Architect's Reality Check

TSensors Summit

November 13, 2014

CUBICON

ENABLING INTELLIGENT EVERYTHING

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CEO & Founder
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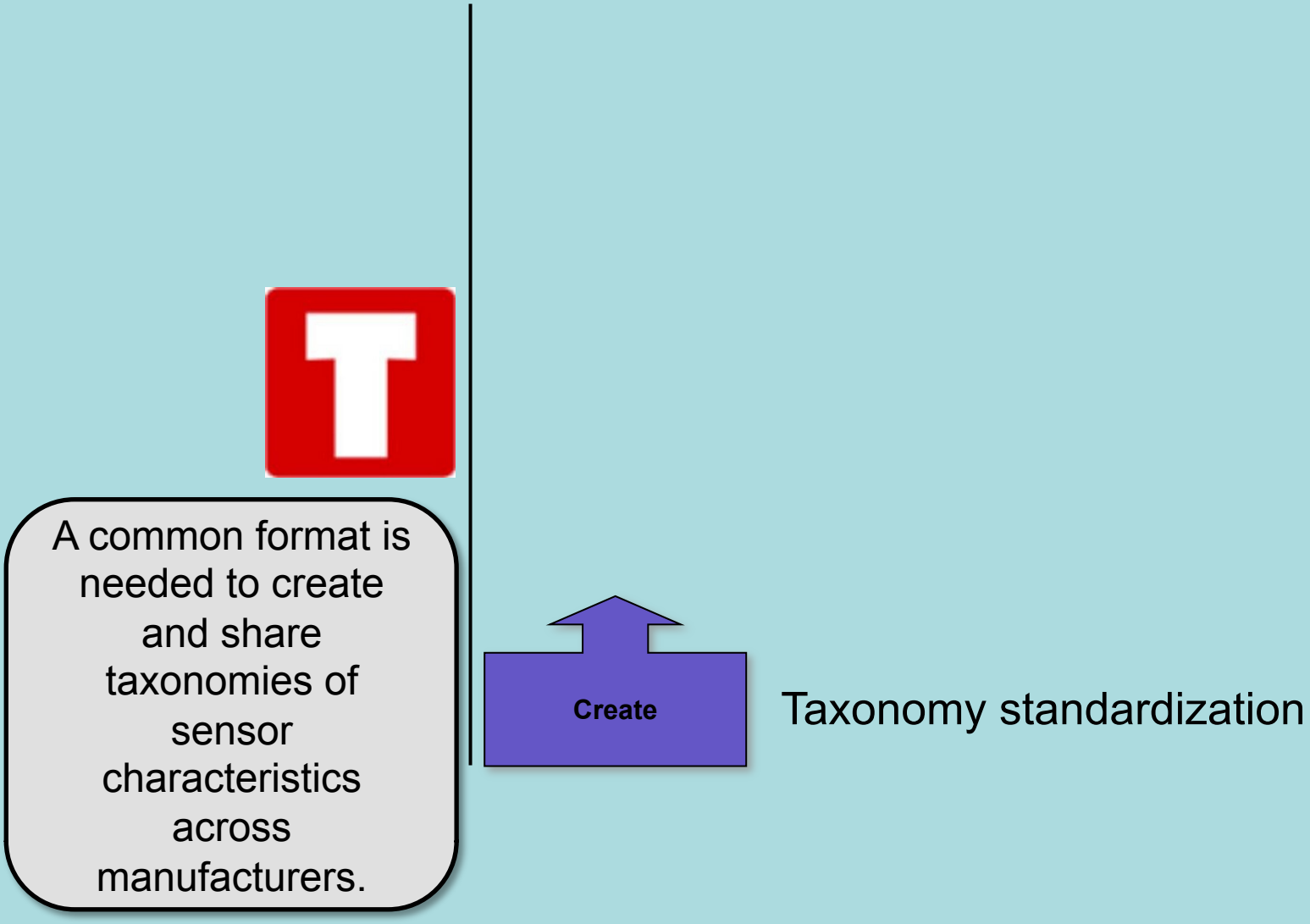
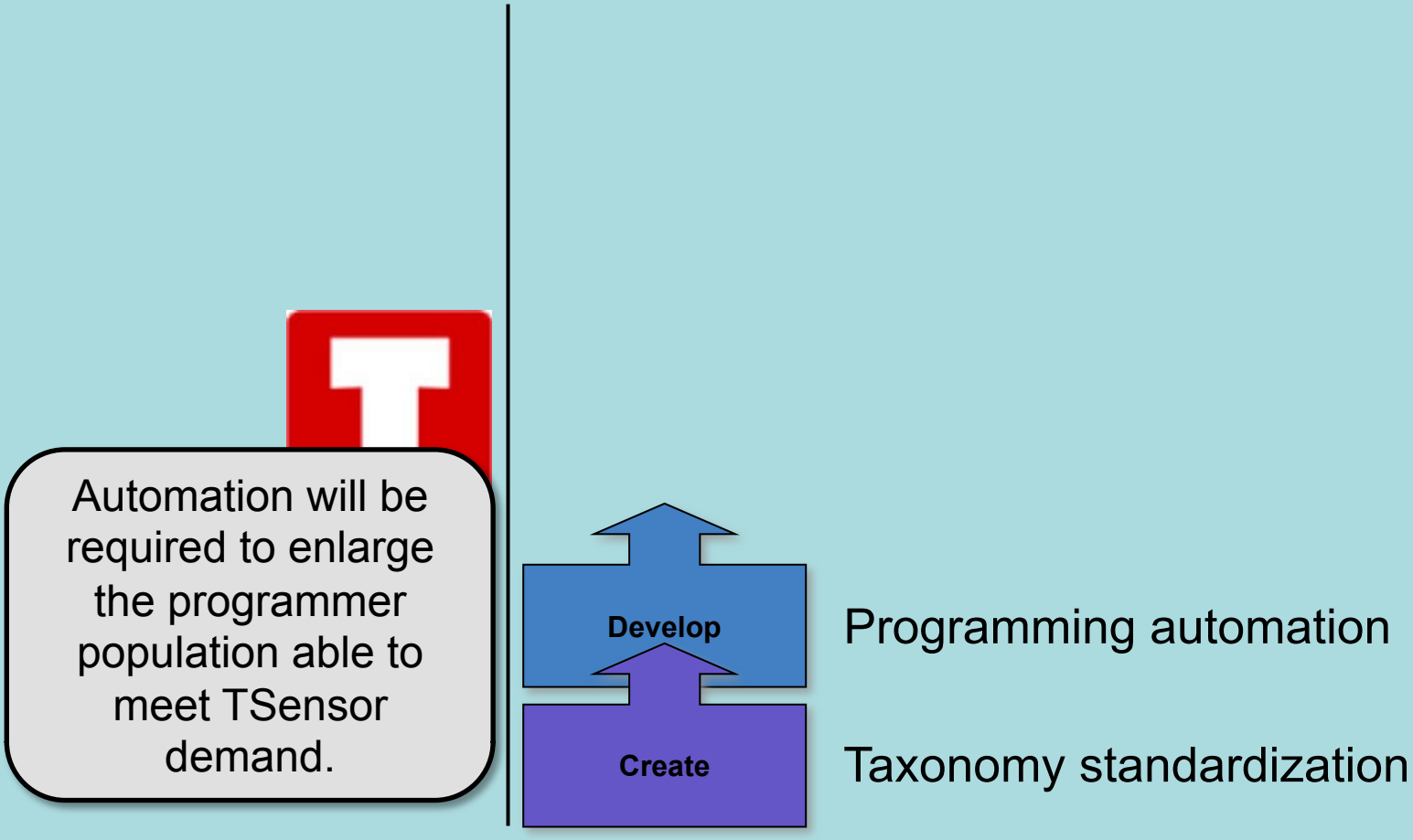
Cathy Kobre

What it really takes to support TSensors from a software perspective

TSensor Software Requirements

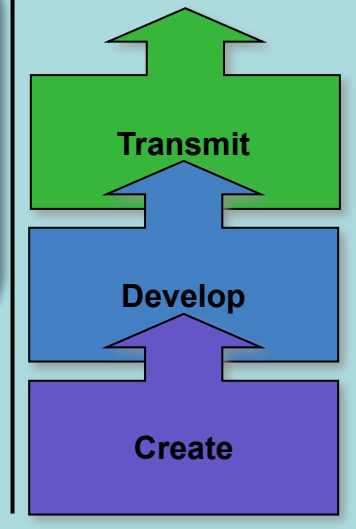


TSensor Software Requirements



TSensor Software Requirements

Network latency will require global synchronization of events generated by geographically distributed sensors.



