
Oracle Policy Automation and Business Rules

Asparona
CONSULT DELIVER SUPPORT

NZOUG presentation

By Michael Crowley

Asparona
CONSULT DELIVER SUPPORT



Agenda

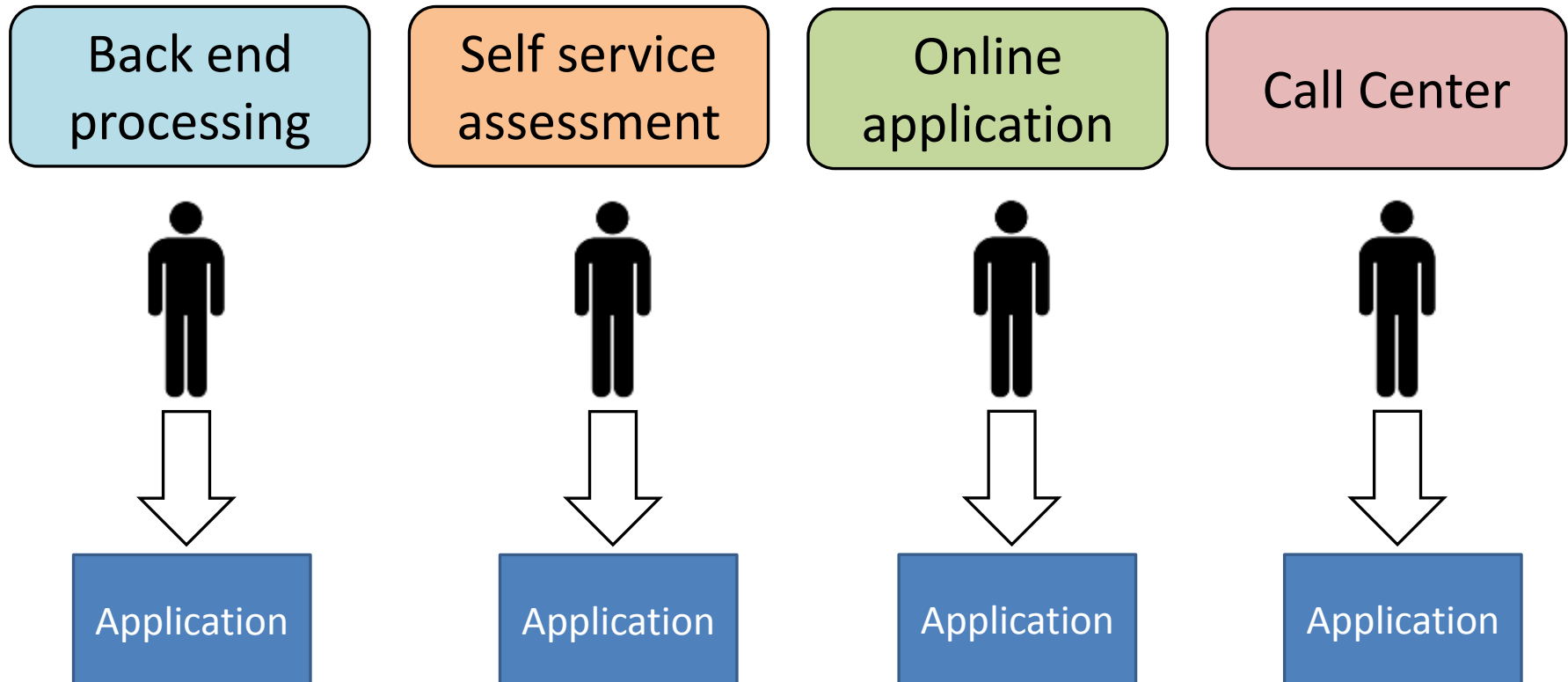
- Why you should automate business rules
- Why you should use OPA
- Who uses OPA
- What goes on inside OPA
- Questions

The Challenge

Why you should automate business rules

Current State:

Multiple Channels / Multiple Applications



What are Business Rules?

“Business rules define, constrain, assert, influence, enable or control some aspect of the behaviour of the business”

If the applicants family has a history of heart disease, **then** the premium is increased 50%

If the customer has been bankrupt, **then** the customer cannot access additional borrowing

The Passage of Time...

