Software is Eating the World, APIs are Eating Software

Steven Willmott
3scale Inc.
@njyx, @3scale

3SCALE

3scale is…

API
Infrastructure
Provider

Power 350+
APIs

110,000
Developers
writing Apps

(Selection)

API Tech Operations

API Business Operations

Developer Support

3scale.net

3SCALE

What do you mean **API?**

Software is Eating the World

@pmarca - WSJ / Aug 2011

3SCALE

Almost every major industry is becoming software driven

Retail Video Telephony Music

...

amazon

Amazon: “Software Driven Retail”

Lytro: “Software Defined Cameras”

PIXAR
ANIMATION STUDIOS

Pixar: “Software powered animation”

Philips Hue: “Software Controlled Lighting”

3SCALE

(Web) APIs Are Eating Software

(The Web is Eating Software)

3SCALE

1. APIs are the key glue that make this software *remotely addressable*

2. APIs provide a myriad of new external building blocks to *speed up* and *enrich software development*

3. If you do these things together *special things happen*

Inside-Out

APIs Make Software Remotely Addressable

Transport for London

London Transport: Open Data

Thousands
Of Devices

Netflix: "Massive Distribution"

Evernote: "Platformization"

Johnson Controls

JCI: "Software Controlled Buildings"

Outside-In

APIs are the new Libs

"In computer science, a library is a collection of implementations of behavior, written in terms of a language, that has a well-defined interface by which the behavior is invoked"

Download & Add to Classpath

Became

Find and Integrate

Speed (Time to Market)

e.g. shirts.io + Devops Borat

e.g. liveplasma (Top Mashup on Progr Web)

Richness / Functionality

e.g.

Next Slide

e.g.

Offboarding

e.g. 

(Rich Photo Effects For Mobile by SDK)

e.g. 

(Monitoring System in the Cloud)

