ELASTRA

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From Agile Development to Agile Operations

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Objectives

- Reflecting on how cloud computing is changing the game between development & operations
- Suggested design goals for cloud computing technology, to help bridge these worlds
- Characterizing an integrated approach to application design, development, and operations

About Your Presenter

- Stuart Charlton
  - Canadian,  now in San Francisco
- CTO, Elastra
- In prior lives...
  - BEA Systems, Rogers Communications, Infusion Development, global training & consulting
- RESTafarian and Data geek
- Stu Says Stuff http://stucharlton.com/blog

The Dev / Ops Game

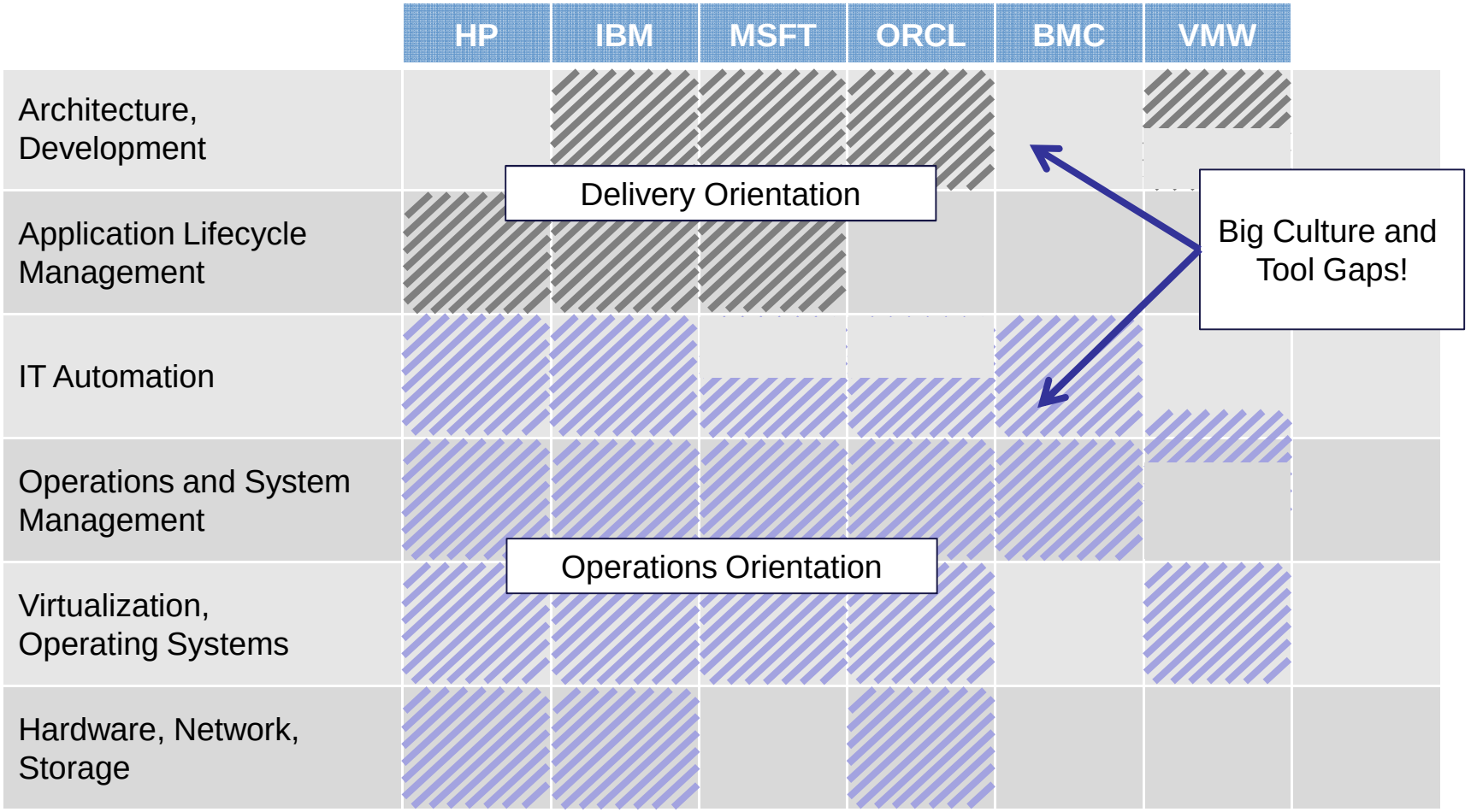
The Realities

- Organizationally & Geographically **Distributed** Design and Operations (The Cloud)
- Performance, Scale, and Availability are due to a **complex combination** of design and operational decisions
- Application and infrastructure management is **complex** and **inter-disciplinary**

The World of Design & Operations

