Innovative solutions for next-generation product and systems development

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Smarter software for a smarter planet

Accelerating Product and Service Innovation | Rational

Software is the driving force behind today's innovations

Aerospace and Defense

Today's F35 has 10 million lines of code on board, twice the amount on the F-22, another stealth fighter.

Energy and Utilities

Smart meters for water utilities will lead to $29.9 million in sales by 2017 compared with $10.3 million in 2011.

Automotive

Electronics drives 80 percent of the automotive industry's functional innovation —software is the key to most of it.

Telecom

Between 2012 - 2016, mobile data traffic will multiply tenfold, with video content acting as the biggest driver.

Electronics

By 2014, 230 million Smart TVs will be installed with 57 million homes watching web-based streams over broadband.

Medical Devices

The da Vinci S surgical robotic system:
• 1.4 million lines of code
• Computing power of 7 laptops
• 10,000 individual parts

At the same time the world is experiencing unprecedented change

- Globalization

- Bandwidth explosion

- Integrated technologies

- Internet of things

- Cloud, mobile, social business

- Consumerization of products

The nemesis of product innovation is complexity

- Product Development organizations are faced with increasingly difficult problems to solve

  - The **explosion in software** creates opportunities to innovate faster but quality must be preserved

  - Products and systems require **multiple engineering disciplines** to collaborate

  - Smarter products are part of a larger, even more **complex system of systems**
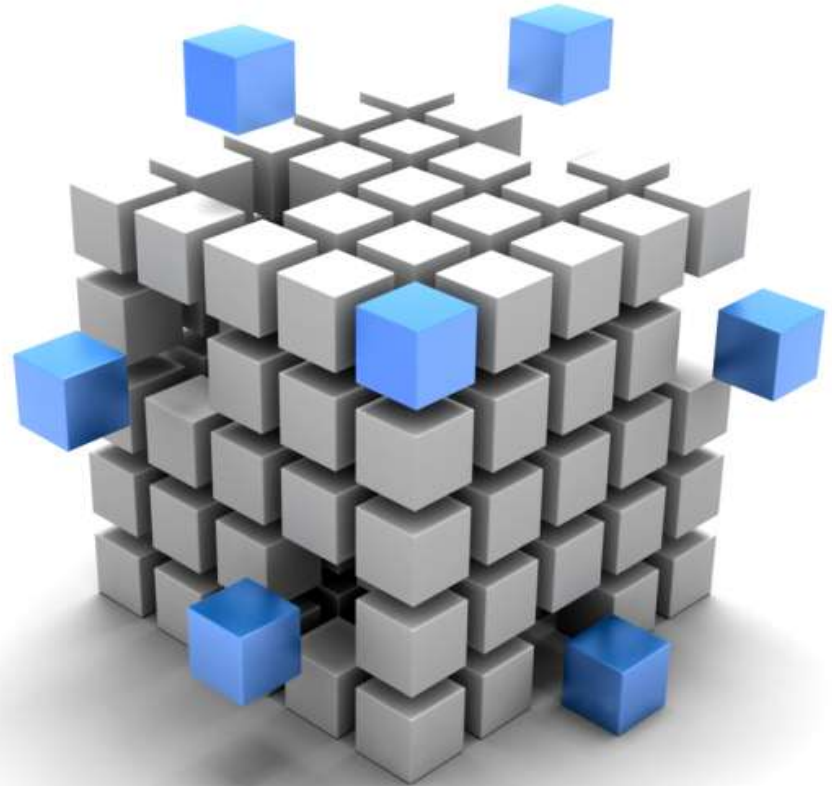
This new reality also uncovers unique challenges and opportunities *for systems engineers*

BEST-IN-CLASS

"I need to better understand my design alternatives earlier in the development process"

88%
Improve ability to **predict system behavior**

"I need a level of traceability that allows me to verify what was specified was delivered"

39%
Link **requirements** to specific **test cases**

"I need to manage change across mechanical, electrical, and software engineering"

1 of 4
Involve **multiple engineering disciplines** in design reviews

Aberdeen Group: "System Design: Get it Right the First Time", August, 2011

Smarter products require a systems approach to product development
Make the change or get left behind