Reprint as at 1 January 2013

Land Transport Act 1998
Public Act 1998 No 110
Date of assent 8 December 1998
Commencement see section 1(2), (3), (5)

Note
Changes authorised by [section 17C](#) of the Acts and Regulations Publication Act 1989 have been made in this reprint.
A general outline of these changes is set out in the notes at the end of this reprint, together with other explanatory material about this reprint.
This Act is administered by the Ministry of Transport.

Contents

[Title](#)
1 [Short Title and commencement](#)

[Part 1](#)
[Preliminary provisions](#)

[2 Interpretation](#)
[3 Act to bind the Crown](#)

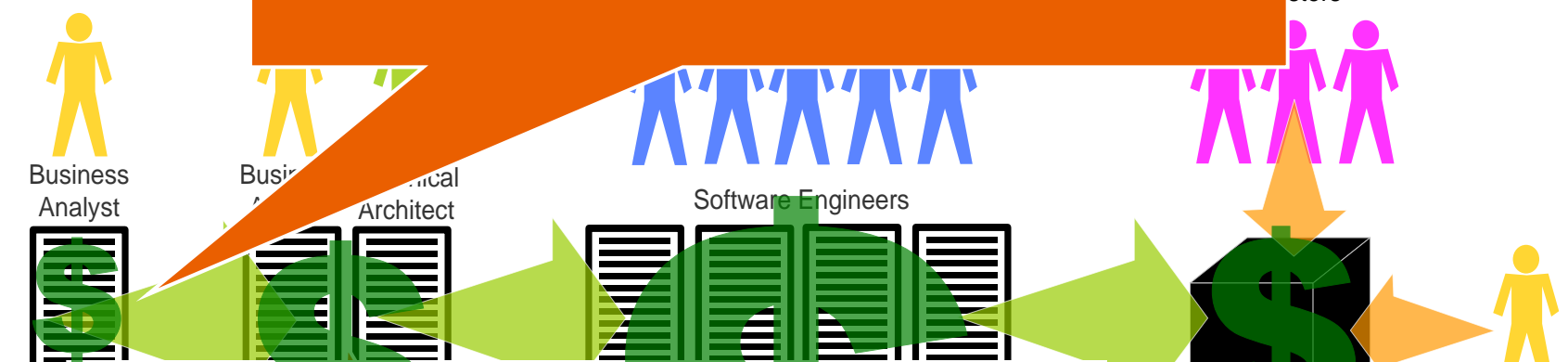
[Part 2](#)
[Primary responsibilities of participants in land transport system](#)
[General responsibilities](#)

[4 General requirements for participants in land transport system](#)

Threshing Committee of the U. S. Food Administr'n for Knox Co.

The Traditional Software Life Cycle

STEP 1:
Document requirements, including business rules



STEP 4:
Test executables – note this is depicted as a black box because of the lack of transparency into system decisions

STEP 3:
Build solution using source code & supporting libraries
Driving change from this point in the process is very expensive – it involves traversing the entire life cycle again!

What do we Have?

The Challenge...