Timing synchronization

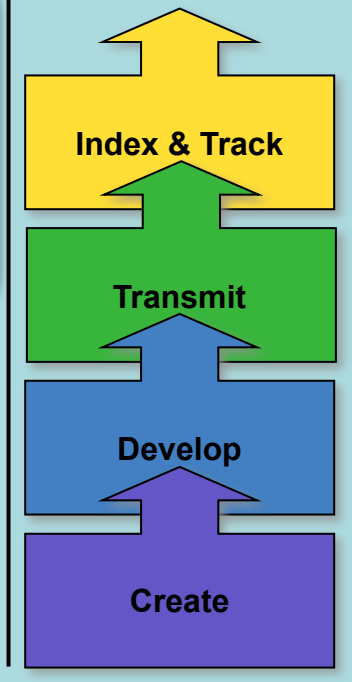
Programming automation

Taxonomy standardization

TSensor Software Requirements

Indexing is required for Sensor-as-a-Service discovery.

Tracking is required to monitor service consumption.



Service discovery and monitoring

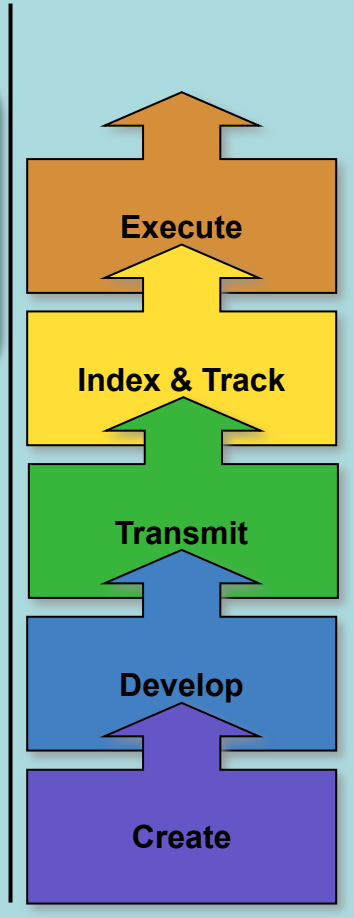
Timing synchronization

Programming automation

Taxonomy standardization

TSensor Software Requirements

Real-time execution is required to assure deterministic processing of sensor data.



Deterministic execution

Service discovery and monitoring

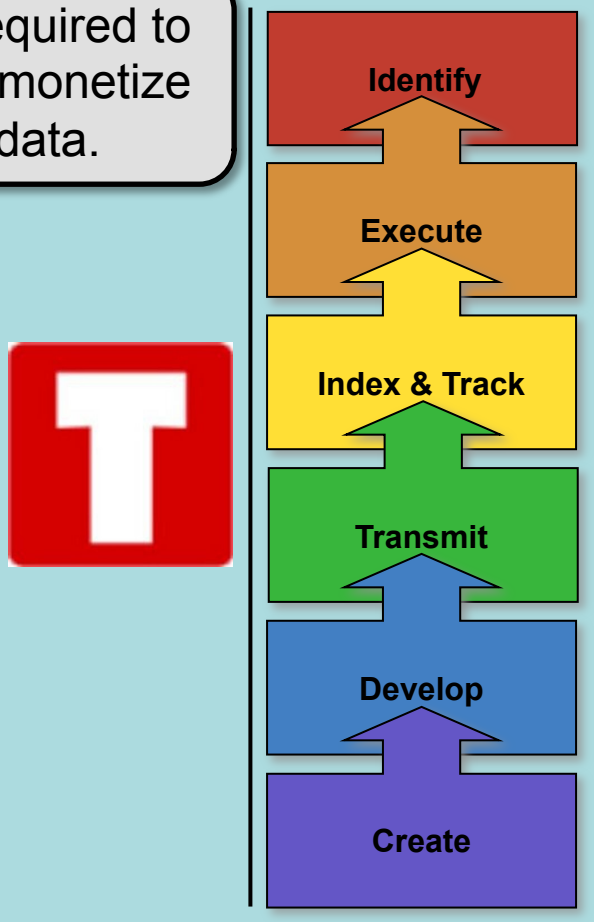
Timing synchronization

Programming automation

Taxonomy standardization

TSensor Software Requirements

Identity is required to secure and monetize sensor data.



Absolute identification

Deterministic execution

Service discovery and monitoring

Timing synchronization

Programming automation

Taxonomy standardization

OBJECT MANAGEMENT GROUP

Industrial Internet Consortium

Accelerating Innovation in Connected, Intelligent Machines and Processes

Accenture
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BlackBerry
Bosch
Canonical Group Limited
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Elecsys Corporation
EMC Corporation
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Fujitsu Limited
General Electric*
Grid Connect Inc.
Hewlett-Packard
Hitachi Ltd
Huawei Technologies Co., Ltd.
IBM*
Intel*
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Water & Process Group (WPG)
Wyconn
Xcaliber Technologies, LLC