Traditional Product Development

Mechanical Engineering

Electrical Engineering

Software Engineering

Physical Design and BoM-centric Approach
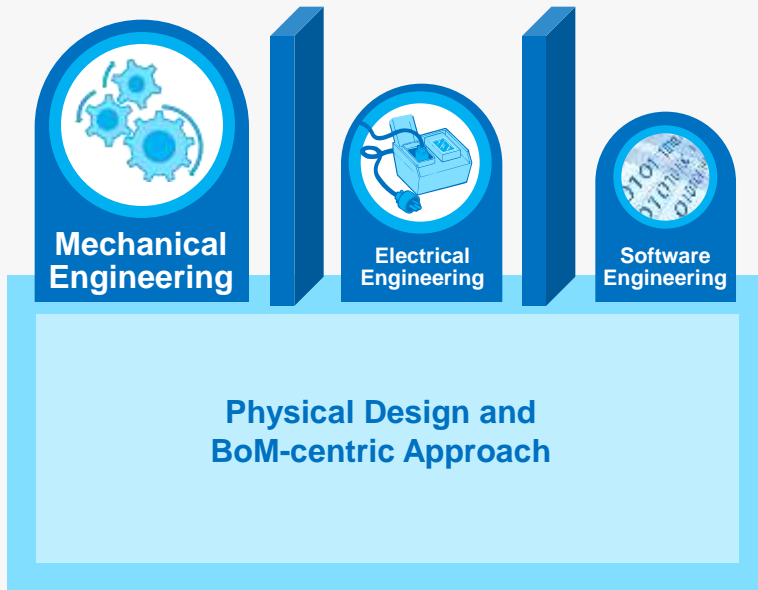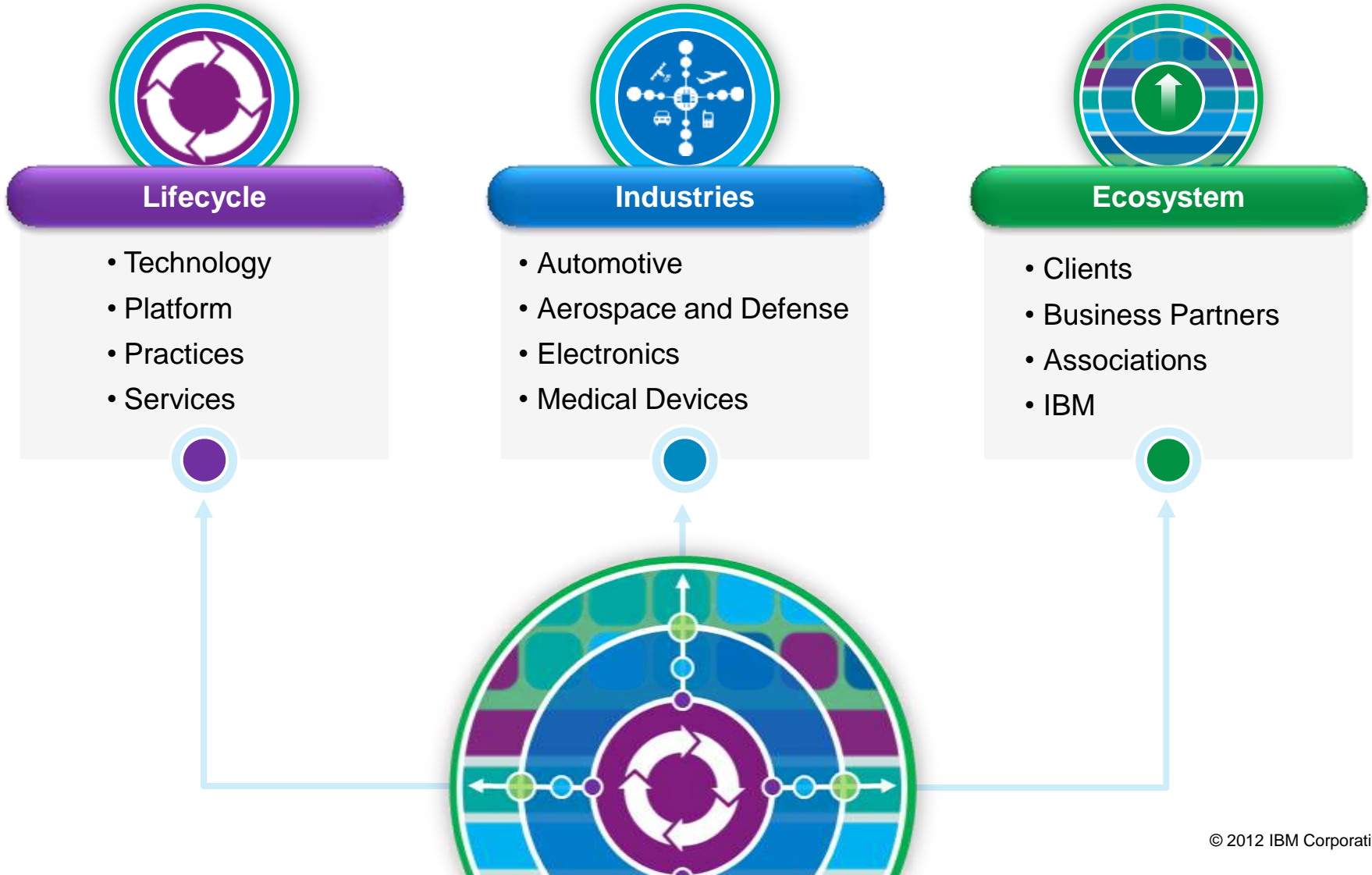
- Used for product but not systems of systems design
- Siloed engineering disciplines
- Not ready for the software explosion