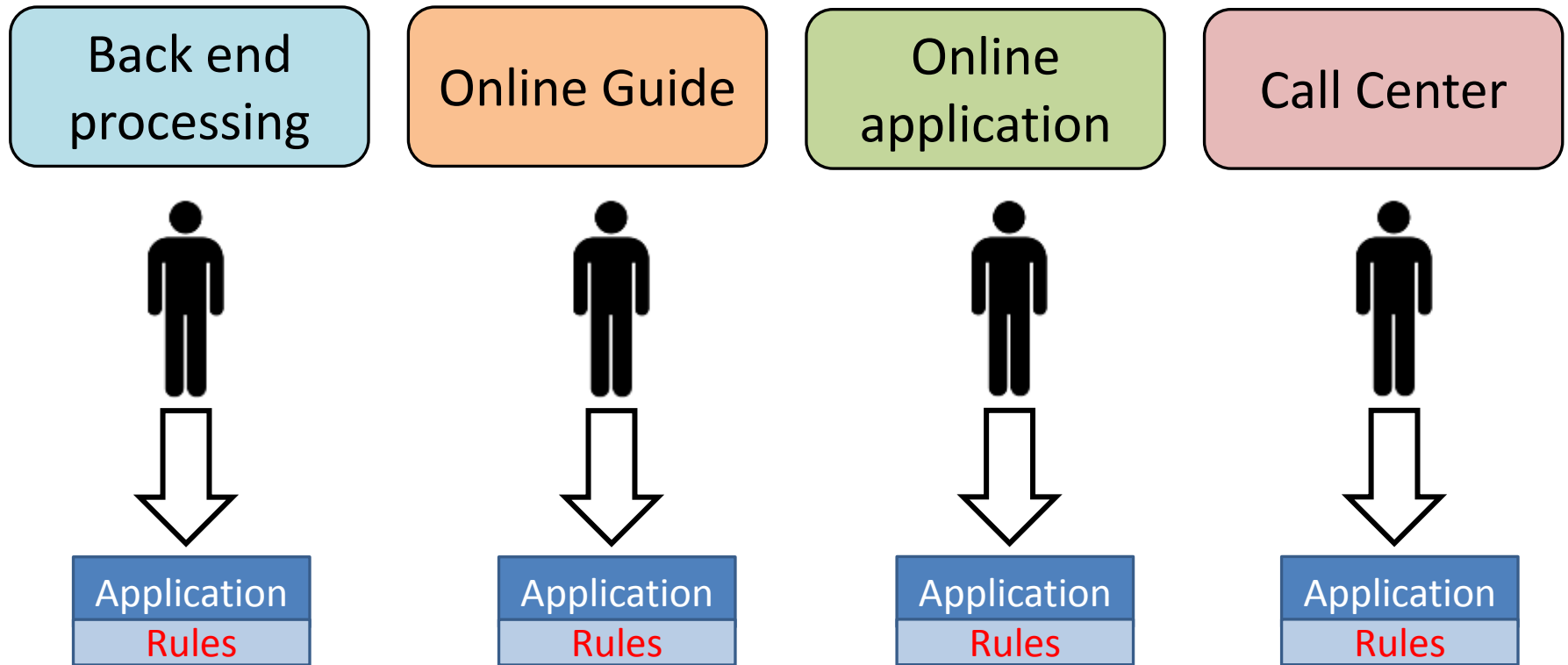
Logic embedded in many systems / applications

Achieving consistency across channels is difficult

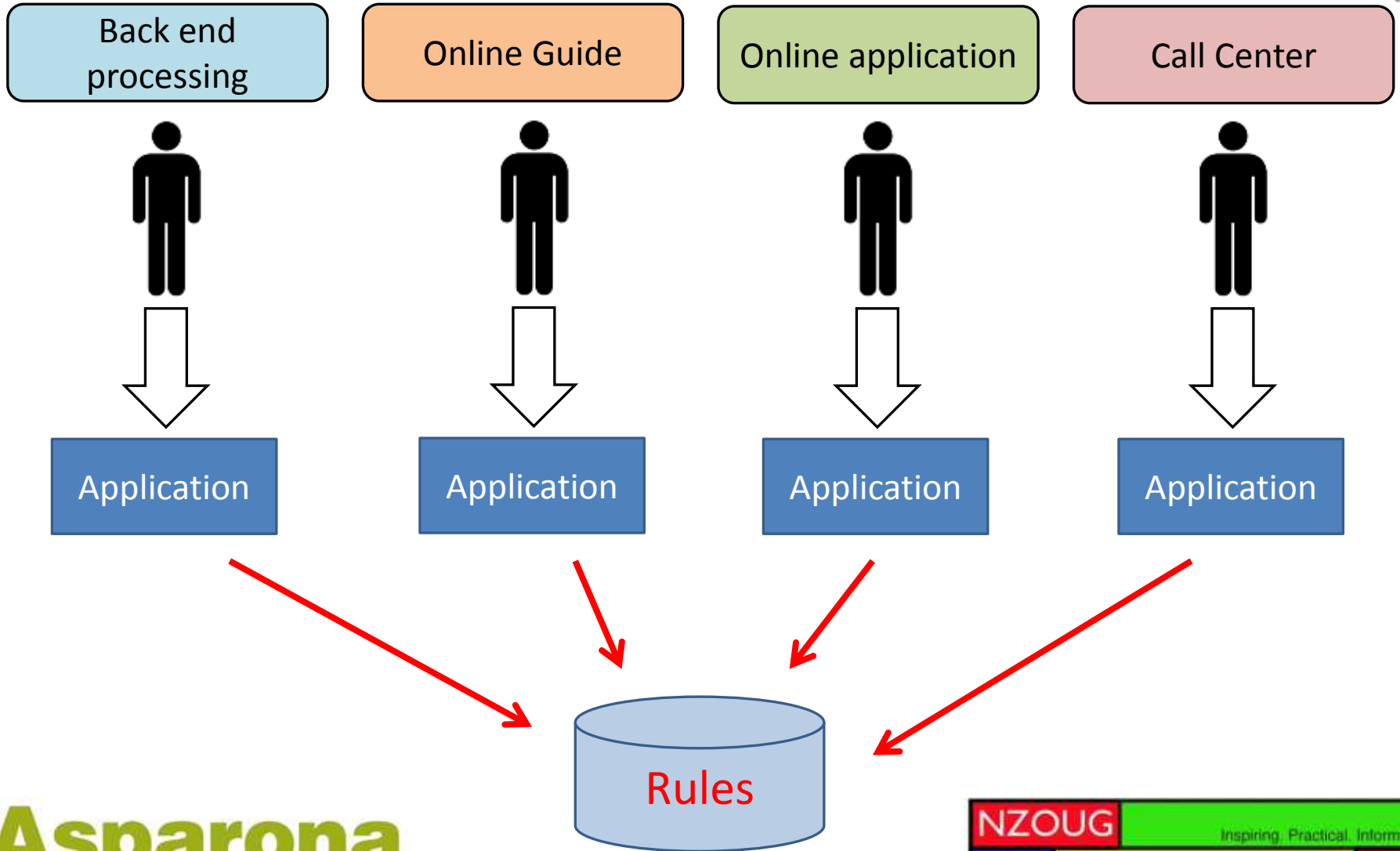
Maintenance of rules in multiple systems is expensive and time consuming