*Founding Members

Working Group

OBJECT MANAGEMENT GROUP

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Micron Technology
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MITRE Corporation
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Moxa Inc
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PrismTech
PTC Inc
Purfresh Inc.
Real-Time Innovations
RhoData Corporation
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Synapse Wireless
System Insights
TE Connectivity
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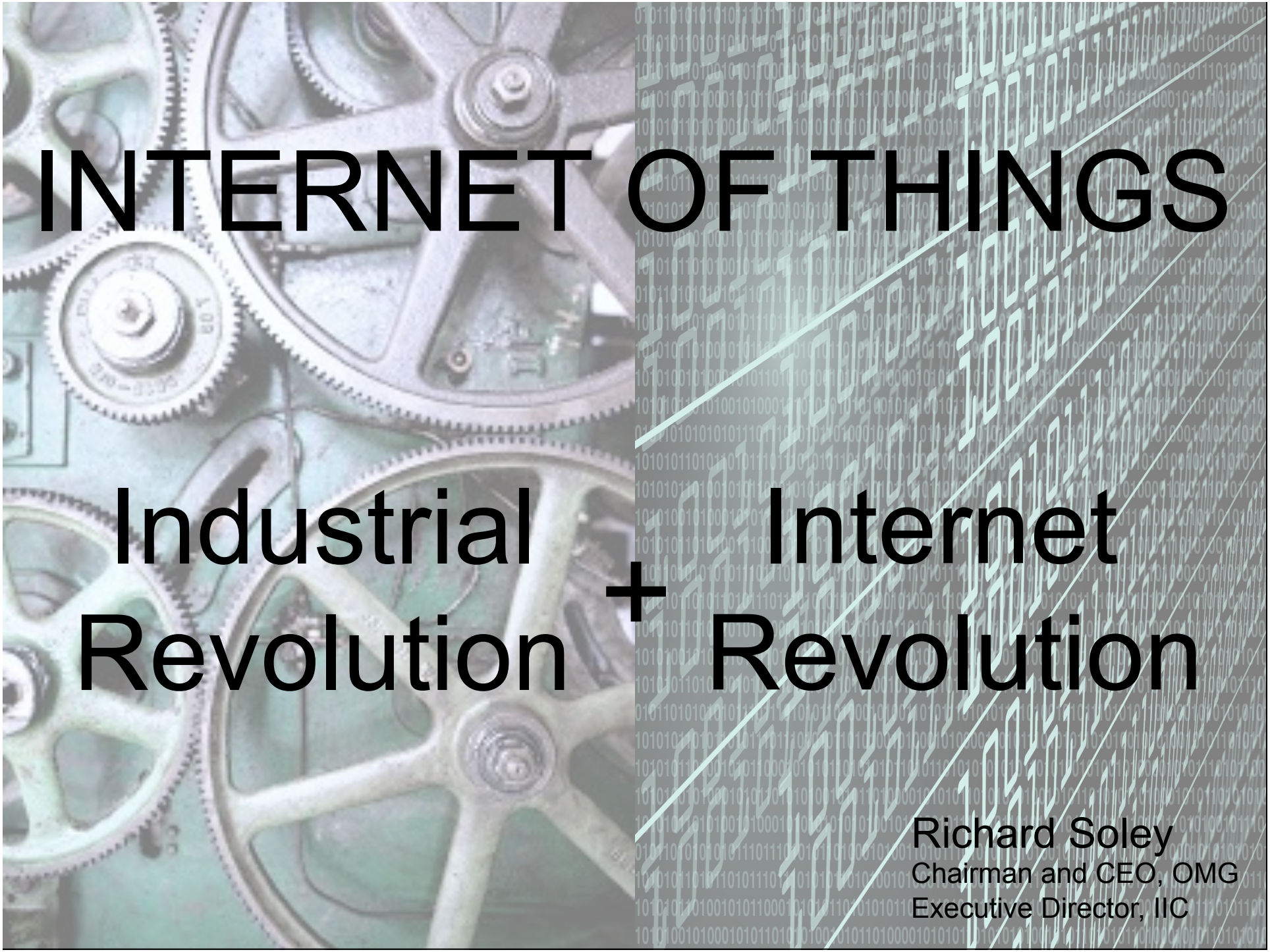
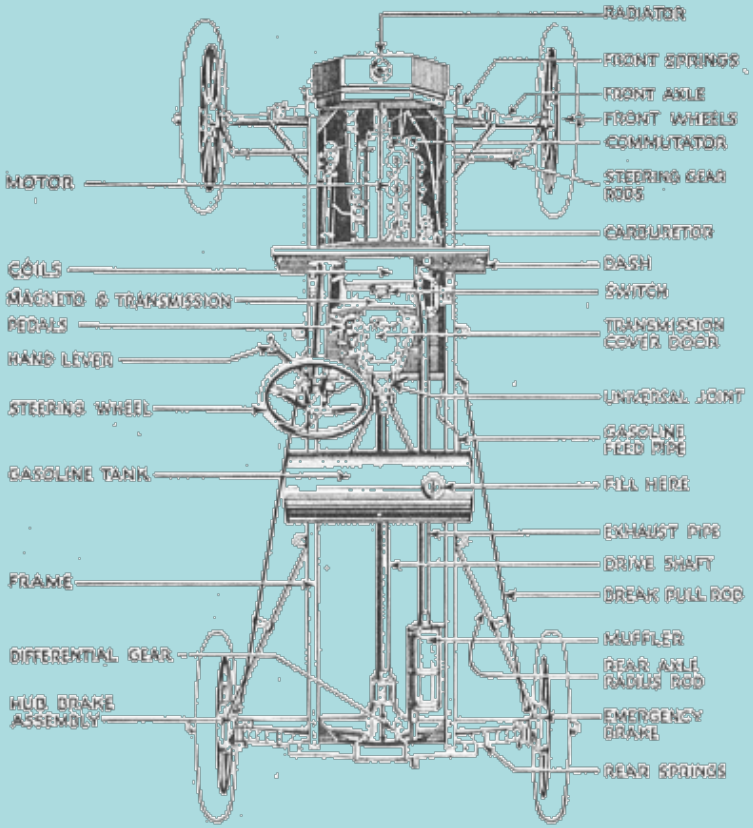

INTERNET OF THINGS
Industrial Revolution
+
Internet Revolution
Richard Soley
Chairman and CEO, OMG
Executive Director, IIC

We can benefit
from lessons learned
during the
Industrial Revolution.

INDUSTRIAL REVOLUTION
Lesson #1

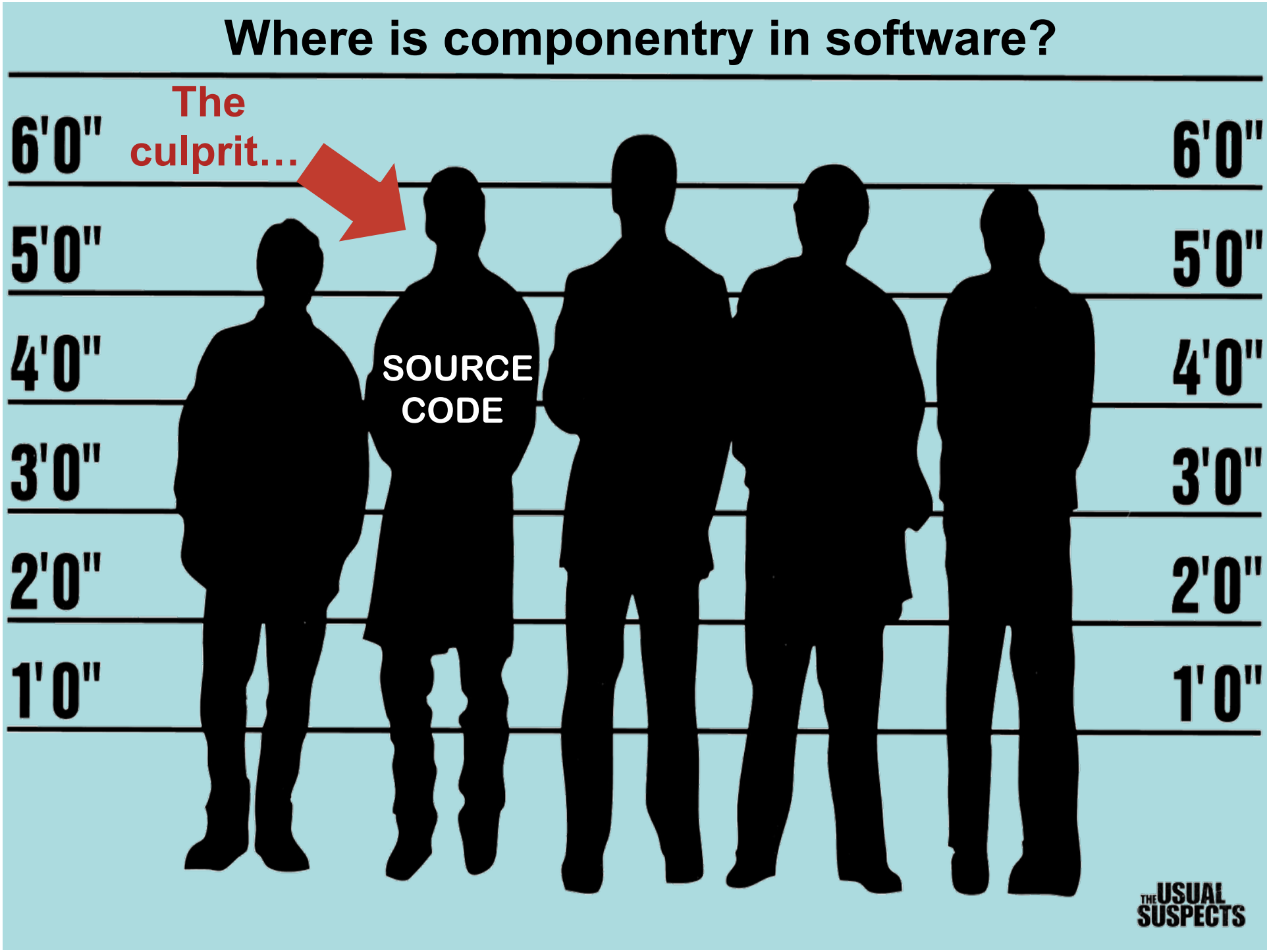
Componentry helped maximize…

- compatibility
- interoperability
- repeatability
- quality
- interchangeability



Ford's Model T Chassis

Where is componentry in software?