A 'Systems' approach to Product Development

Integrated Electronic, Mechanical, and Software Engineering
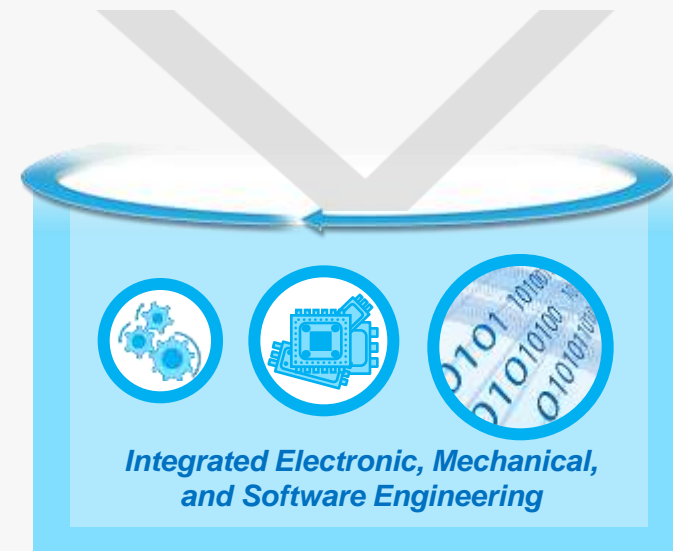
- Optimized for product, system and systems of systems design
- Systems approach encourages engineering collaboration
- Excels in software design management

Innovative solutions for next-generation *systems and software engineering*

Lifecycle

- Technology
- Platform
- Practices
- Services

Industries

- Automotive
- Aerospace and Defense
- Electronics
- Medical Devices

Ecosystem

- Clients
- Business Partners
- Associations
- IBM

IBM Rational Solution for Systems and Software Engineering

- **Specify, design, implement and validate complex products and the software that powers them** with an integrated set of tools, practices, and services.

- **Improve quality, predictability and consistency** with best practices and process guidance.

- **Assess and manage changes** throughout your systems lifecycle.

- **Unify software, electrical and mechanical engineering** through a federated, linked data approach.

- **Increase agility** in embedded software development.

IBM Rational Solution for Systems and Software Engineering

- Architecture, Design and Development
- Requirements
- Visualize, Analyze, and Organize
- Quality
- Planning, Change/ Configuration Management

