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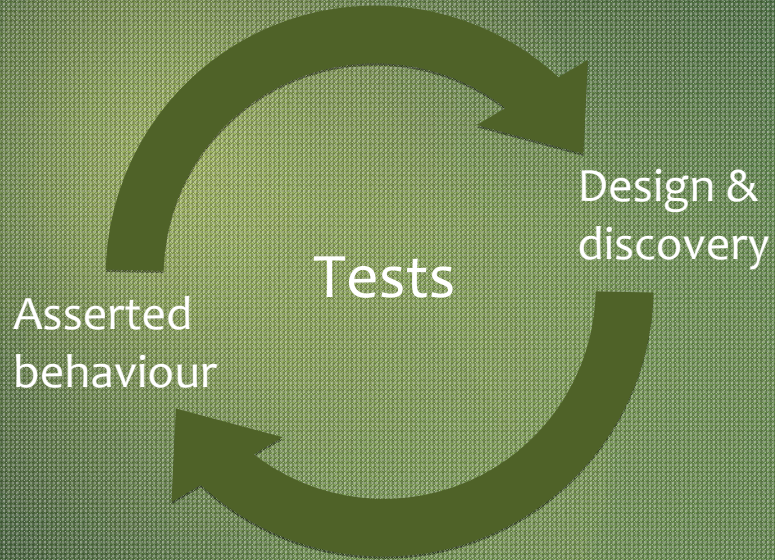


Testable Foundations for Service-Oriented Development

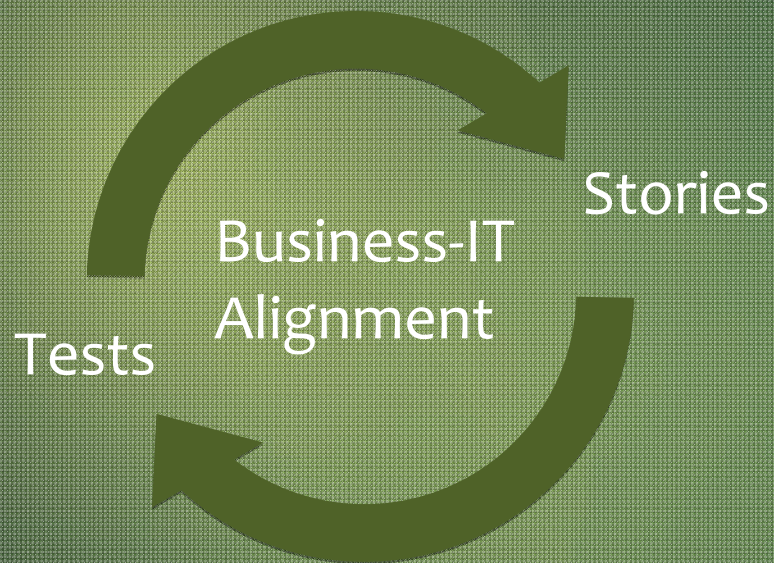
Ian Robinson

<http://iansrobinson.com>

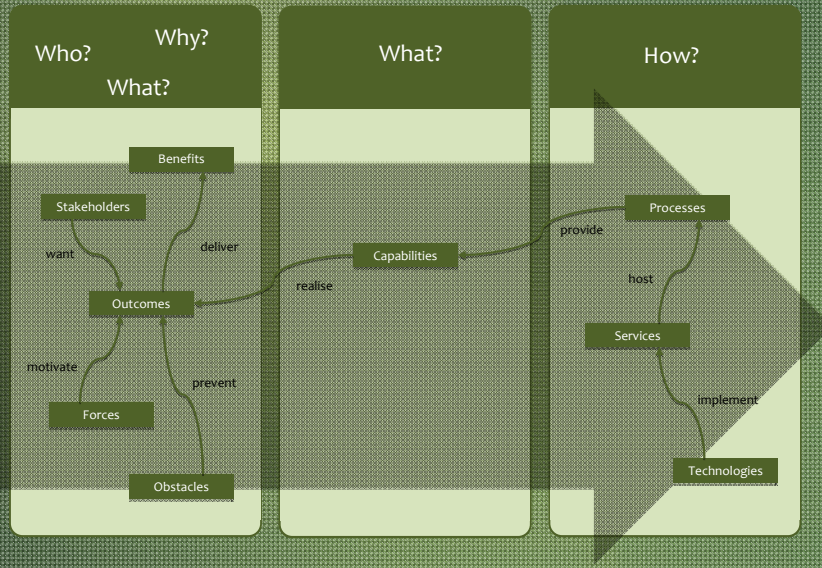
Tests, Testing and Testability



Micro Alignment



A Map of the Territories: From What to How



Stories, Capabilities, Services and Contracts



(Behaviour-Driven Development) Stories

Outside-in

Outcomes

As an *Order Management service*
I want *to fulfill orders based on*
current offerings
So that *I can meet customer*
expectations efficiently