THE SOLUTION: Cubicon Component

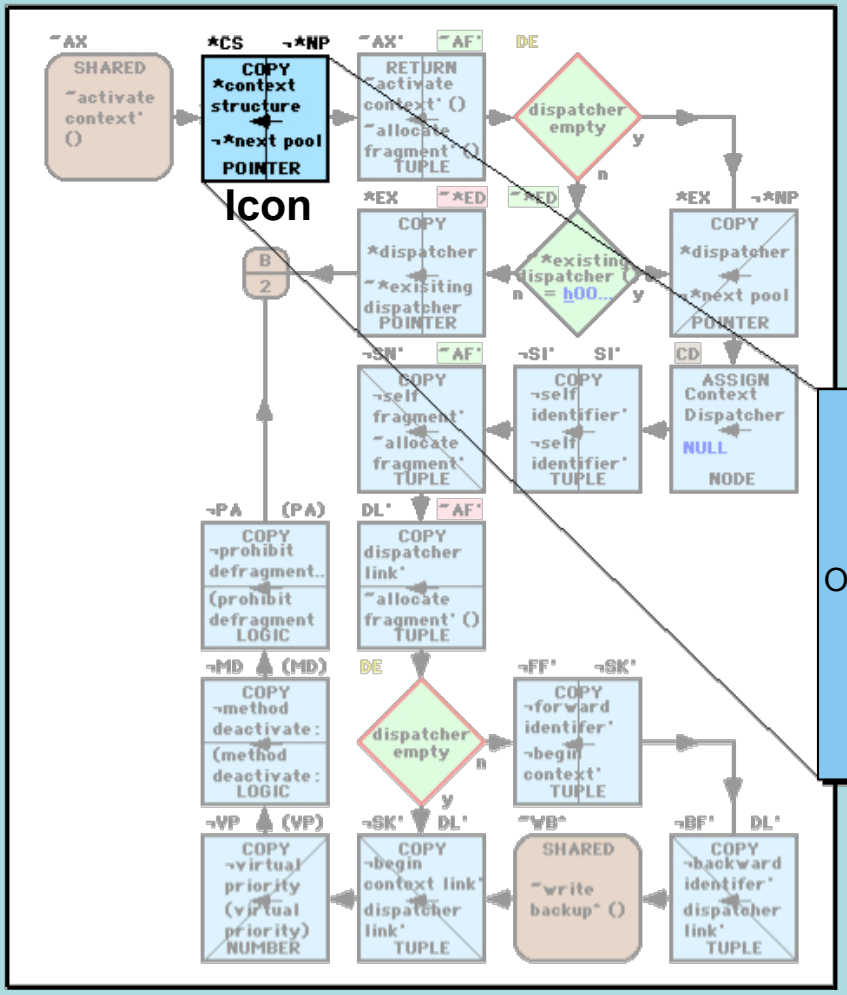
Syntax
expressed in graphics and text

Semantics
represented in binary

A component's expression and representation are fused together like two sides of a coin

Cubicon Component

Syntax -
Human develops

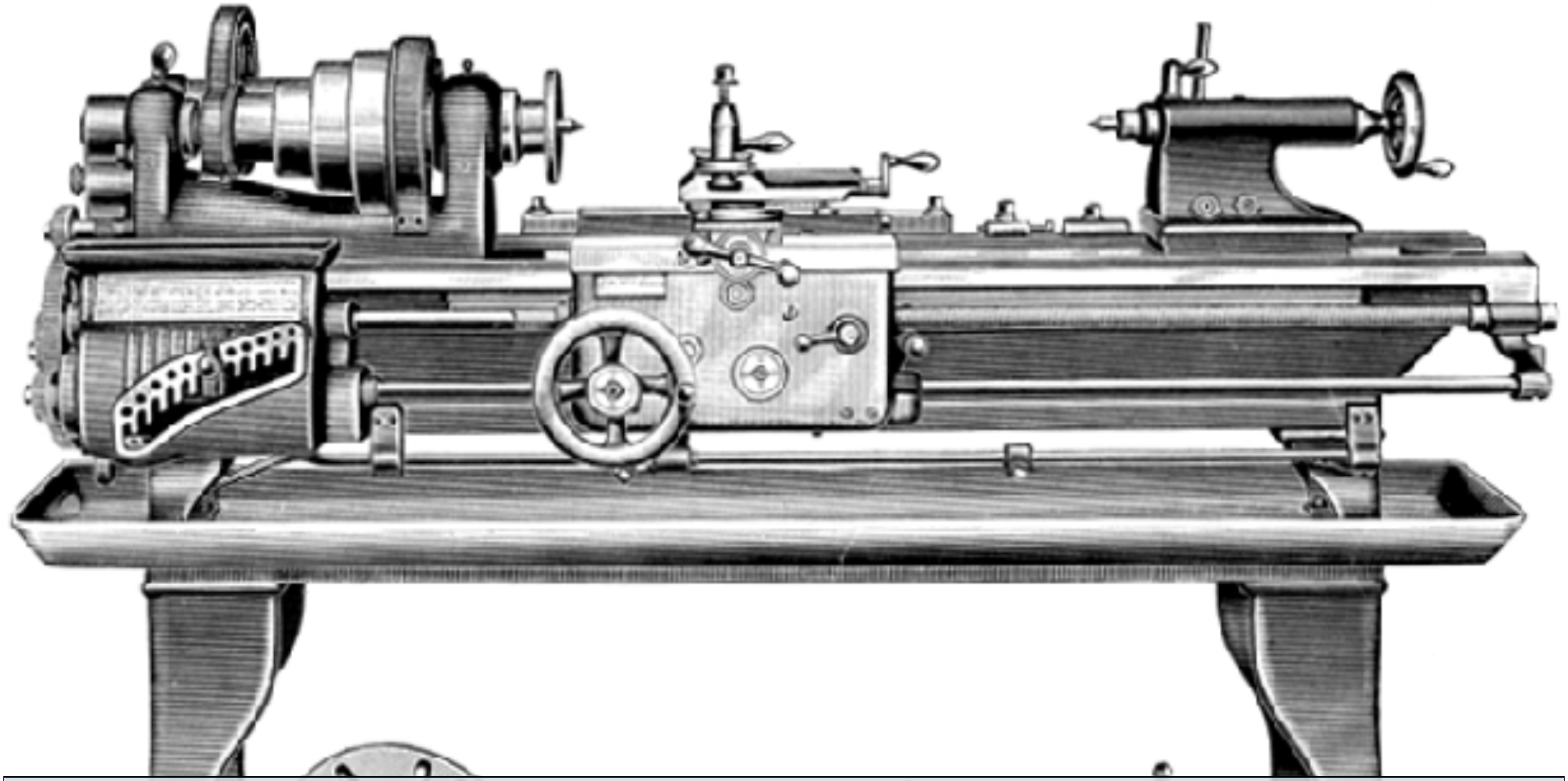


Semantics -
Machine executes

Operation			
	AS	access set status	CLOSED
	BC	"block collection/widget	VAC/STRUCT
	BF	"block form	VACUOUS
	CR	circular reference	*UNSET*
	CL	closure'	¥ID/xIID
	CC	closure call out link	*UNSET*
	CC	collection cardinality	ALWAYS ONE
	CL	Collection Label^	*EMPTY*
	CG	column grid view	4
	CB	component byte size	0
	CS	composition slot form	ROOT 0
	CF	"complex form	ATTRIBUTE
	DE	dependency	NONE
	FA	"facet'	NID
	LT	link transfer: include•exclude	*UNSET*

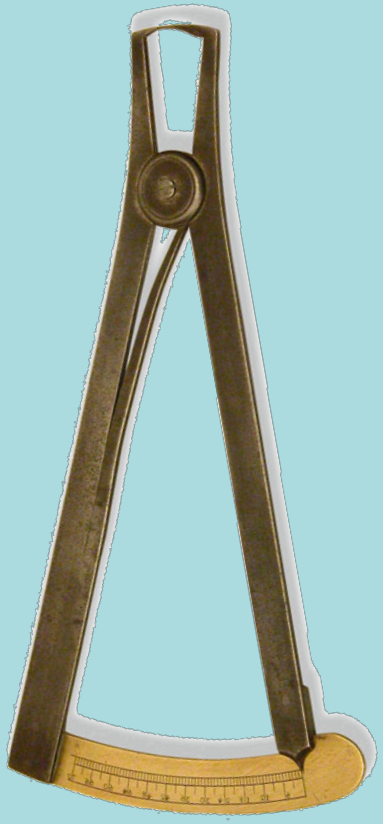
Meta-object slots -
represents characteristics of an icon