Best Practices and Services

Open Lifecycle Integration

Jazz.
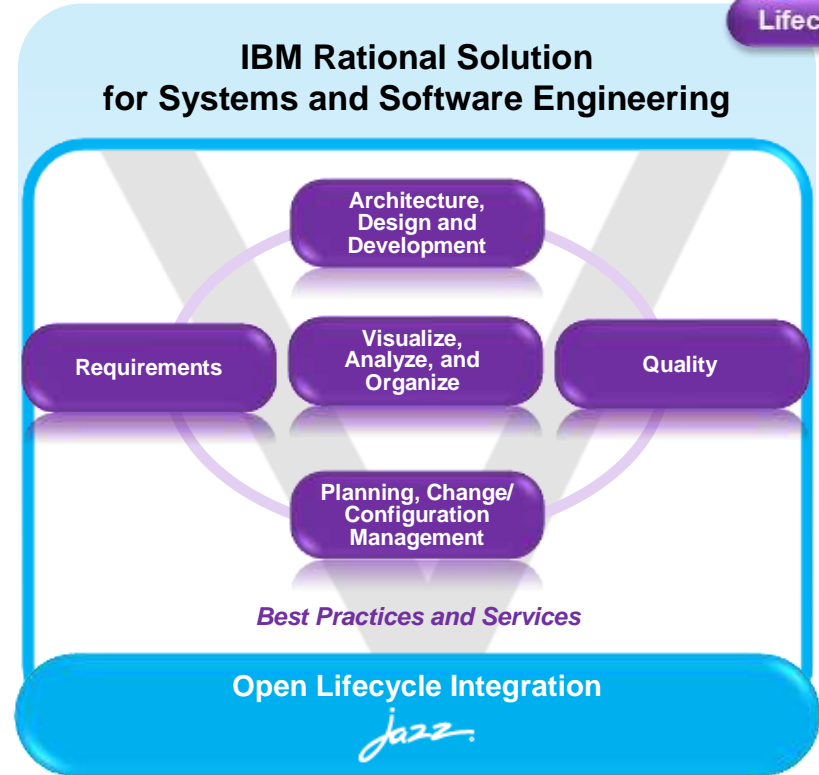
Systems Engineering	Embedded Software Engineering
• Optimize design alternatives	• Develop against changing requirements
• Link design and test	• Reduce compliance overhead
• Manage change across domains	• Integrate HW/SW development

Jazz and OSLC are basis technologies

Lifecycle

Open Lifecycle Integration
jazz.

www.jazz.net

- A scalable, extensible team collaboration platform

- An integration architecture enabling non-Jazz based products to participate

- A community at Jazz.net, where you can see Jazz-based products being built

Everything is a resource!
"I can link any resource to any other resource, regardless of where the resource lives!"

Standard interfaces
"Each tool can evolve independently without breaking integrations!"

Open Services for Lifecycle Collaboration
Lifecycle integration inspired by the web

OSLC Steering Committee
Founding members: Accenture, Creative Intellect, EADS, Siemens, Tasktop, and IBM

- Foundation for major interoperability projects

- A different approach to industry-wide proliferation

- Inspired by Internet architecture

- Integrate over 40 tools natively and through third-party adapters

Domain-specific lifecycle standards
"Each domain can create standards without having to wait on the others or get the whole industry to agree!"
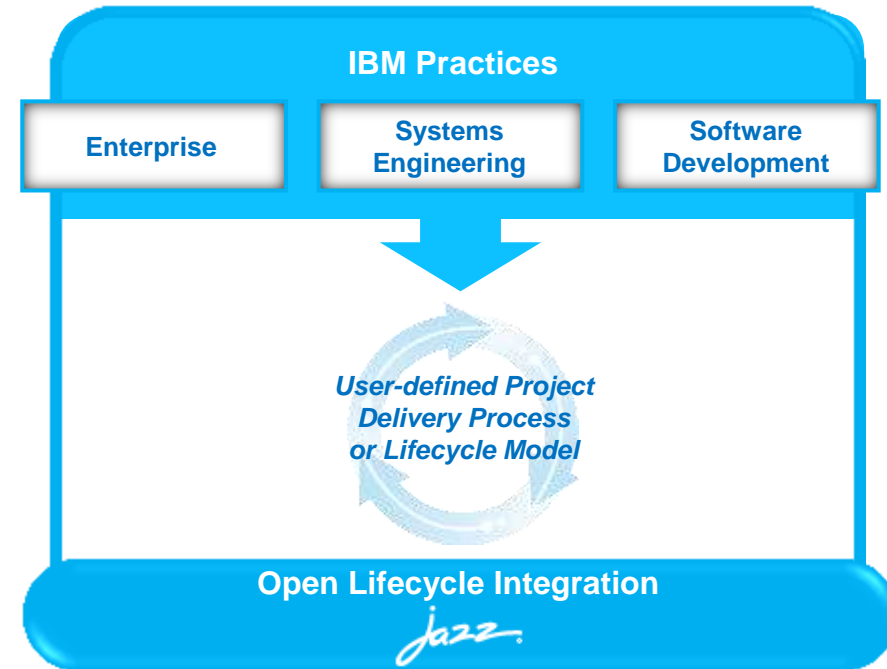
Vendor agnostic
"Each vendor can evolve their tool to exploit the services that are valuable to customers like me!"