	HP	IBM	MSFT	ORCL	BMC	VMW
Architecture, Development		Rational	Visual Studio	Jdeveloper		Spring
Application Lifecycle Management	Mercury	Rational	Visual Studio Team System			
IT Automation	OO	TPM	Systems Center CM	Oracle EM	Atrium	Vcenter Orch., vApps
Operations and System Management	SA, NA, CMDB	Tivoli	Systems Center	Oracle EM	Patrol Remedy Blade Logic	vCenter
Virtualization, Operating Systems	HPUX NonStop	z/OS, LPAR AIX	Windows, Azure, Hyper-V	Oracle VM, Linux, Solaris		vSphere
Hardware, Network, Storage	Proliant Integrity ProCurve	System x, 1, p, z		Sun		

A Major Cultural Split



Applying Agile Practices to Operations?

Some can remain a useful guide…

- Value expressed through functionality
- Automated Build, Test, Integration
- Autonomous teams
- Continuous integration of source

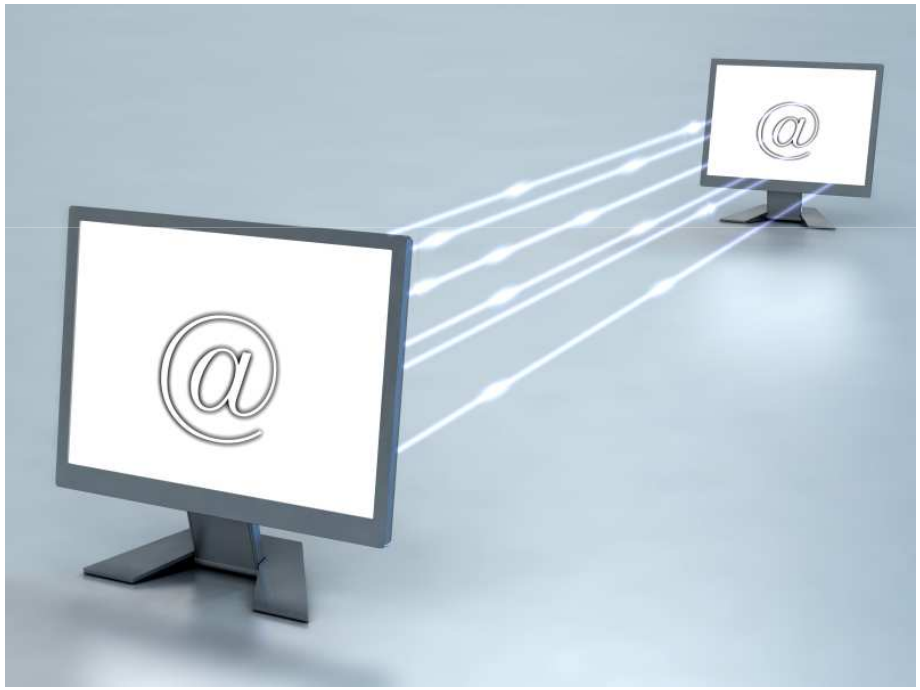
…But development practices don't always translate well

- Greater value is placed on continuity and risk
- What's the test environment?
  - » More like "rehearsal"
- Legacy dependencies
  - » Need for situational awareness
- Where's the source?