MACHINE TOOLS



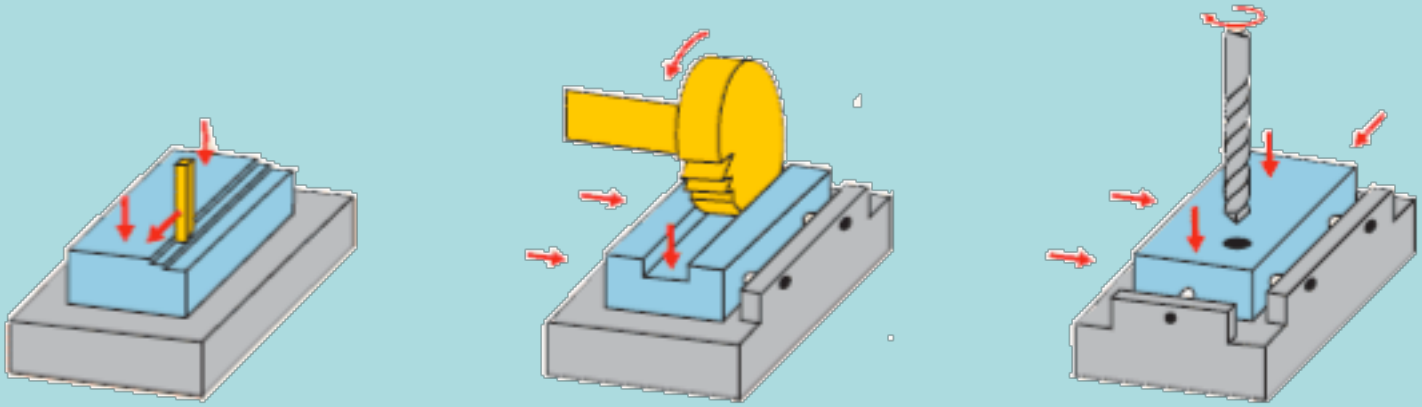
INDUSTRIAL REVOLUTION
Lesson #2

With their inherent precision, machine tools enabled the economical production of interchangeable parts.

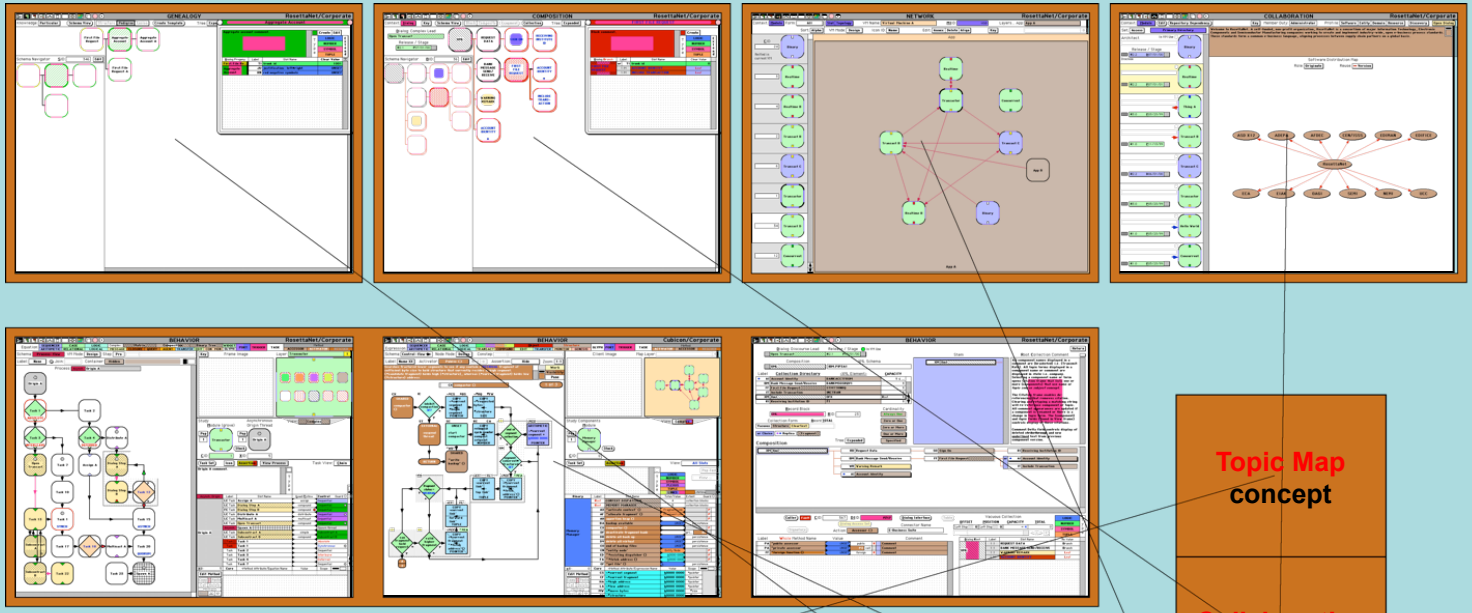


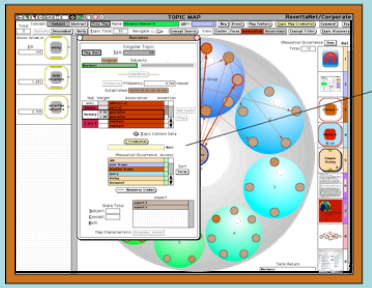
Calipers

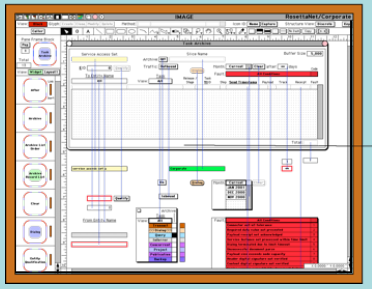
All machine tools have some means of constraining the work piece and provide a guided movement of the parts of the machine.