IBM Practices for Systems and Software Engineering
Proven guidance when and where you need it most

Lifecycle

- Integrated and proven process, methods and tools to help reach key business objectives

  - Pre-defined and highly re-usable roles, tasks, guidance, work products and associated relationships

  - Configured and enacted independently in the context of each project or any specific delivery process or lifecycle model

  - Helps avoid too much self-inflicted process

  - Offers faster and more predictable results

  - Allows incremental measured improvement

IBM Practices

| Enterprise | Systems Engineering | Software Development |

User-defined Project Delivery Process or Lifecycle Model

Open Lifecycle Integration

Jazz

"… The quality of a product is largely determined by the quality of the process that is used to develop and maintain it."

– based on Shewhart, Juran, Deming & Humphrey

Accelerate development and reduce risk with industry-specific solutions

Industries

Aerospace and Defense

Accelerate the development of complex software and systems in the A&D industry

- DO-178B/C
- DoDAF, MODAF, and UPDM
- SysML

Automotive

Realize greater value of your solutions by addressing key auto industry trends and challenges

- ISO 26262
- AUTOSAR
- GENIVI

Electronics

Co-develop hardware and software effectively to drive new and innovative products

- Hardware software co-design
- EDA integrations

Medical Devices

Meet regulatory compliance and reduce cost and time to market

- FDA QSR standard
- International standards (IEC 62304)

Insight and Product Innovation capabilities
IBM's ecosystem of hardware, software, and services

Ecosystem

BUSINESS PLANNING & TRANSFORMATION

Global optimization of product, process and organization

PRODUCT & SYSTEMS DEVELOPMENT

Designing, delivering and managing product value and differentiation

PRODUCT SUPPORT

Closing the loop between design and support

LIFECYCLE COLLABORATION

Automating processes across the ecosystem of system contributors

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IBM's unique set of capabilities for building smarter products;
…from concept, through product development, to end of life, all while collaborating
throughout the process both inside and outside of your 'four walls'

Teaming with the Systems and Software Community

- ***Expanding the systems ecosystem***
  - Business partnerships
  - Systems engineering organizations
  - Standards members

- ***Events***
  - Systems and software engineering symposiums
  - Innovate
  - Voice of the customer
  - Executive briefings
  - Industry events

- ***Education***
  - Access to resources physically or virtually
  - Academic initiatives
  - IBM Rational Proof of Technologies hands-on tool and solution training
  - Recorded and live web and podcasts
  - Rational enlightenment series

- ***IBM helps you stay connected***
  - Virtual Rational User Community for Systems Engineering
  - Expand professional networks
  - IBM social media

Rational Client Programs Framework

Sales Support Programs

- Tiger Teams
- Jazz Jumpstart
- Unleash the Labs
- Lab Services (ISSR)*

⇐ • **Enable Sales**
- **Influence buying decision**

Client Feedback Programs

- Board of Advisors (BoA)
- Design Partner Program (DPP)
- VoiCE
- Beta Programs
- RFE Community

⇐ • **Solicit and act on Client feedback**
- **Influence purchase decision**
- **Generate Client sponsorship**

Client Advocacy Programs

- Lab Advocate Program
- Accelerated Value Program (AVP)*

⇐ • **Solve Client issues**
- **Influence buying decision**
- **Maintain Client sponsorship**

Product Support Programs

- Standard Support (Passport Advantage)
- Developer Works User Groups
- Accelerated Value Program (AVP)*

⇐ • **Pre and Post Sales "Support" Mechanisms**

*Fee based

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We've only just begun to discover what is possible…

- These are exciting times for product developers!

- There is no better time to seize the opportunities to build the next generation of products on a smarter planet.

- There's no limit to what we can do. Partner with us and let's blaze the trails together..

www.ibm.com/software/rational