Example:
Why can’t these two servers communicate?

Possible areas of problems

- Security
  - » Bad credentials
- Server Configuration
  - » Wrong IP or Port
  - » Bad setup to listen or call
- Network Configuration
  - » Wrong duplex
  - » Bad DNS or DHCP
- Firewall Configuration
  - » Ports or protocols not open



Example:
What do I need to do to make this change?

Desired Change

- Scale-out this cluster

But…

- Impacts on other systems
  - » Security Systems
  - » Load Balancers
  - » Monitoring
  - » CMDB / Service Desk
- Architecture issues
  - » Stateful or stateless nodes
  - » Repartitioning?
  - » Limits/constraints on scale out?

Example:
What is the authoritative reality?

Desired State

- Configuration Template
- Model
- Script
- Workflow
- CMDB
- Code

Current State

- On the server
  - » Might not be in a file
  - » Might get changed at runtime
- And when you do change…
  - » It may not actually change
  - » It might change to an undesirable setting
  - » It might affect other settings that you didn't think about

Cloud Computing to the Rescue?
What Exists, What is Missing

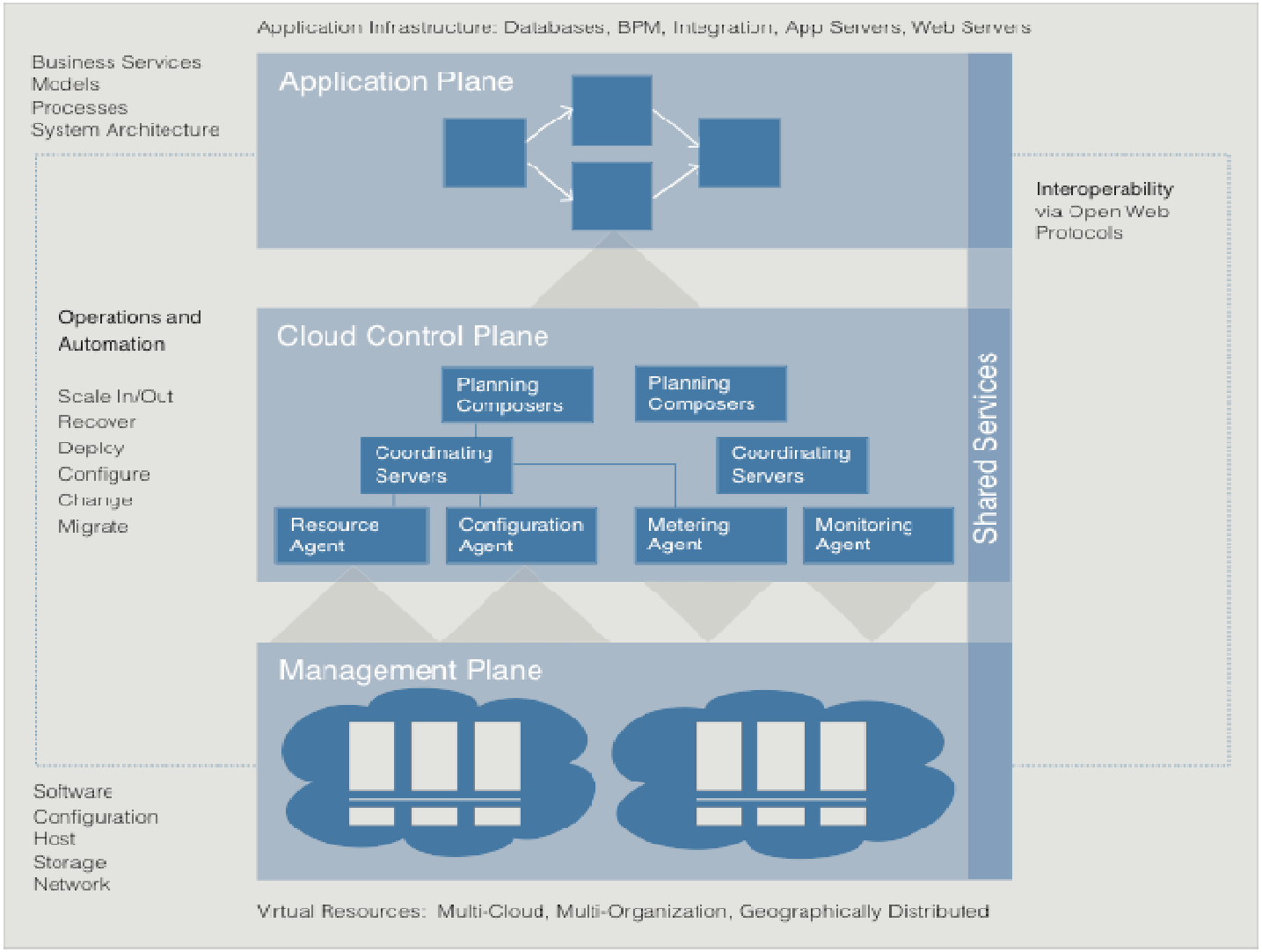
- What we have now:
  - On Demand Provisioning of Commodity Infrastructure
    - OS-level down registration, launch, attachment
  - On Demand Provisioning of Constrained Applications
    - Works for some cases, not integrated cases (yet)