Value

External
behaviour

Capabilities

Resources

People

Processes

Technology

Capabilities

Outcomes

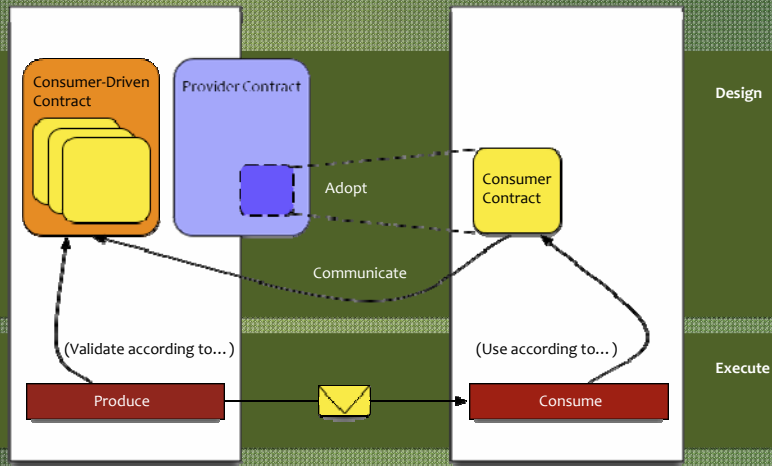
Stable

What not How

Processes
change

Technology
changes

Contracts



XmlUnit

```
public class ArtistUpdatedTestCase extends XMLTestCase {  
    ...  
    protected String xml;  
    public void testXPath() throws Exception {  
        assertXPathExists("/n:ArtistUpdated", xml);  
  
        assertXPathExists("/n:ArtistUpdated/a:Artist", xml);  
        assertXPathExists("/n:ArtistUpdated/a:Artist/a:GlobalArtistCode", xml);  
        assertXPathExists("/n:ArtistUpdated/a:Artist/a:DefaultName", xml);  
  
        assertXPathExists("/n:ArtistUpdated/a:Artist/a:MainRepertoireOwnerCompany",  
            xml);  
        assertXPathExists("/n:ArtistUpdated/a:Artist/a:MainRepertoireOwnerCompany/" +  
            "s:OperatingCompanyCode", xml);  
        assertXPathExists("/n:ArtistUpdated/a:Artist/a:MainRepertoireOwnerCompany/" +  
            "s:Name", xml);  
  
        assertXPathExists("/n:ArtistUpdated/a:Artist/a:ChangedDate", xml);  
    }  
}
```

Schematron

```
<?xml version="1.0" encoding="utf-8" ?>
<schema xmlns="http://www.ascc.net/xml/schematron">

  <title>ArtistUpdated Contract</title>

  <ns uri="http://example.com/notifications" prefix="n"/>
  <ns uri="http://example.com/artist" prefix="a"/>
  <ns uri="http://example.com/sharedtypes" prefix="s"/>

  <phase id="id-test" active="true">
    <active structure="id-test"/>
  </phase>

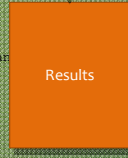
  <pattern name="id-test">
    <rule context="n:ArtistUpdated">
      <assert test="a:GlobalArtistCode"/>
      <assert test="a:DefaultName"/>
      <assert test="a:MainRepertoireOwnerCompany"/>
      <assert test="a:ChangedDate"/>
    </rule>
    <rule context="n:ArtistUpdated/a:Artist">
      <assert test="s:OperatingCompanyCode"/>
      <assert test="s:Name"/>
    </rule>
  </pattern>
</schema>
```

Schematron rules

Intermediate transform

XSLT

Results



An External DSL for Consumer Contracts

Declarative

```
ArtistUpdated [http://example.com/notifications]
  Artist[http://example.com/artist]
    GlobalArtistCode : int
    DefaultName : string
    MainRepertoireOwnerCompany : companyType (0..1)
    ChangedDate : datetime

Company[http://example.com/company] id(companyType)
  OperatingCompanyCode : string
  Name : string
```