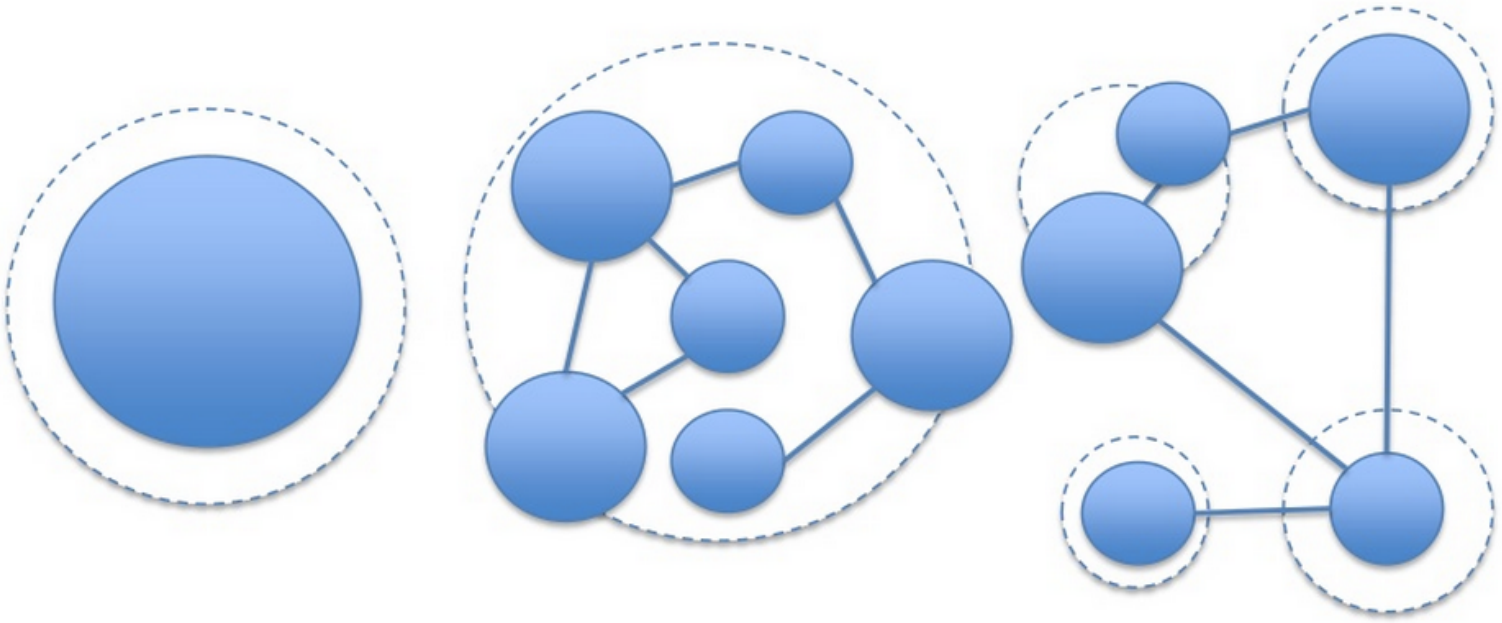
Reliability

e.g.  SendGrid (Email by API)

e.g.  (Amazon S3)