System Cube Model

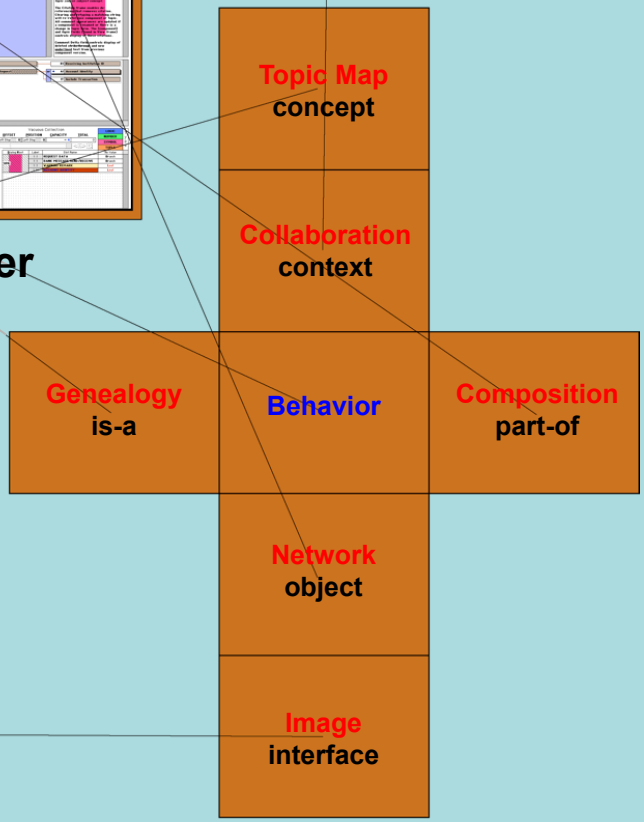




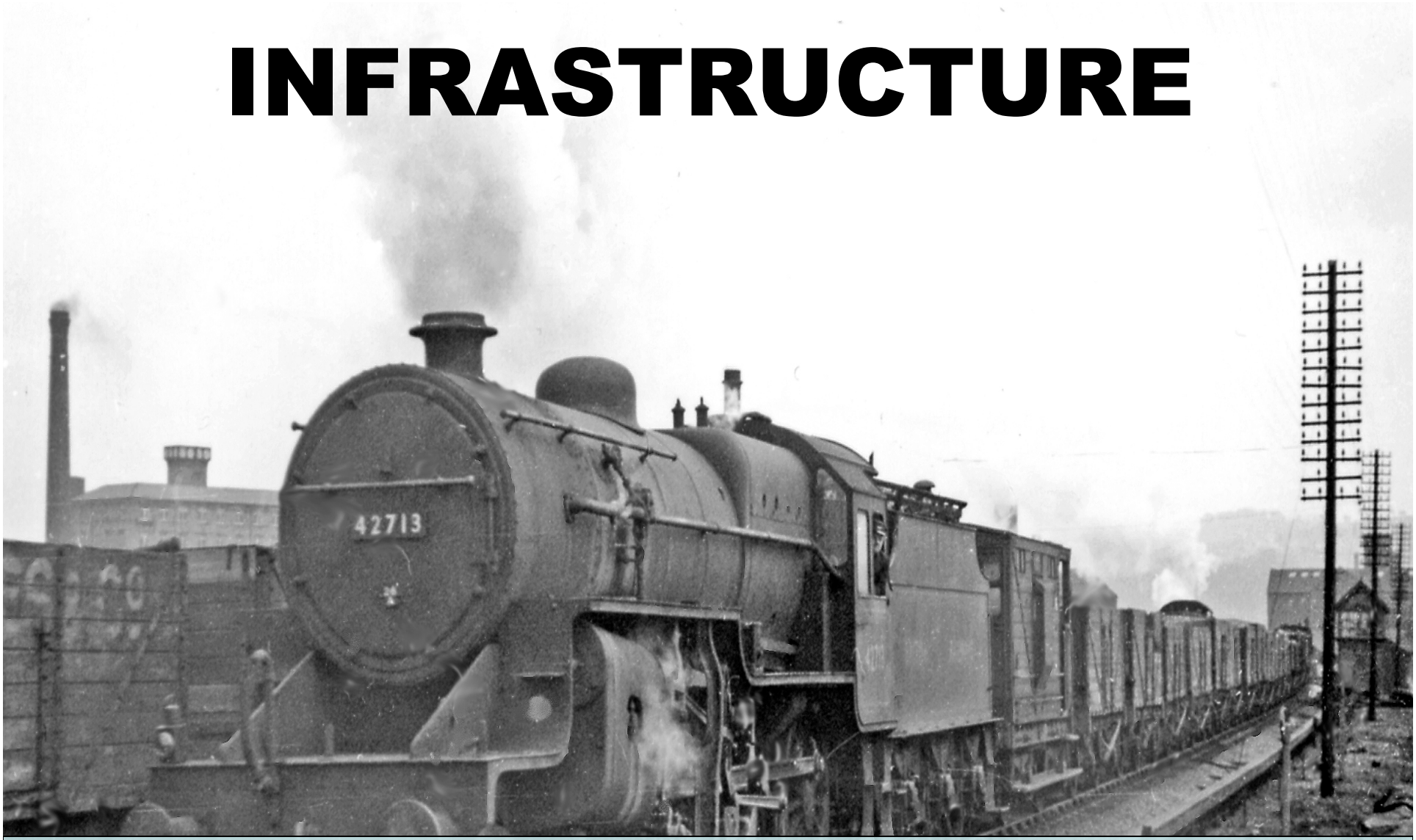


Windows in the CubeDesigner development environment

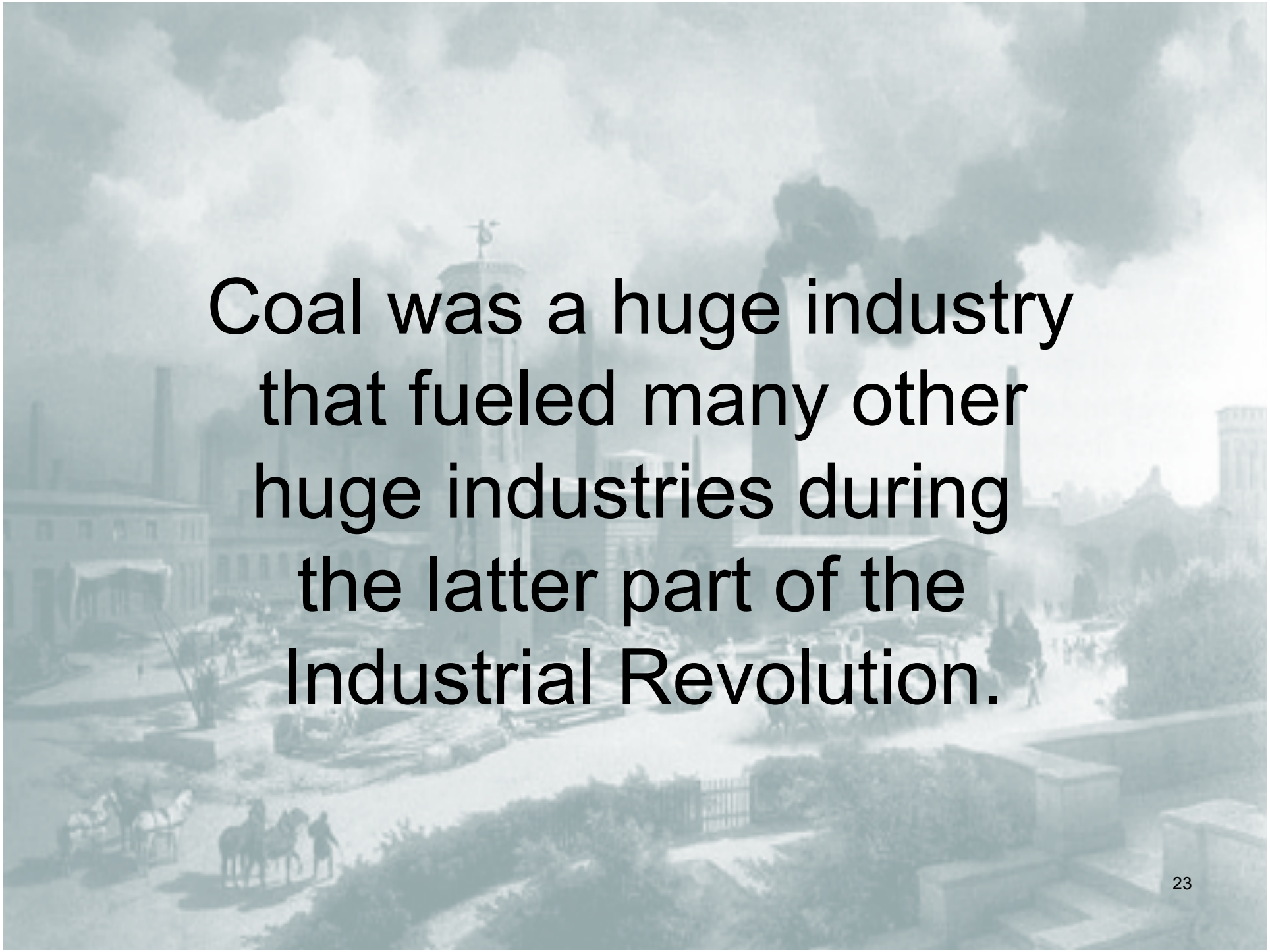
The model is used to constrain the software development lifecycle.