High dependency on IT (technical resources)

Multiple Channels / Multiple Applications



Extracting Business Rules



What do we Need?

The Need...

Externalise business logic

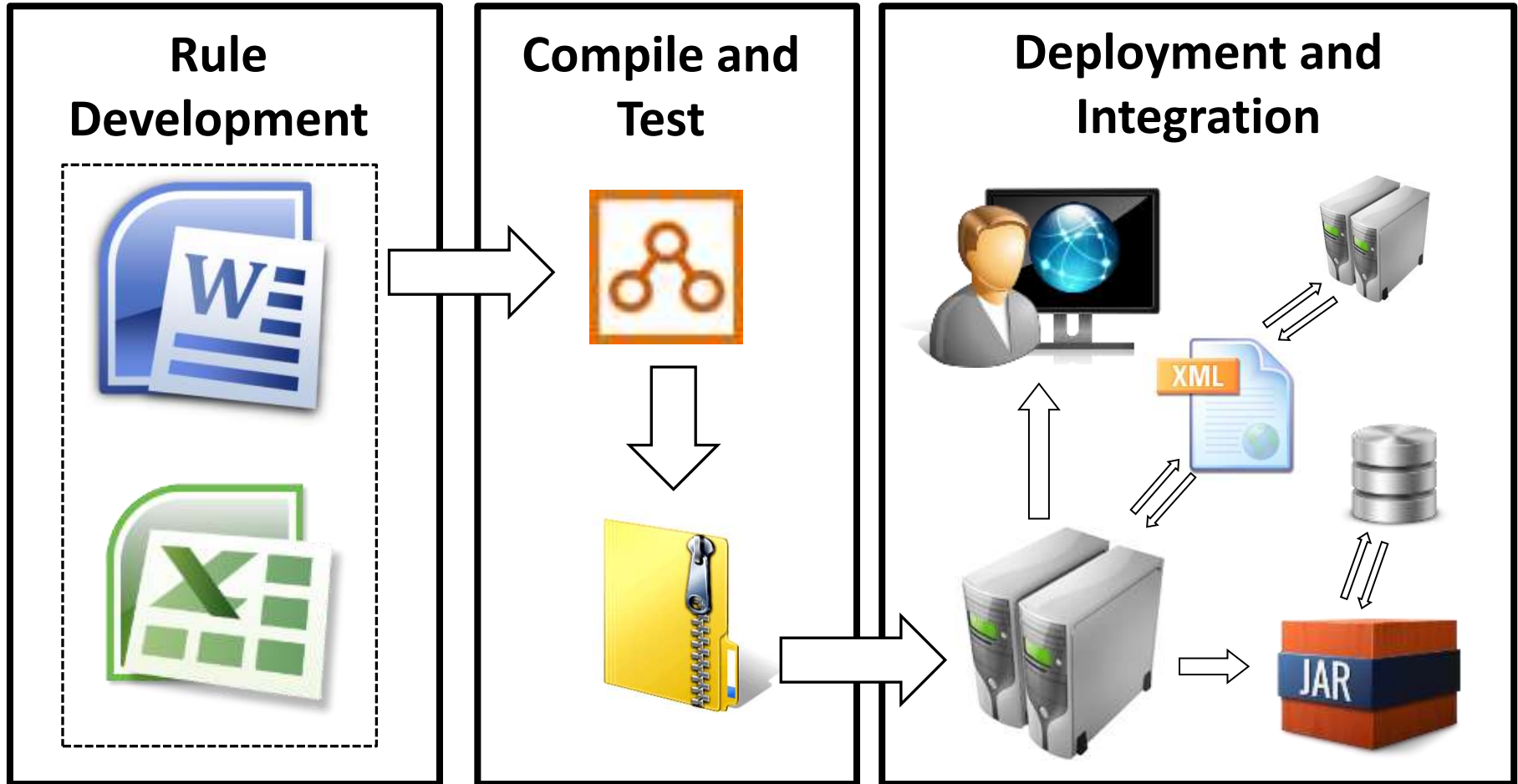
Re-use single source of rules across multiple system