Mixing the Two

Software Development over Time



Software Before 1995

Software 1995 – 2010

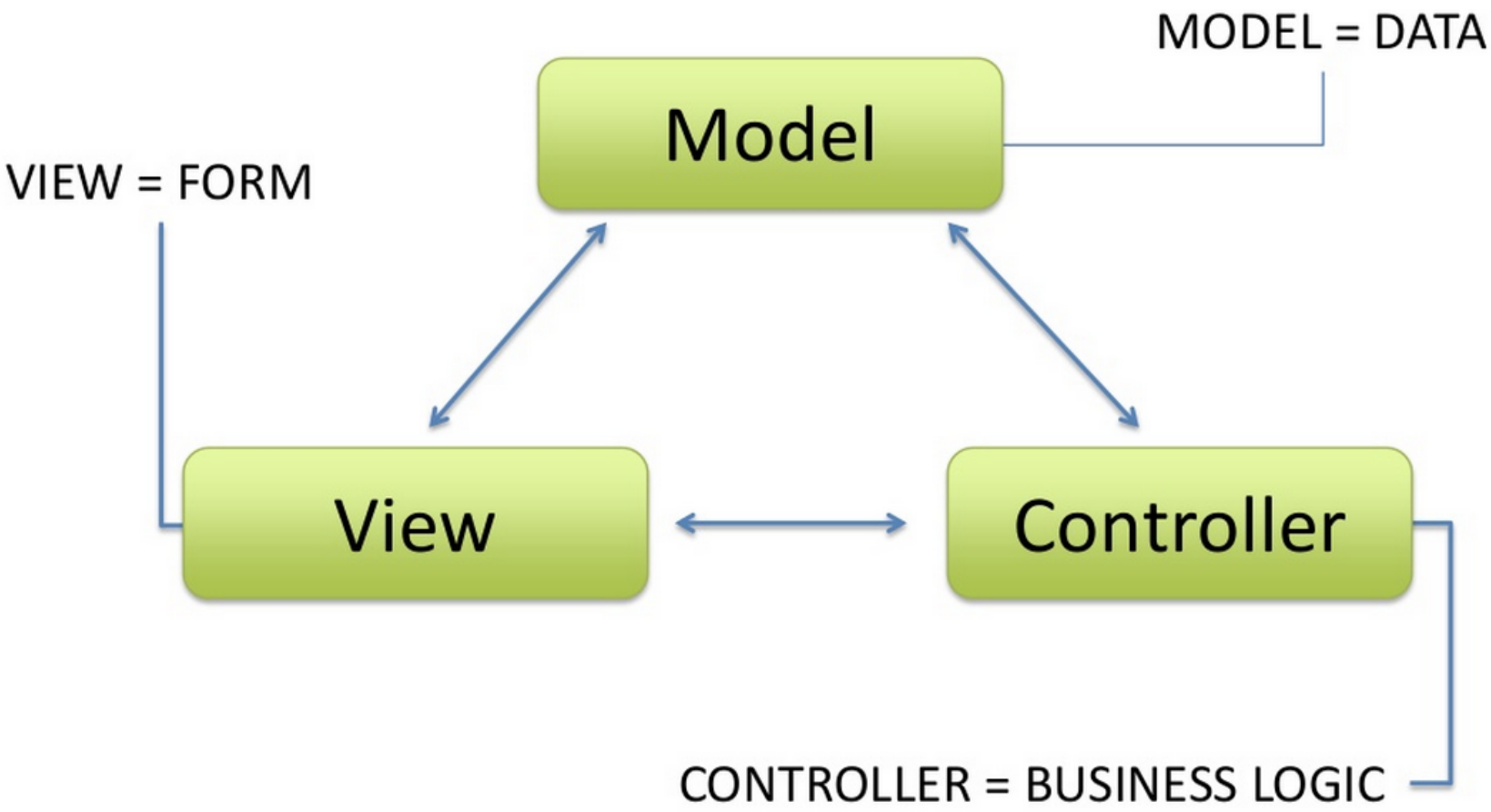
Software 2010 -

3SCALE

Enables specialization, focus, much wider distribution

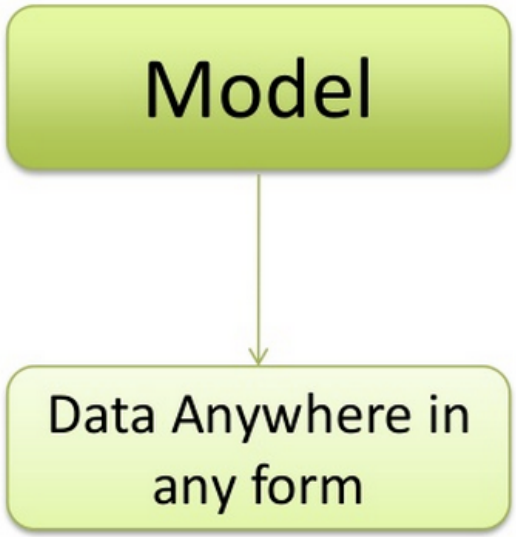
1. Changing Software Development

Software as Model-View-Controller



Now it can done at the company / organization level

Example “Models”