What not *How*

Validating XML

```
ArtistUpdated [http://example.com/notifications]
  Artist[http://example.com/artist]
    GlobalArtistCode : int
    DefaultName : string
    MainRepertoireOwnerCompany : companyType (0..1)
    ChangedDate : datetime

Company[http://example.com/company] id(companyType)
  OperatingCompanyCode : string
  Name : string

<ArtistUpdated xmlns="http://example.com/notifications">
  <Artist xmlns="http://example.com/artist">
    <GlobalArtistCode>13570</GlobalArtistCode>
    <DefaultName>Tom Waits</DefaultName>
    <MainRepertoireOwnerCompany xmlns:c="http://example.com/company">
      <c:OperatingCompanyCode>HF32L</c:OperatingCompanyCode>
      <c:Name>Mercury Records Ltd</c:Name>
    </MainRepertoireOwnerCompany>
    <ChangedDate>2008-09-10T13:57:14+01:00</ChangedDate>
  </Artist>
</ArtistUpdated>
```

Validating JSON

```
ArtistUpdated [http://example.com/notifications]
  Artist[http://example.com/artist]
    GlobalArtistCode : int
    DefaultName : string
    MainRepertoireOwnerCompany : companyType (0..1)
    ChangedDate : datetime

Company[http://example.com/company] id(companyType)
  OperatingCompanyCode : string
  Name : string

{
  "ArtistUpdated": {
    "Artist": {
      "GlobalArtistCode": 13570,
      "DefaultName": "Tom Waits",
      "MainRepertoireOwnerCompany": {
        "OperatingCompanyCode": "HF32L",
        "Name": "Mercury Records Ltd",
      },
      "ChangedDate": "2008-09-10T13:57:14+01:00"
    }
  }
}
```

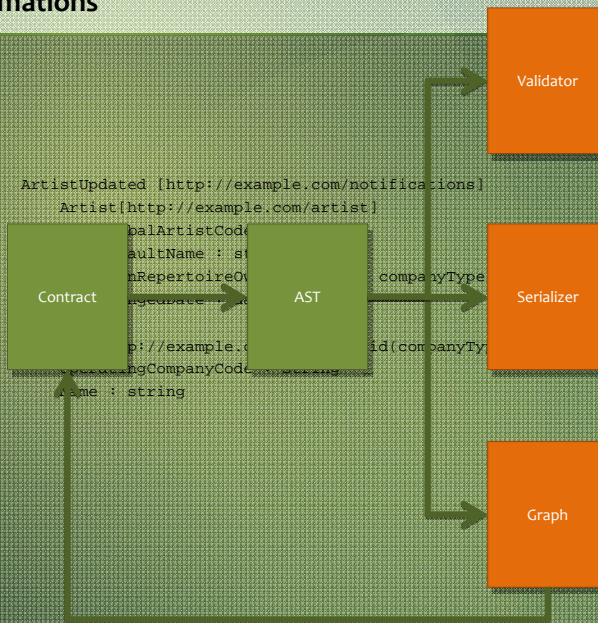
Validating YAML

```
ArtistUpdated [http://example.com/notifications]
  Artist [http://example.com/artist]
    GlobalArtistCode : int
    DefaultName : string
    MainRepertoireOwnerCompany : companyType (0..1)
    ChangedDate : datetime
```

```
Company [http://example.com/company] id(companyType)
  OperatingCompanyCode : string
  Name : string
```

```
ArtistUpdated:
  Artist:
    GlobalArtistCode: 13570
    DefaultName: Tom Waits
    MainRepertoireOwnerCompany:
      OperatingCompanyCode: HF32L
      Name: Mercury Records Ltd
    ChangedDate: 2008-09-10T13:57:14+01:00
```