Streamlined changes in rule logic

Enable business users ownership of business rules

Faster and lower costs

Oracle Policy Automation



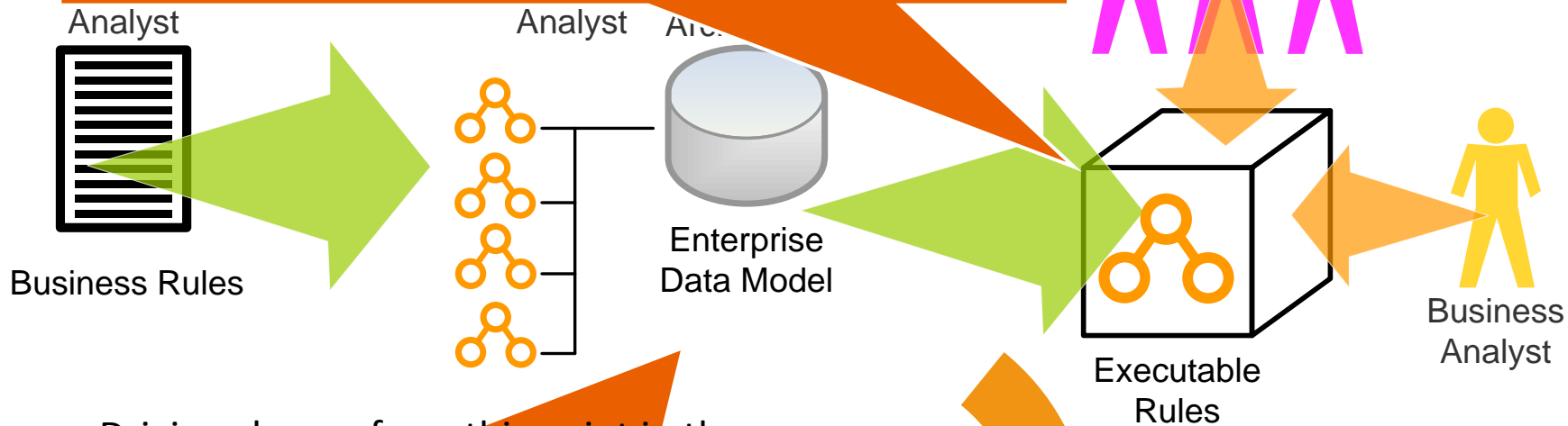
The Oracle Policy Automation Life Cycle

STEP 1:

Capture rules in Oracle Policy Modeling

STEP 3:

Deploy & test rules – well supported by transparent execution (decision reports)