The New York Times
Expect the World®

xignite
On-Demand Financial Market Data

Bloomberg

data.gov.uk BETA

DATA.GOV
EMPOWERING PEOPLE

WeatherBug

3SCALE

Example: Views

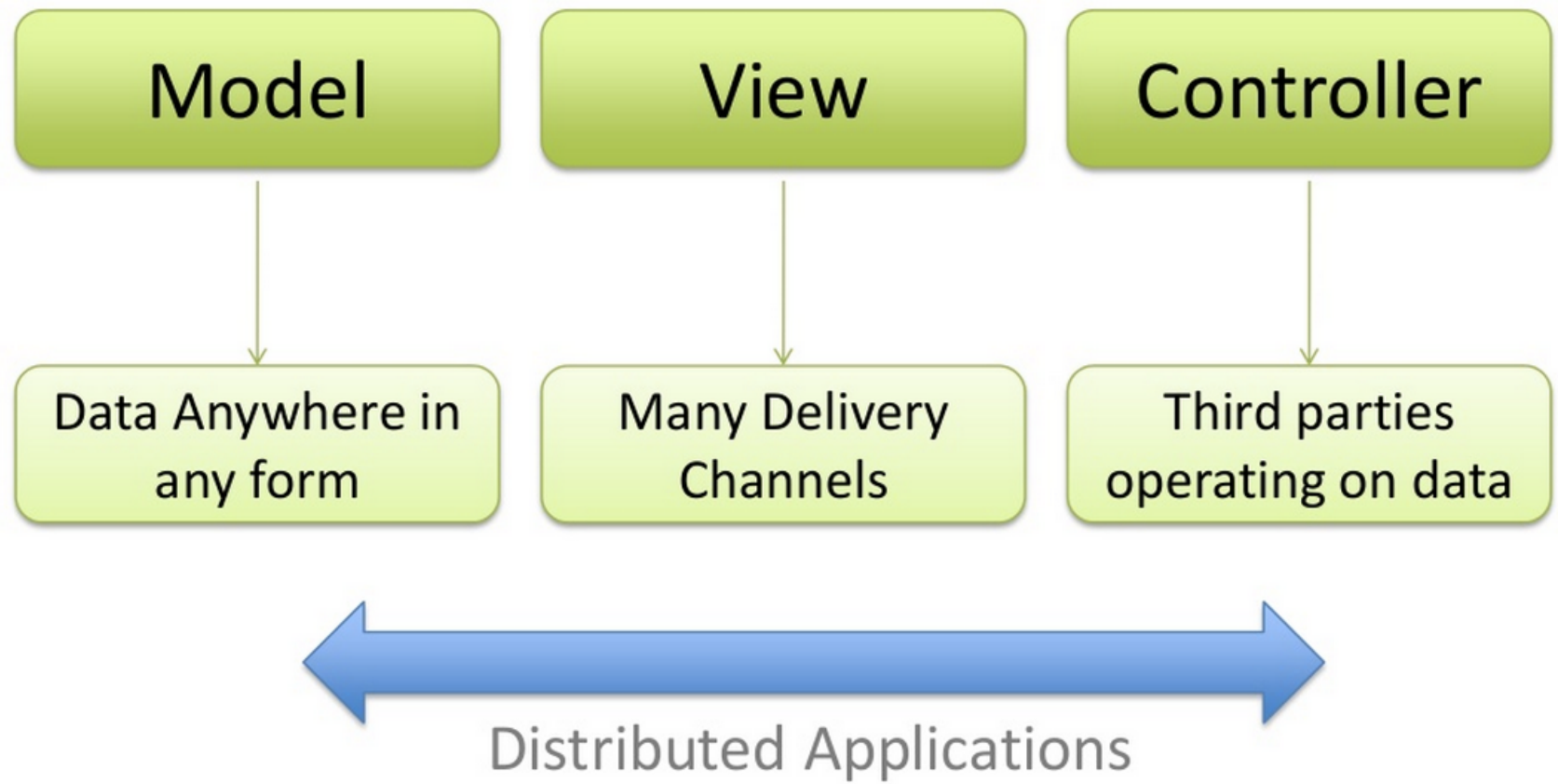
View

Many Delivery Channels

YAHOO!

Example: Controllers

APIs Enable Separation & Focus



Software + APIs allow
Businesses to co-evolve
much faster

Fundamentally Different Model of Developing Software

(MVC is only one model – the point is: componentization is possible)

II But this is Hard to Do

Downsides to Opening APIs…

- Security is key
- Scalability needs to be built in
- It requires long term support
- New type of business interaction

- Vendors can Help
- In many cases some of the work is already done

3SCALE

Downsides to using external APIs...

- Latency?
- Availability?
- Security?
- SLAs?
- Cost
- Service Continuity?

- In most cases there are no other ways to solve the problem
- Tools are emerging

3SCALE

This is Distributed Systems Engineering

10 Hard Things About Building Distributed Systems

- Interface Definition & Consistency
- Latency
- Slow or Dead?
- Distributed State Synchronization
- Remote Clock Problems
- Error Detection
- Change Management
- Static & Dynamic Testing
- Code Validation / Verification
- Frame Problems

3SCALE

But Wait…

It’s even harder than that …

Distributed Across Organizational Boundaries

- No access to source code
- No knowledge of Server Environment
- Security and Access Permissions Everywhere
- Identity Problems
- Shared Semantics are much harder to achieve
- Unknown / Mismatched Scale Issues
- Danger of Much Wider Interdependencies – Frame problem is worse!)

Lots of Challenges

What does this mean for The Web and Web Information Systems?

When Building Something - what do you care about?

A: My System

A: ~~My System~~

A: My Ecosystem

(Everything which is integrated with me)

Getting the Question Right

My System

- Architecture
- Security
- Scaling
- Data Models
- Interactions
- Consistency

More Obvious

My Ecosystem

- Who is integrated
- How do they do this
- Management of Dependencies
- Standard Interfaces
- Think about Client needs to rethink transaction loads
- Share scaling burden with developers

Less Obvious

We're Distributed

- APIs/REST/ SOAP
- Services Model
- Ecosystems
- Dependencies

Problems

1. Mixed Formats
2. Poor Designs
3. No Discovery
4. Fragile Integrations
5. Code Overhead

A Lot of Work to do!

Conclusions

Your Web Systems are now Distributed Computing

The World is being Software Enabled and Web-API-ified

Long way to go - but the basics are having a BIG impact

Discussion Topics

SOAP v's REST

Hypermedia

APIs & HTML5

API Growth

APIS v's Websites

APIS & Semantic Web

...

3SCALE

3scale: http://www.3scale.net

APItools: http://www.apitools.com

APICodex: http://apicodex.3scale.net

Thank You!

Contact:

http://www.3scale.net

@njyx - steve@3scale.net

APIs enable componentization across organizational boundaries