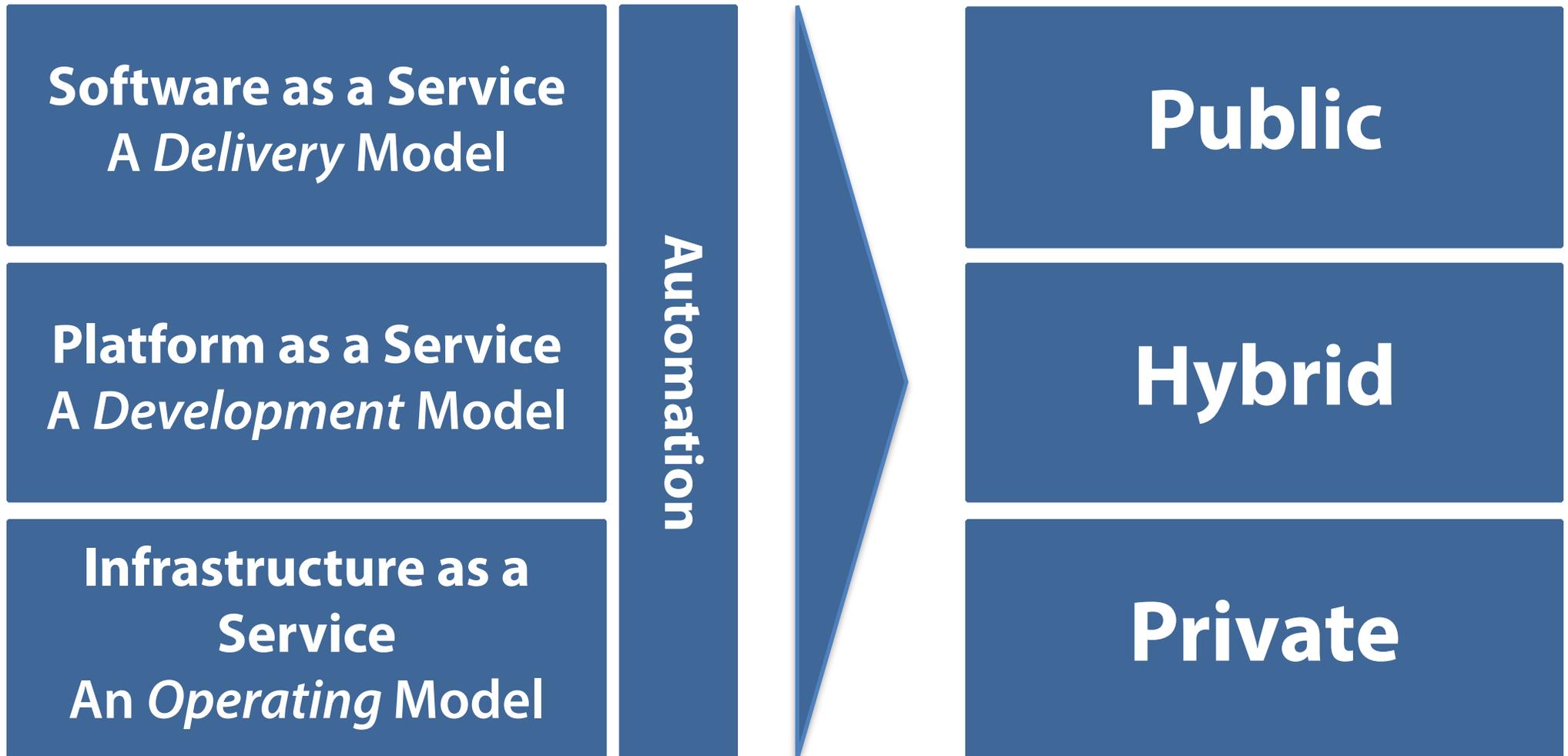
# Cloud Scale Computing

*Cloud computing delivers elastic computing resources - data storage, computation and networking - to users at the time, to the location and in the quantity they wish to consume, with costs based only on the resources used.*

- Scalable, automated, efficient production management capabilities for IT service delivery
- Enabled by 'loosely coupled' computing service architecture, separation of responsibilities and management processes
- Born out of the economic needs of early large scale web service providers: Microsoft, Google, Amazon, Yahoo etc.