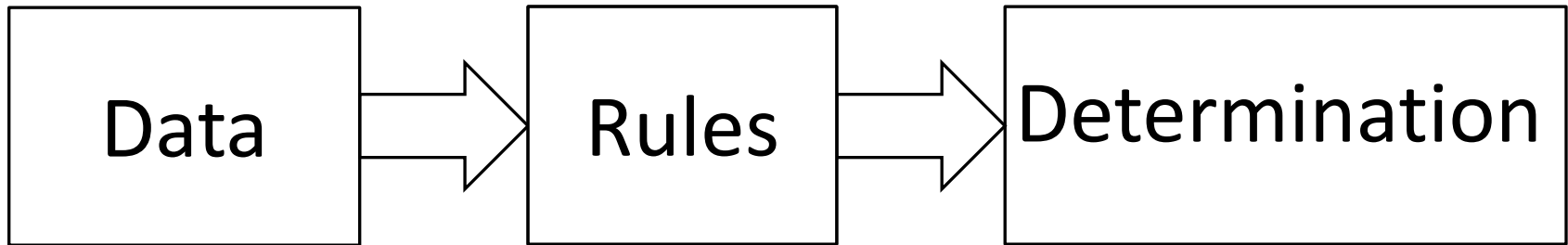


Driving change from this point in the process

STEP 2:

is much cheaper – it involves fewer resources & fewer stages
Map rules to enterprise data model

Oracle Policy Automation:



Structured data:

- True/false
- Currency
- Numbers
- Text
- Dates
- Time

Business Rules:

- Legislation
- Contracts
- Policy
- Practice

Determinations:

- *“The person is eligible...”*
- *“The amount the person is eligible for...”*

Who currently uses OPA?

In New Zealand, Inland Revenue:

The screenshot shows the Inland Revenue (Te Tari Taake) website's Depreciation Calculator. The page title is "Depreciation claim - calculate your tax deduction". It includes a "Restart" button and a "Contact us" link. The calculator is currently on the "Depreciation claim - calculate your tax deduction" tab, with other tabs for "Previous Depreciation Claim" and "Asset Disposal".

Use this page to calculate depreciation on a business asset. You will need to know the depreciation rate that applies to the asset - you can get this from our [Depreciation rate finder](#).

For further information about depreciation you can use our [Depreciation](#) booklet (IR 260).

Don't use this calculator for petroleum mining assets as different depreciation rules apply to them. For more information please [contact us](#) or your tax advisor.

Questions marked with * need to be completed, to calculate your depreciation.

1. When is your balance date? * 31 March

2. How much did the asset cost? * \$0.00

Note: If registered for GST this will be the GST exclusive cost.

Have you claimed depreciation in earlier years for the asset? * Yes No

<http://www.ird.govt.nz/calculators/keyword/depreciation/calculator-depreciation.html>

Some users internationally:

- **Tax Agencies**
 - HMRC, IRS
- **Social Security**
 - Govt of British Columbia, Dept of Social Security (Sweden), 50+ Local Councils in the UK
- **Defence**
 - Ministry of Defence (UK), Dept of Defence (Australia), Dept of Veterans Affairs (Australia)
- **Other**
 - Dept of Immigration (Aus), Montana DMV, Dept Trade and Industry (UK), Dept of Statistics (Netherlands), Credit Suisse, UBS, Toyota Motor Corp (USA), AT&T, American International Assurance

Australian Dept. Immigration and Citizenship

gees | in Australia | Department | Services | Australia's Borders

Visa Wizard

Finding you the right Australian Visa

The Visa Wizard can help you find the Australian visa most likely to meet your specific circumstances.

IMPORTANT: The Visa Wizard includes the most common Australian visas, but does not include every visa. Our website contains more [visa information](#) or you can [contact us](#) for assistance.



Please answer these questions

1. Why do you want an Australian visa? [Learn more](#)

- Please make a selection -

2. What is the country of nationality on your passport? [Learn more](#)

- Please make a selection -

3. Where do you expect to be when you apply for a visa? [Learn more](#)

- Please make a selection -

4. What is your date of birth? [Learn more](#)

day month year

5. How long do you intend to stay in Australia? [Learn more](#)

- Please make a selection -

Find visas

Who is OPA Suitable For?