- What we still need to consider:
  - Configuration as data and as code
  - Collaboration on design and operations
  - Accounting for the full value stream of the system

Suggested Design Goals for Cloud Computing

- Separate Applications from Infrastructure
  - » How far can Black-Box PaaS really go?
- Enabling Computer-Assisted Design and Operations
  - » IT complexity is getting overwhelming
  - » Can machine reasoning and planning help?
- Explicit Collaboration
  - » Both design and operations suggest are highly collaborative work
  - » But in operations, not traditionally supported by most tooling

An Approach to Integrated Design and Ops



Configuration Code, Config, and Models, or ***What is the Source?***

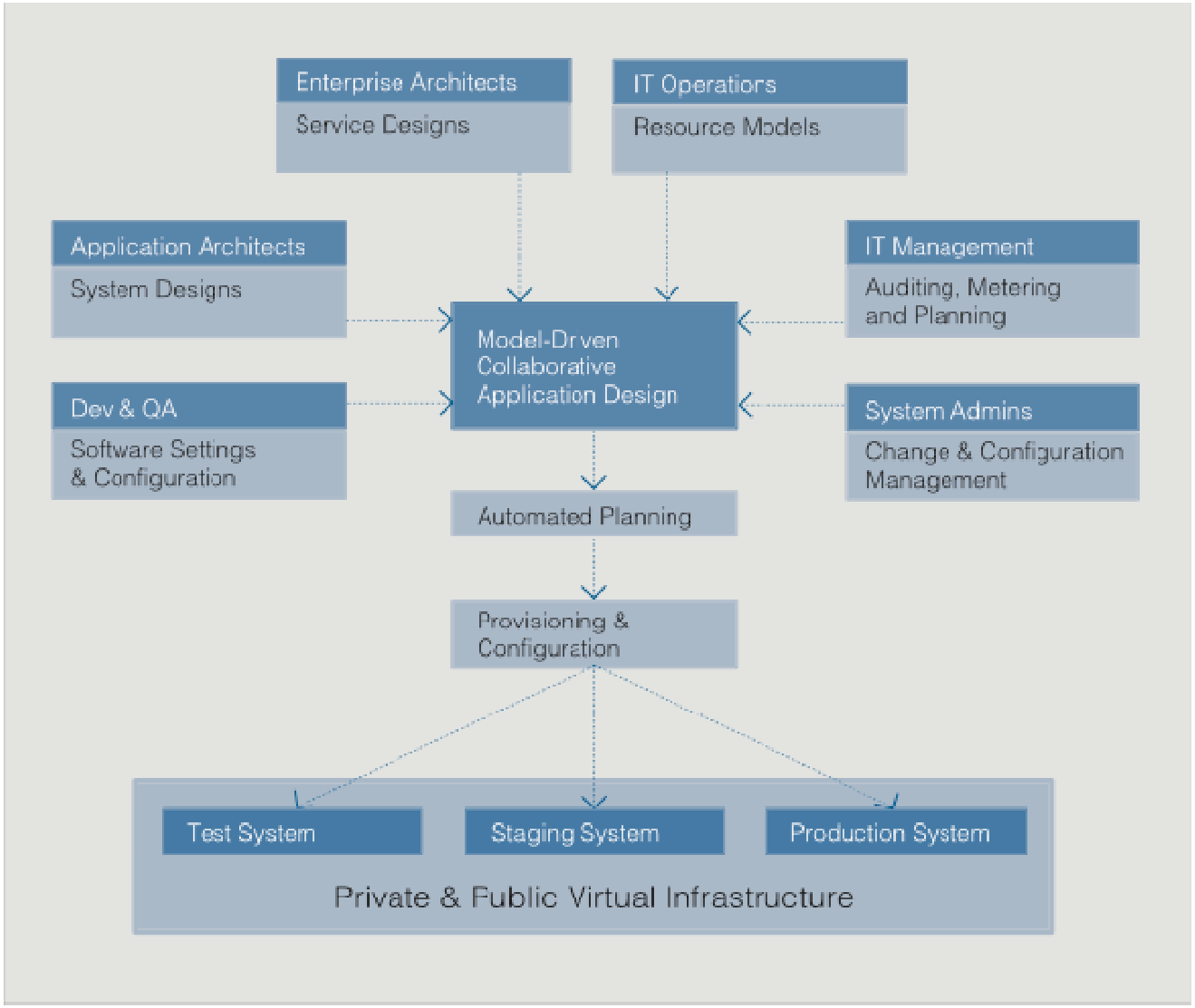
Bottom Up

- Scripts & Recipes
  - » Hand-grown automation
- Runbooks
  - » Workflow, policy
- Frameworks
  - » Chef
  - » Puppet, Cfengine
- Build Dependency Systems
  - » Maven

Top Down

- Modeled Viewpoints
  - » E.g. Microsoft Oslo, UML, Enterprise Architecture
- Modular Containers
  - » E.g. OSGi, Spring, Azure roles
- Configuration Models
  - » SML, CIM
  - » ECML , EDML

Modeled Collaboration & Change Management



On the other hand…

- “All Modeling is Programming and All Programming is Debugging” - Neil Gunther
- Need visibility into what the model implies
  - » Solutions don’t seem completely satisfactory…
    - Code generation?
    - Plan generation?
    - Runtime adjustment?

Accounting Barriers to Agile/Lean Operations

- Cost Attribution
  - » Capex vs. Opex
    - ▸ Lots of heat, little light
  - » Fixed vs. Variable Cost
    - ▸ Maybe? Still HW focused
- As opposed to
  - » Looking at the end-to-end system as a value stream
  - » Costing based on time calculations for repeatable activities: ***Time-Driven Activity Based Costing***

Cloudy, with a chance of …

AN APPROACH

Characterizing an Integrated Approach to Cloud Application Design, Dev & Operations

- Distributed, Autonomous Control
  - » Ownership & stewardship of artifacts and systems are normally decentralized
- Open Document-Exchange Describing a System
  - » The trouble with APIs
  - » Today's attempts: model marts, CMDBs, scripts, POMs
  - » Contrast to the success of the Web
- Hyperlinked Web Architecture
  - » No monolithic documents