\* <http://www.adamalthus.com/blog/2013/03/01/a-short-guide-for-the-perplexed/>

# Cloud Computing = Industrial IT Production



\* <http://www.adamalthus.com/blog/2013/03/01/a-short-guide-for-the-perplexed/>

April 22, 2015, 3:57 PM ET

# EMC CEO Says IT in Midst of Biggest Secular Shift in History

**Superhot startup Docker raises \$95 million as it prepares to squeeze out the competition**

TECHNOLOGY / GLOBAL

**VMware Responds to Container Movement with Lightweight Linux OS and Cloud-Native Tools**

3 DAYS AGO, BY SUSAN HALL

**Google Brings Containers to its Cloud With Hosted Kubernetes**

**Microsoft reveals Azure Service Fabric, platform behind Cortana and more**

Software already battle-hardened, used to run Cortana, Lync, Azure SQL.

**Container wars: Microsoft debuts its Windows-based answer to Kubernetes**



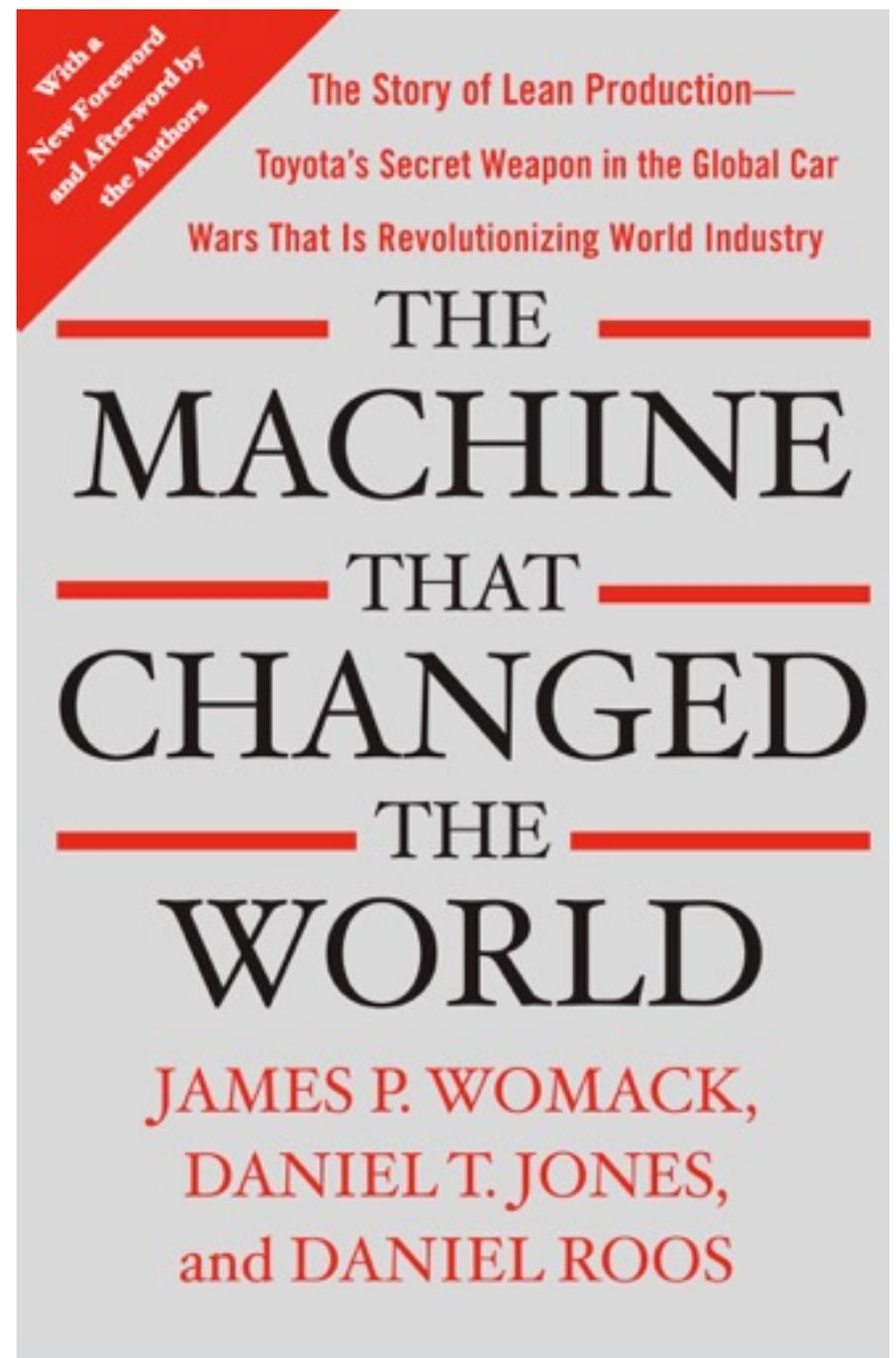
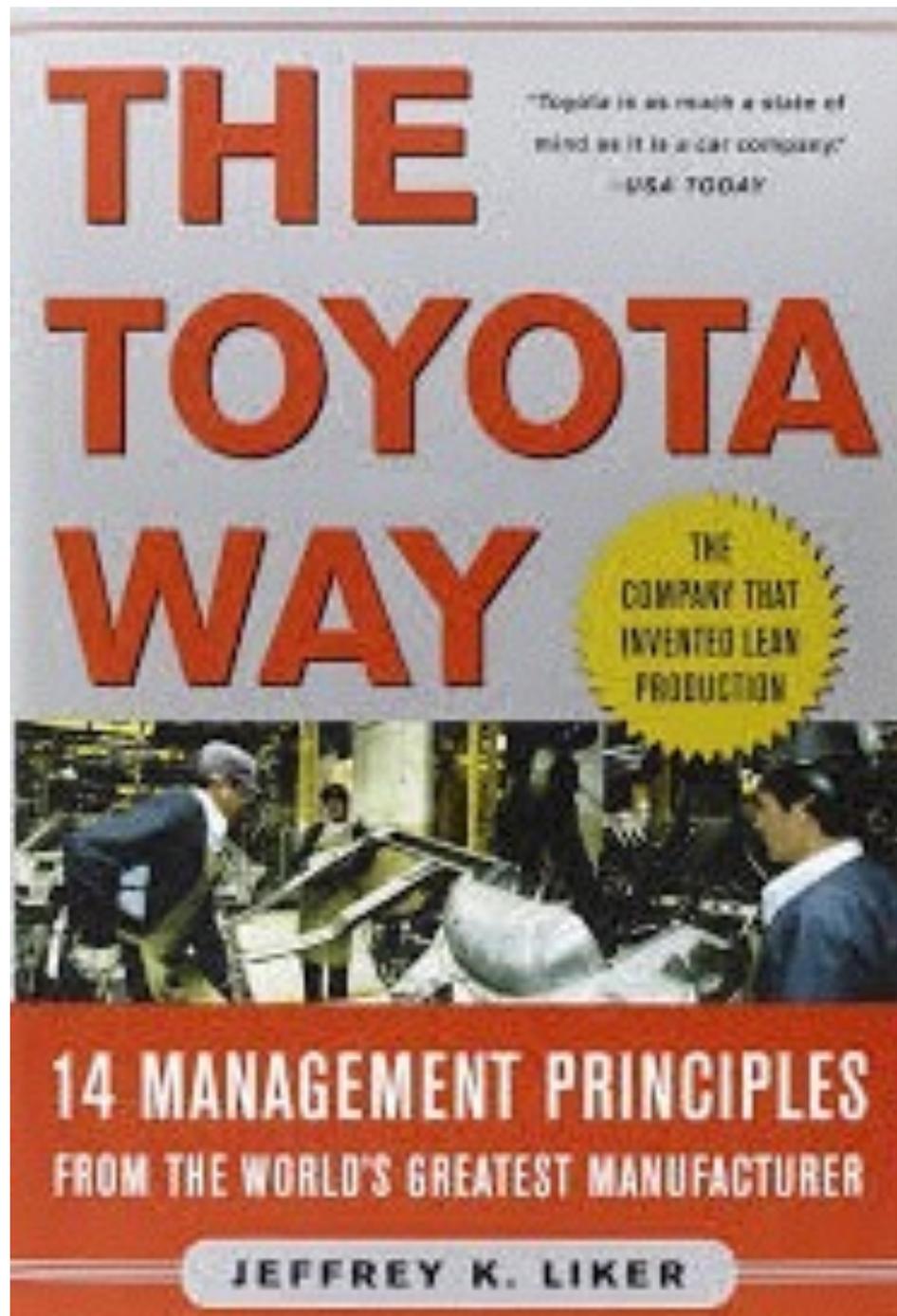
# Craft IT