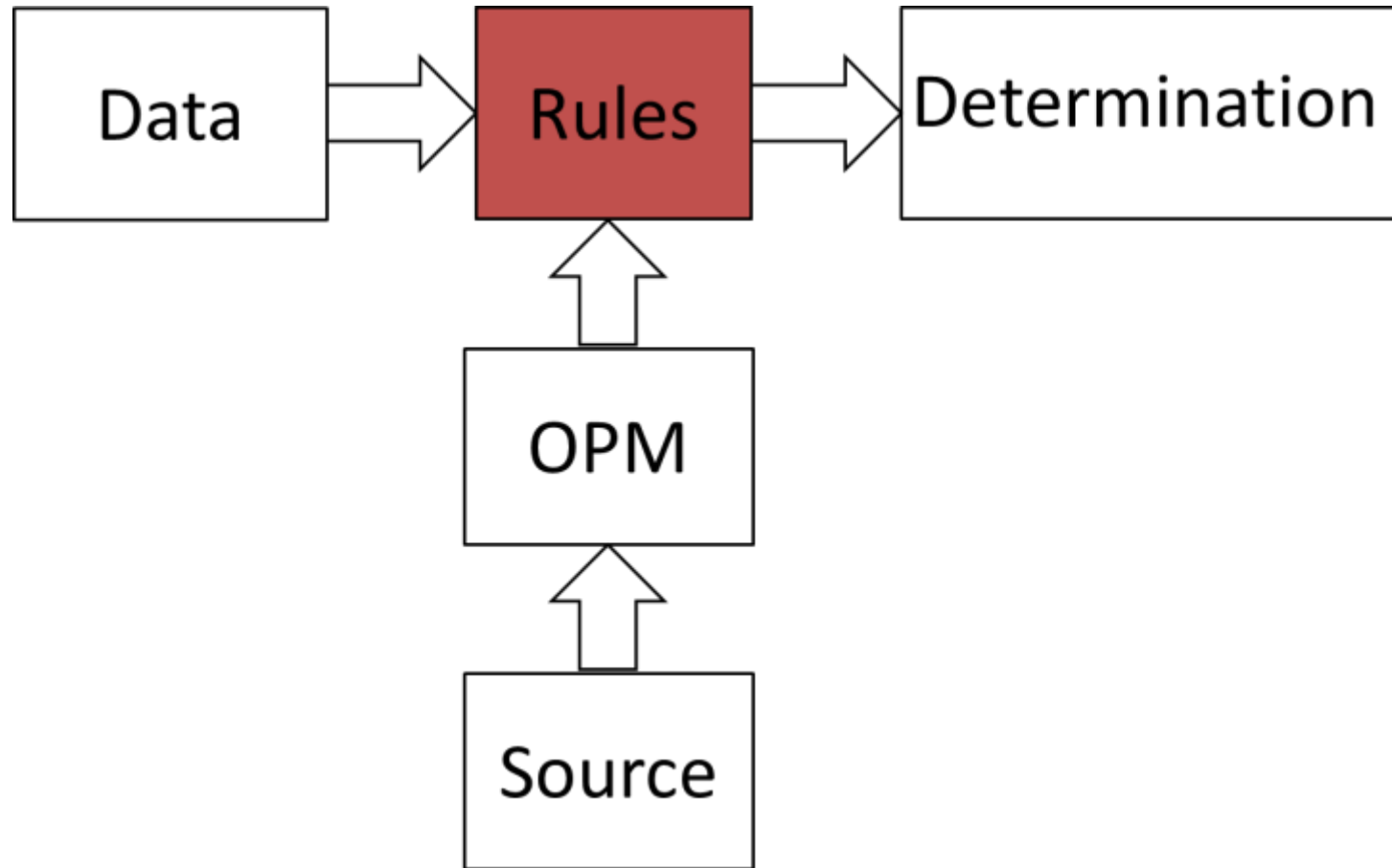
Are You Asking:

- Is the person eligible for, entitled to, liable for, required to...?
- What is the amount of benefit, compensation, tax, payment...?