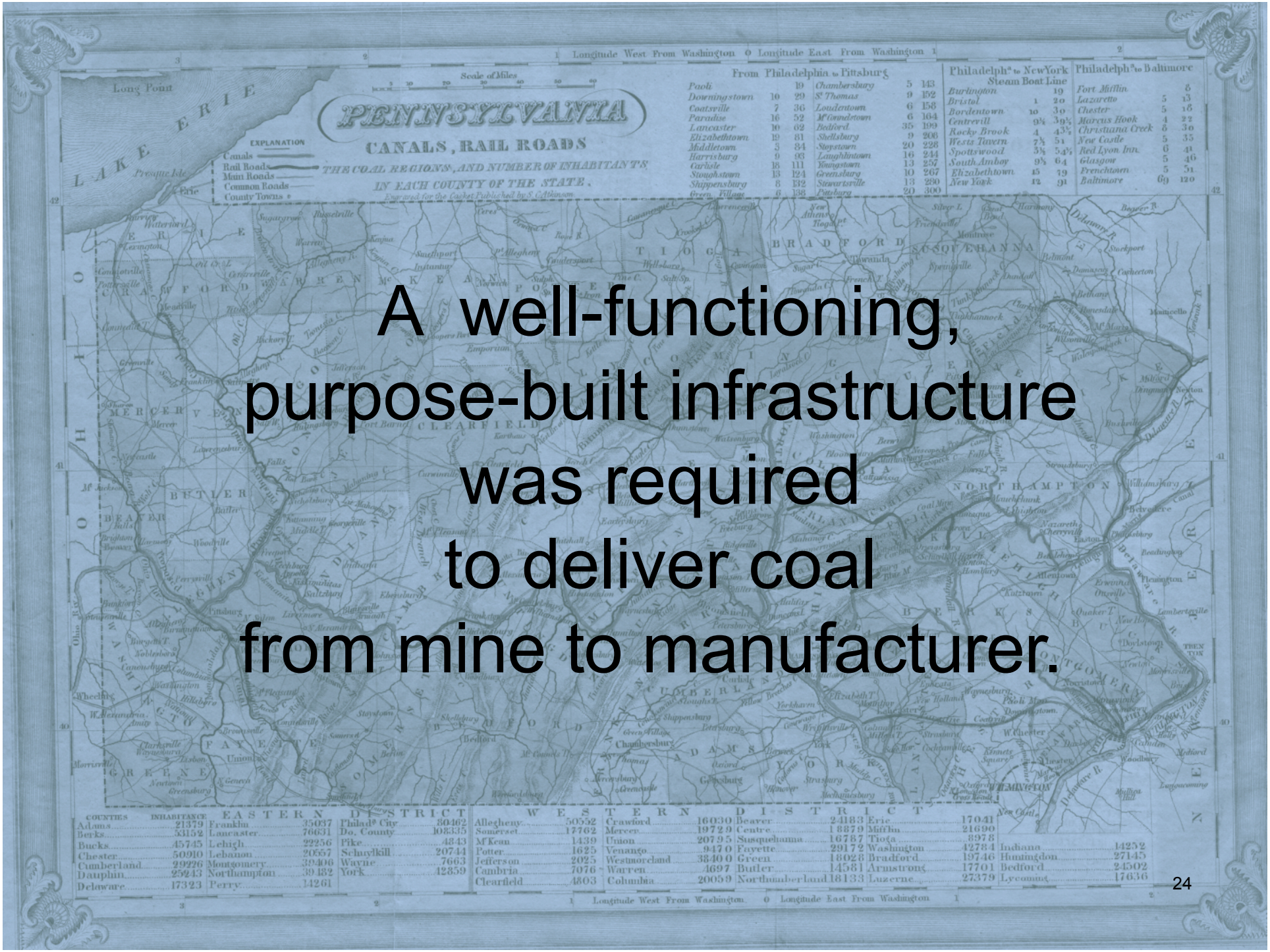
INFRASTRUCTURE



INDUSTRIAL REVOLUTION
Lesson #3



Coal was a huge industry that fueled many other huge industries during the latter part of the Industrial Revolution.


PENNSYLVANIA
CANALS, RAIL ROADS
THE COAL REGIONS, AND NUMBER OF INHABITANTS
IN EACH COUNTY OF THE STATE.
Engraved for the Casket Published by S. C. Atkinson.
EXPLANATION
Canals
Rail Roads
Main Roads
Common Roads
County Towns
Scale of Miles
Longitude West From Washington 0 Longitude East From Washington
From Philadelphia to Pittsburg
Philadelphia to New York Steam Boat Line
Philadelphia to Baltimore
EASTERN DISTRICT
WESTERN DISTRICT
A well-functioning,
purpose-built infrastructure
was required
to deliver coal
from mine to manufacturer.

In the IoT,

data

is the new coal.


Sensors mine their
environment for raw data.

The machine-driven, real-time world of the IoT will require a purpose-built infrastructure that supports data in context.


Context
makes raw data
actionable. Valuable.

Context as a Container

Think of Context like a container that securely holds the meaning (semantics) of data for processing across disparate devices and things

Context as a Container

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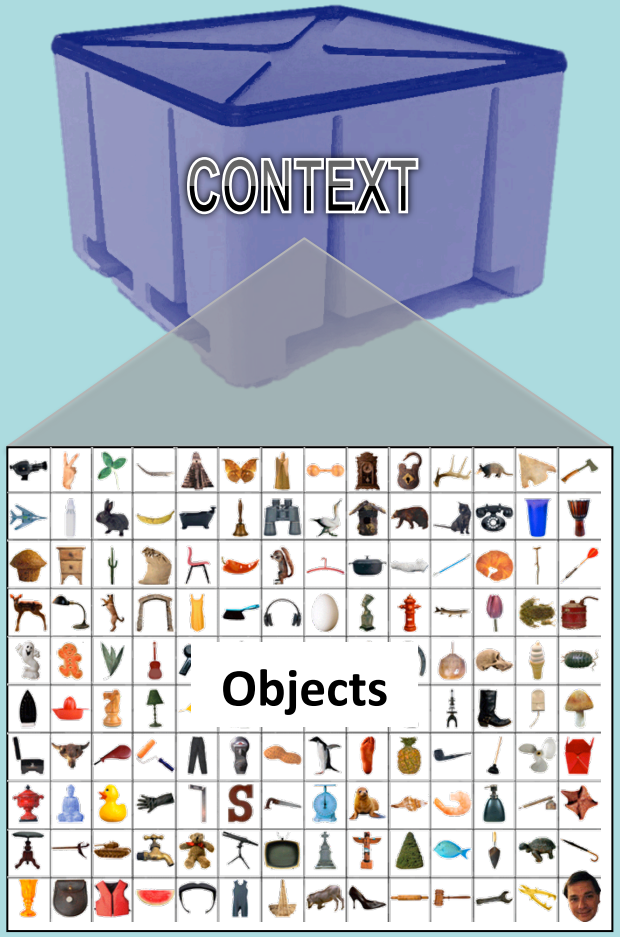
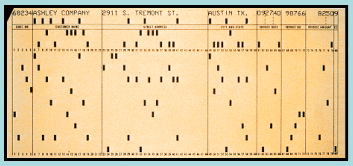
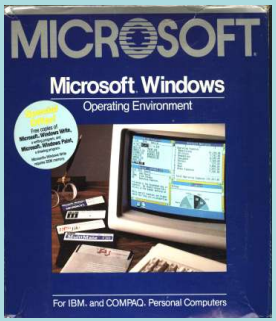


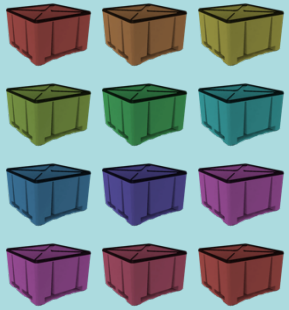
Context as a Container

Think of Context like a container that securely holds the meaning (semantics) of data for processing across disparate devices and things

Evolution of Software Packaging







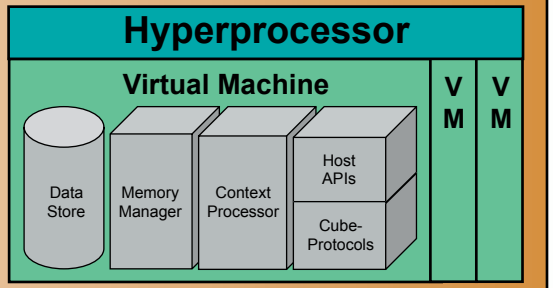
Punch card → Program → Application → App → Context

Cubicon Infrastructure Elements

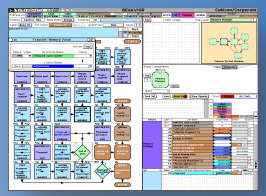
Internet Layer
CubeWeb - Store, index, track, associate context