Transformations



Validating Forms

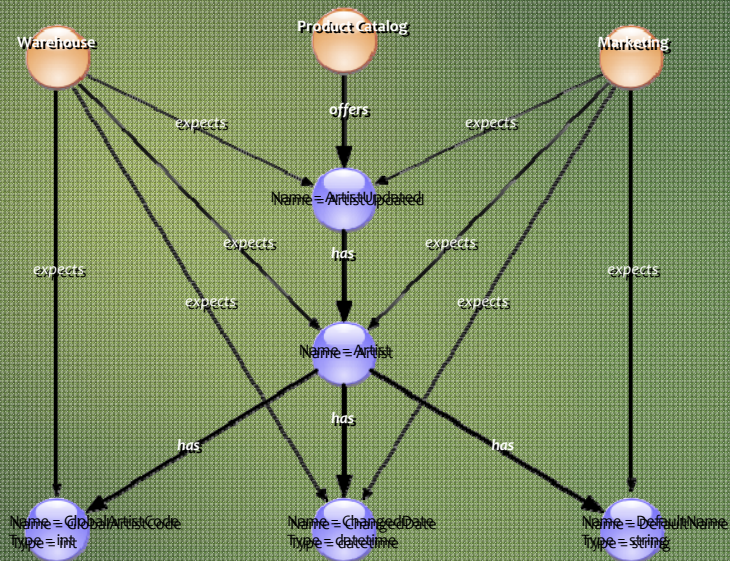
```
ArtistUpdated [http://example.com/notifications]
  Artist[http://example.com/artist]
    GlobalArtistCode : int
    DefaultName : string
    MainRepertoireOwnerCompany : companyType (0..1)
    ChangedDate : datetime
```

```
Company[http://example.com/company] id(companyType)
  OperatingCompanyCode : string
  Name : string
```

```
POST /notifications HTTP/1.1
Host: example.com
Content-Type: application/x-www-form-urlencoded
Content-Length: 301
```

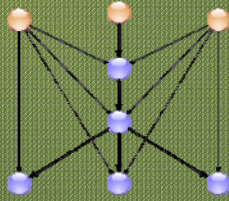
```
ArtistUpdated_Artist_GlobalArtistCode=13570&ArtistUpdated_Artist_DefaultName=Tom+Waits&ArtistUpdated_Artist_MainRepertoireOwnerCompany_OperatingCompanyCode=HF32L&ArtistUpdated_Artist_MainRepertoireOwnerCompany_Name=Mercury+Records+Ltd&ArtistUpdated_Artist_ChangedDate=2008-09-10T13%3A57%3A14%2B01%3A00
```

Social Networks for Contracts



Generating Consumer-Driven Contracts

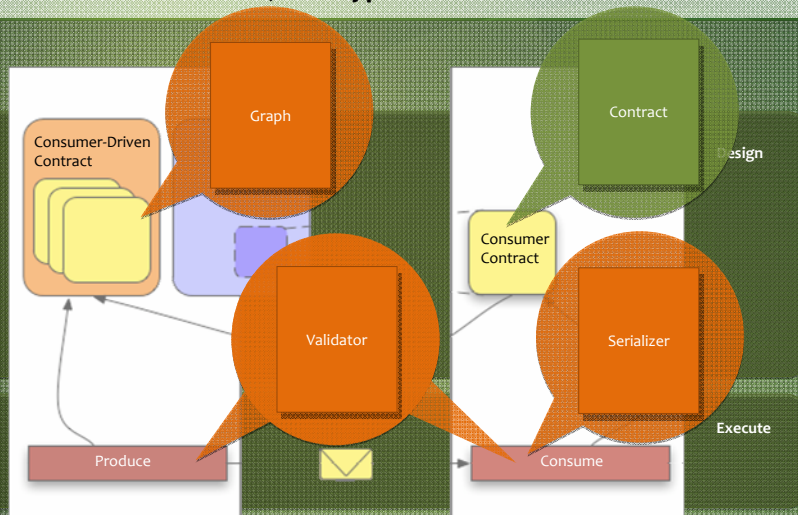
```
ArtistUpdated
Artist
  GlobalArtistCode : int
  ChangedDate : datetime
```



```
ArtistUpdated
Artist
  GlobalArtistCode : int
  DefaultName : string
  ChangedDate : datetime
```

```
ArtistUpdated
Artist
  DefaultName : string
  ChangedDate : datetime
```

Services Share Contract, Not Type

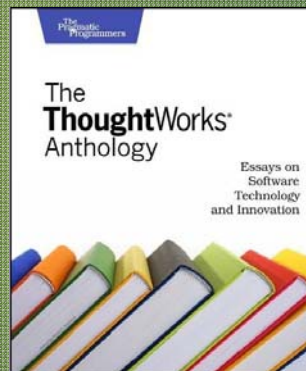


Summary

- How do we get started?
 - Iteratively fill out map of the territories
- 4 core artefacts:
 - Stories
 - Capabilities
 - Services
 - Contracts
- Consumer and consumer-driven contracts:
 - Tests exchanged between teams
 - DSL for consumer contracts

Consumer-Driven Contracts

- <http://www.martinfowler.com/articles/consumerDrivenContracts.html>
- <http://www.infoq.com/articles/consumer-driven-contracts>
- <http://iansrobinson.com/>



Thank you

<http://iansrobinson.com>