A high-angle, wide shot of a modern automotive manufacturing plant. The floor is filled with yellow robotic arms, likely KUKA or similar, positioned around car chassis. The robots are in various stages of assembly, with some appearing to be welding or painting. The background shows a complex network of steel beams, pipes, and other industrial equipment, creating a sense of a large-scale, automated production environment. The lighting is bright and even, highlighting the metallic surfaces of the cars and robots.

# Industrial IT





# Why Industrialized IT?

- Firm and sector level productivity has greatly improved as a result of investments in IT, but...
  - Growth in IT investment has lead to an exponential growth in IT system complexity
  - Increasing complexity reduces the efficiency of physical IT and human capital
  - IT function productivity has not improved
  - Explosion in business demands on IT function

# Benefits of Industrialized IT

- Efficient utilization of physical IT and human capital
- Accelerated Time-to-Value
- From discreet to continuous production processes
- Decomposition of IT/Service value chains
- Abstraction and encapsulation of services
- High velocity, low cost experimentation
- Rapid innovation and efficiency improvement cycles

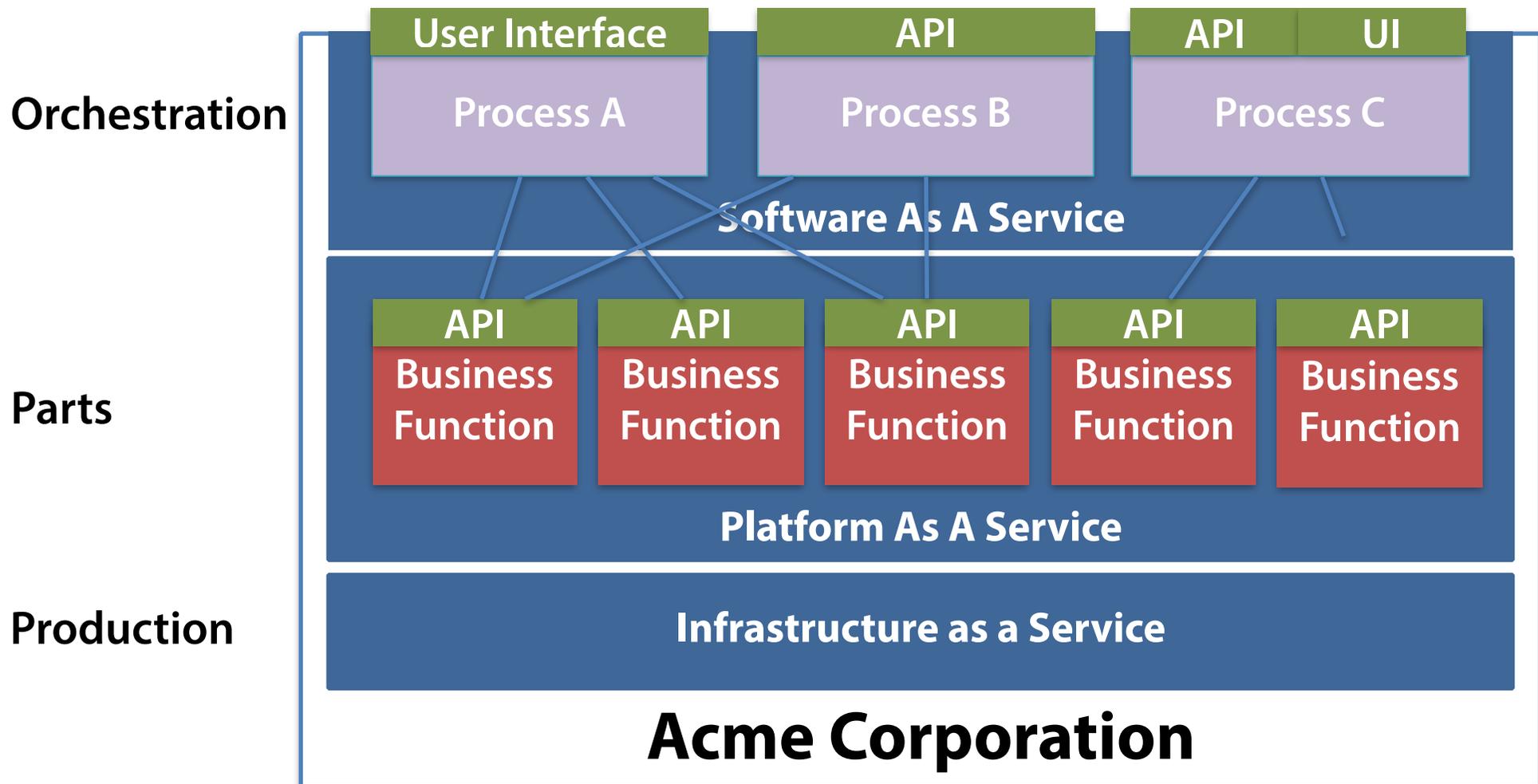