Domain Repositories | Context Registry | Software Emporium
Software Repositories | CubeEngine Registry | Service Emporium

Execution Environment
CubeEngine - execute context

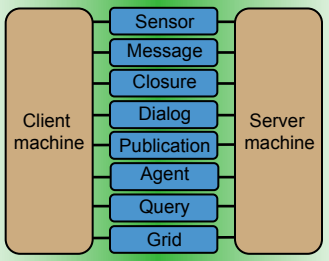


Development Environment
CubeDesigner - develop context



Systems Language
Cubicon - create context

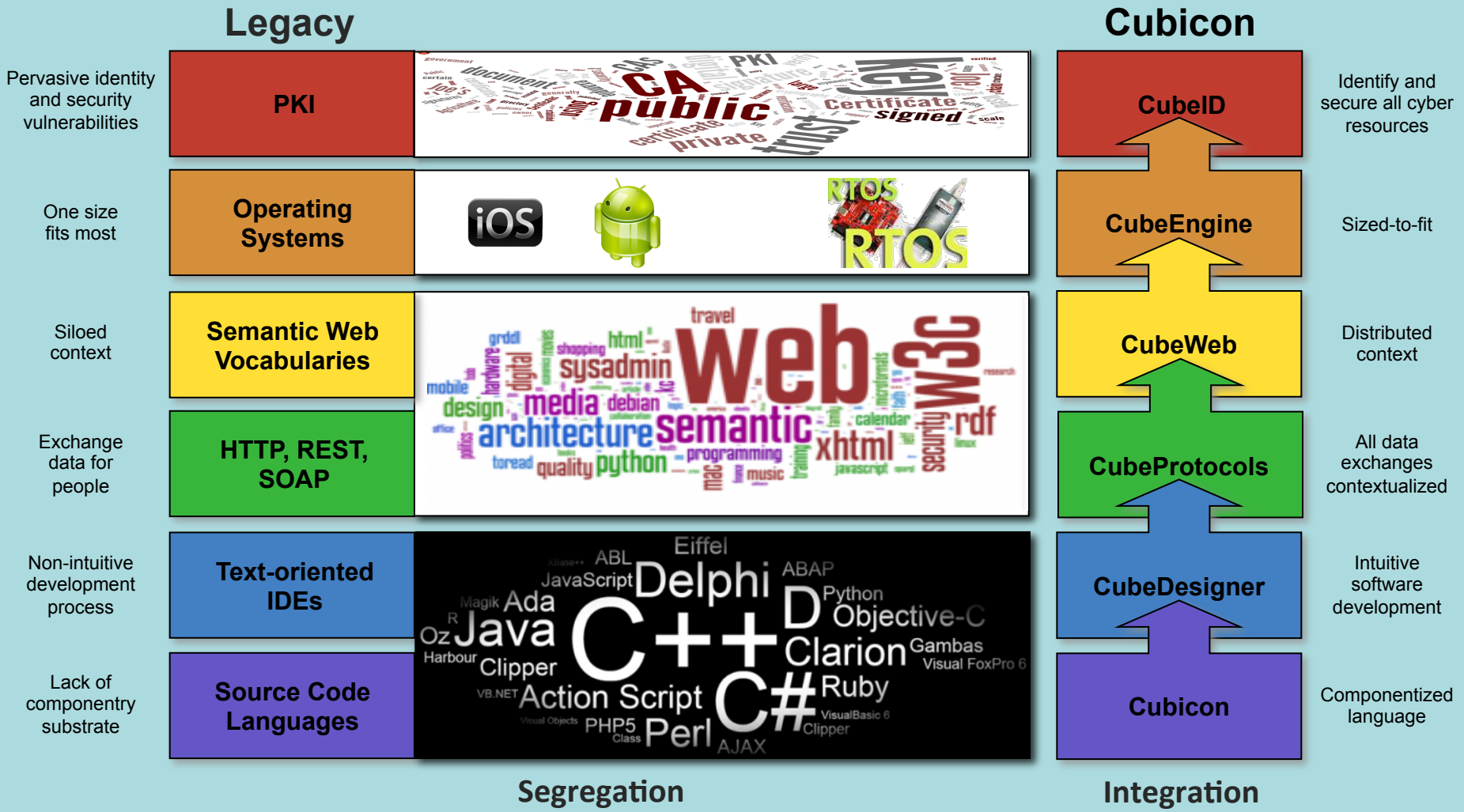
Protocols
CubeProtocols
- transmit context



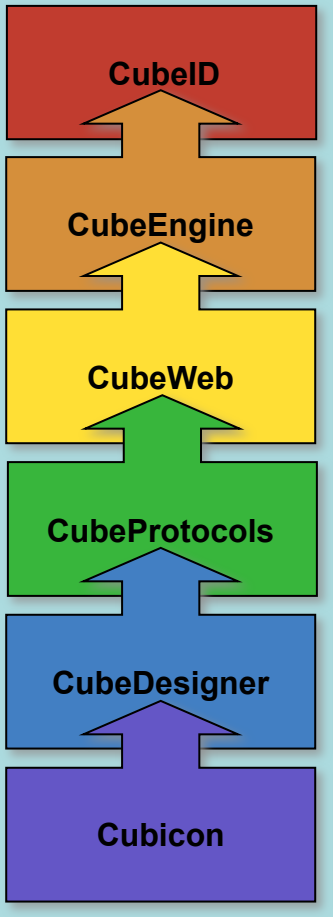
Web

Provenance
CubeID
- identify context

Functional Segregation vs. Integration



Cubicon Enables TSensors



Globally typed identifiers enable new security model for sensors

Execution environment enables real-time analysis of sensor data

Repositories, Registries and Exchanges enable sensor sharing and monetization

Sensor protocol enables fog, swarm and grid capabilities

INFRASTRUCTURE

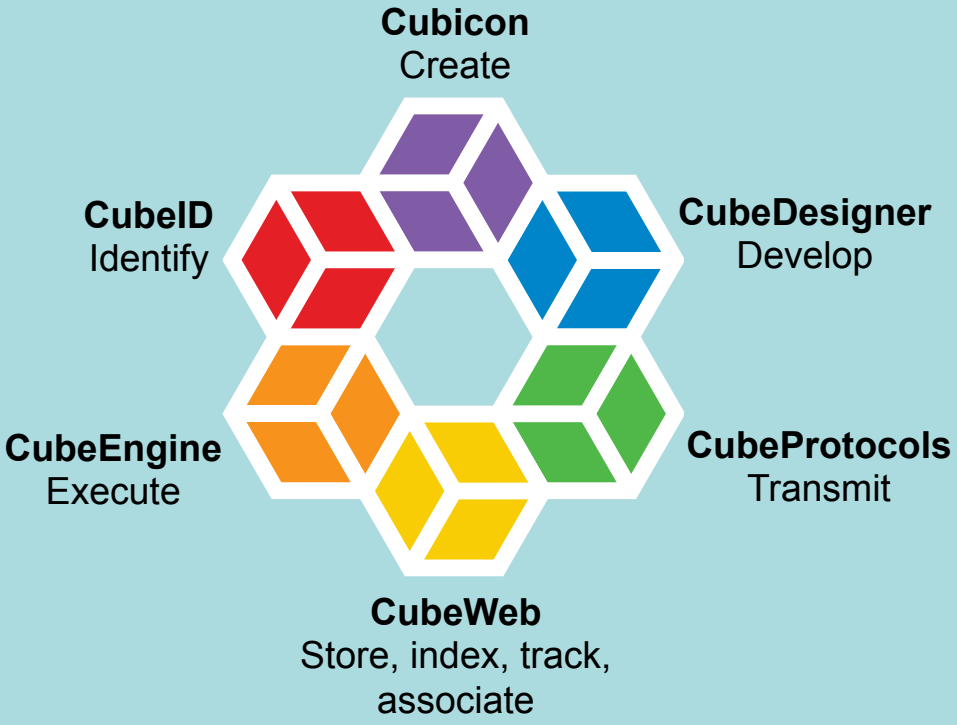
Development environment supports mass development of sensor logic

MACHINE TOOLS

Systems Language supports sensor taxonomy standardization across manufacturers

COMPONENTRY

Thank you!



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