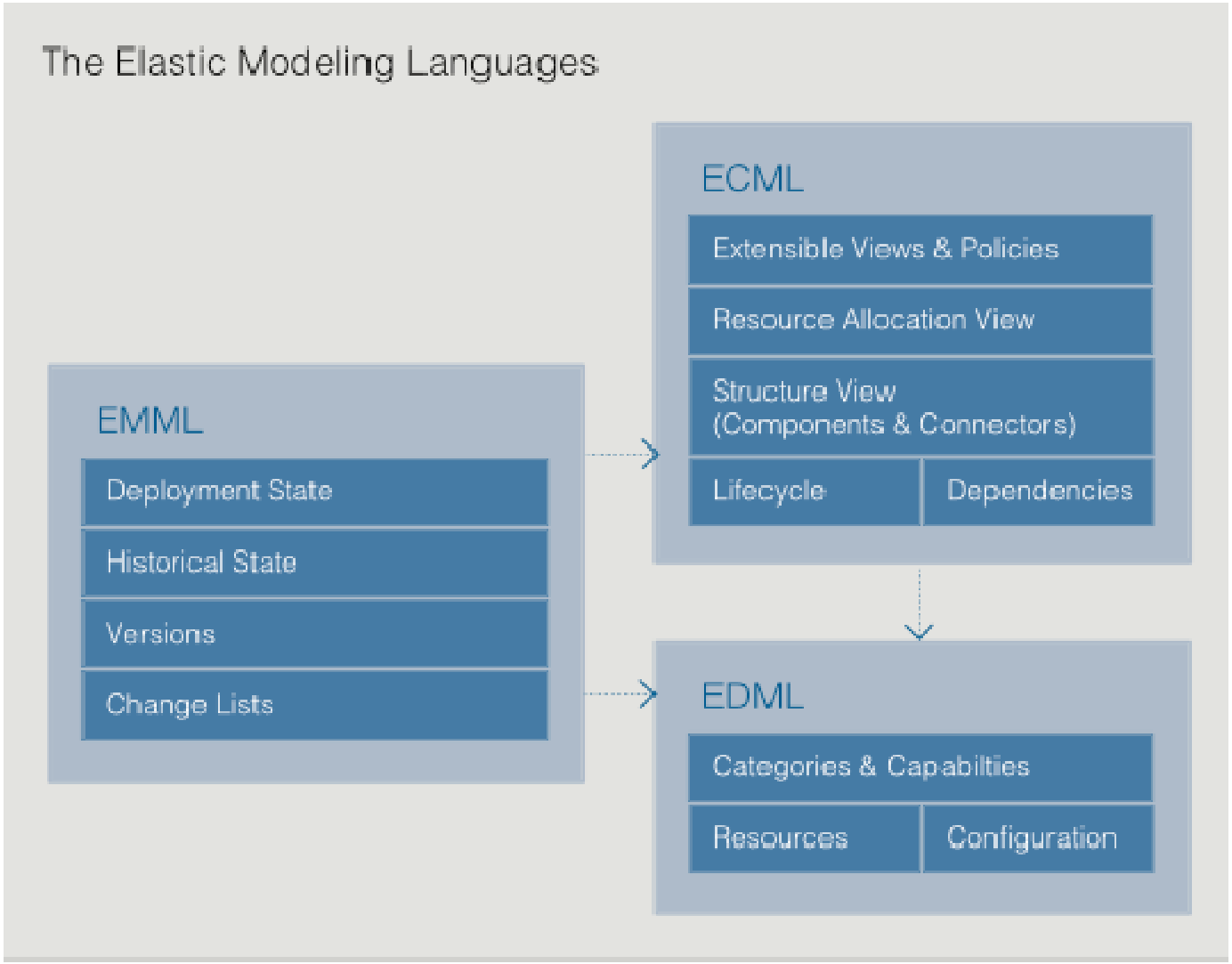
Characterizing an Integrated Approach to Integrated Cloud App Design & Operations

- Model-Driven
  - » Make documents conform to a logical framework and visual notation
- Goal and Policy Driven
  - » “What, not How”: Declarative specifications
  - » Allow for automated planning of operational steps
- Viewpoint-Based
  - » Extensible modeling languages & constraints

Characterizing an Integrated Approach to Integrated Cloud App Design & Operations

- Collaborative
  - » Leveraging social computing
  - » Faster decision making to enact changes to a system
- Governable
  - » Access control & entitlement enforcement

Elastic Modeling Languages – A Beginning



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THANK YOU