# Composable

*\kəm-ˈpōz-ə-bəl\*

Of being constructed from parts

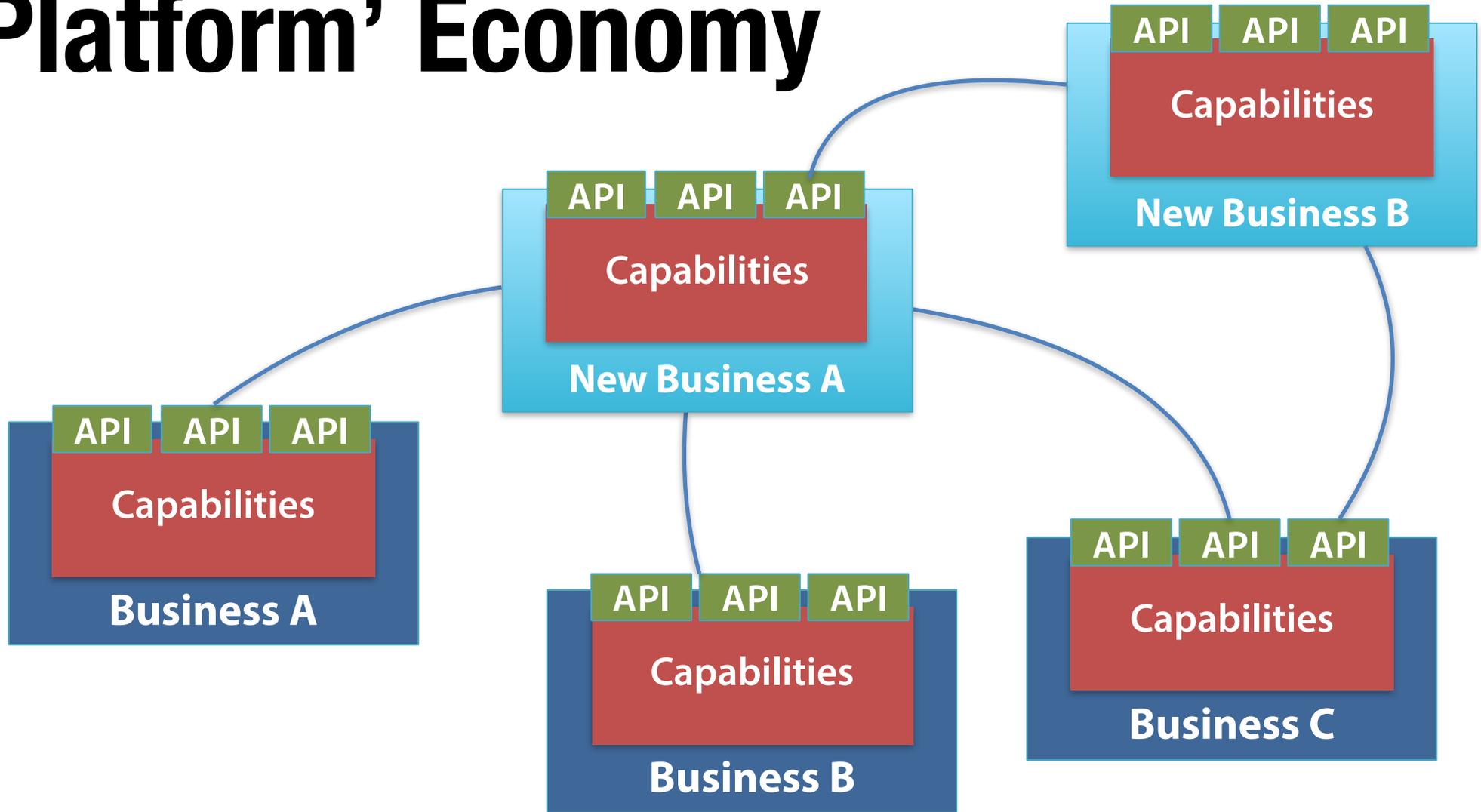


# The Composable Enterprise\*

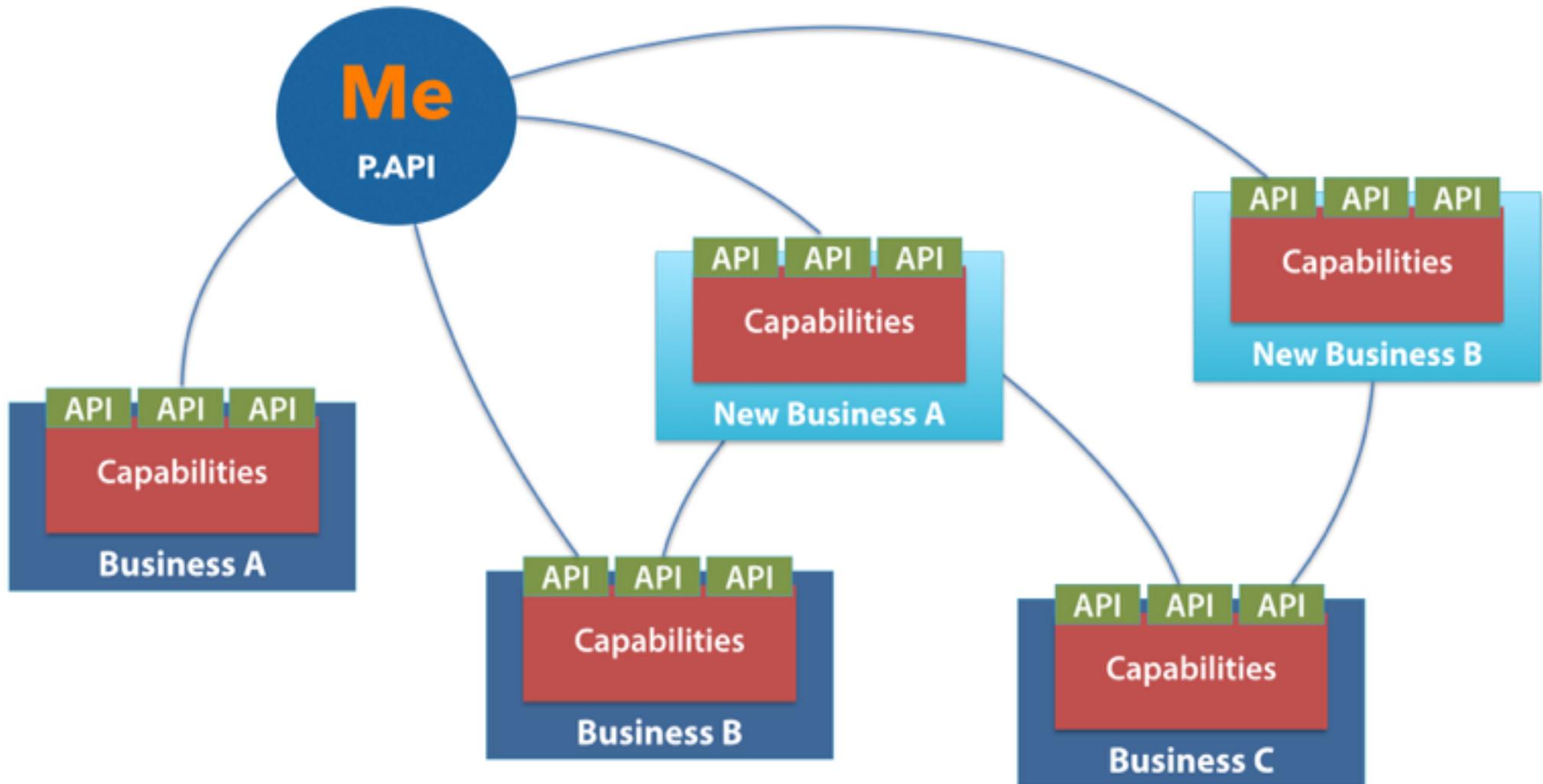


\* <http://www.adamalthus.com/blog/2013/04/04/the-composable-enterprise/>

# Enabling The Composable 'Platform' Economy



# Integrating a Composable Me



# The Next Computing Era

1st Era

Tightly coupled

2nd Era

Loosely Coupled

3rd Era

Uncoupled

# Metaform\*

*\ 'mā-tä-'förm \*

A platform of platforms

\* <http://www.adamalthus.com/blog/2015/01/08/the-metaform-the-platform-of-everything/>



# 3rd Era Requirements

- Uncoupled execution everywhere
- Smart contracts
- Trusted Transactions
- Friction-free payments
- Private data
- Efficient data processing for IoT volumes

# 3rd Era Enabling Technologies

- **OpenStack & Azure Fabric Services** - Infrastructure for Industrial IT
- **Docker + Kubernetes/Mesos** - Reducing skills required and time to deliver applications and services at scale
- **AWS Lambda & Code Deploy** - Data/Event driven code execution everywhere
- **Apache Storm, Spark, Mahout** - Industrial strength OSS real-time BigData processing and machine learning
- **Blockchain & Ethereum Project** - Fabric for secure, trusted and anonymous distributed service execution

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