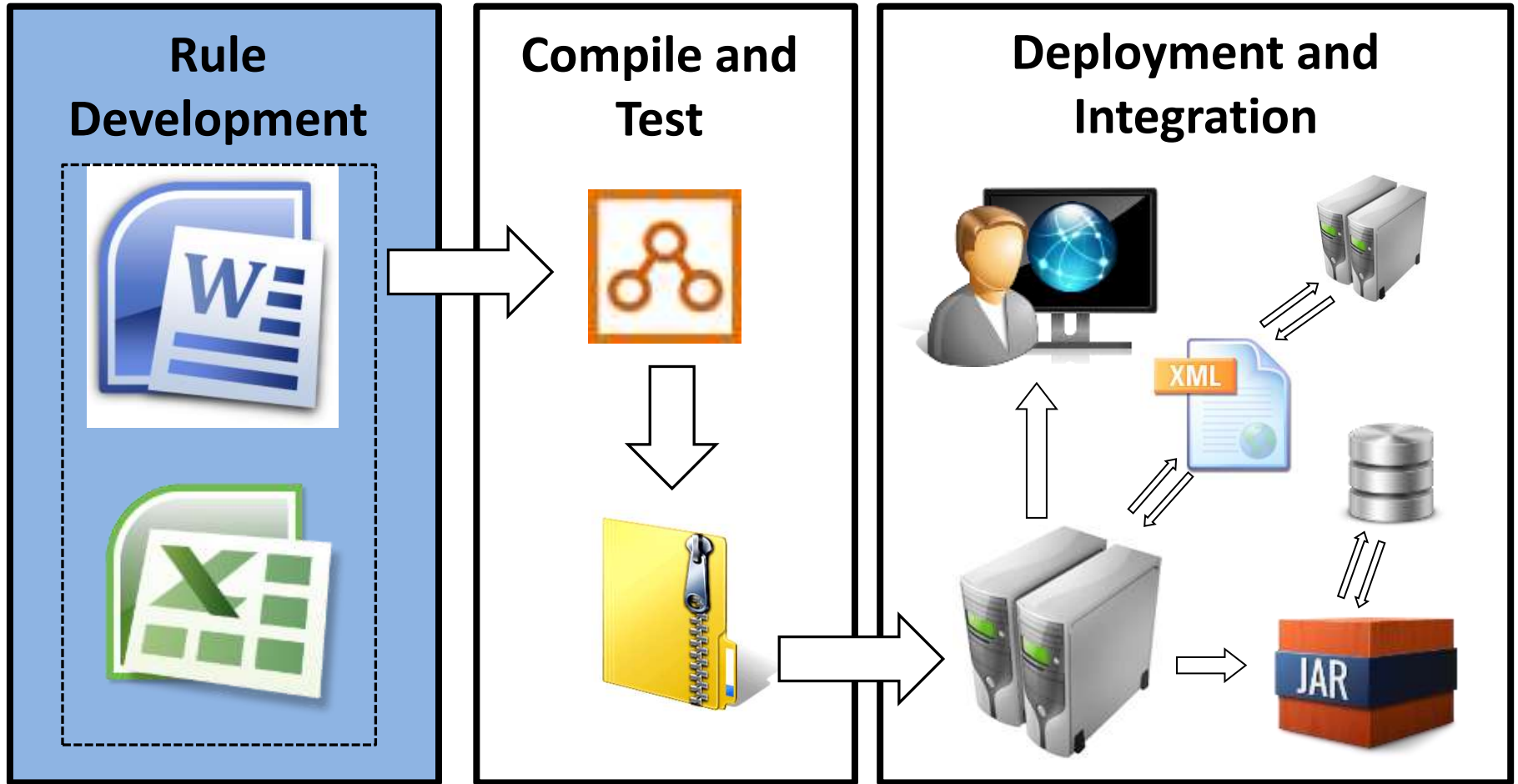
Yes?... Then OPA is right for you!

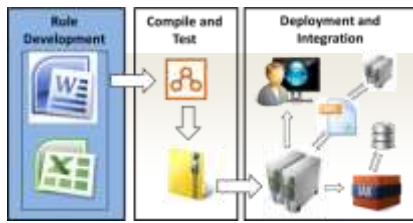
What goes on inside OPA?

Oracle Policy Automation:



Components



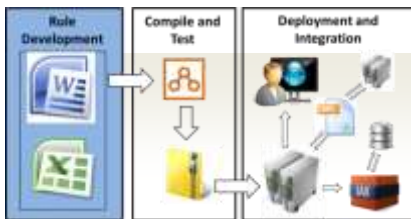


Rules Development

Rule Development



- Rules written in Word
 - Isomorphic
 - Plain language
 - Easy rule changes
- Rules written in Excel
 - Suitable for tables of rates
 - Often suitable for schedules in legislation



Isomorphism between source material the rules written in Word

89 Unemployment benefit: standard eligibility requirements

(1) A person is entitled to an unemployment benefit if he or she satisfies the criteria in subsections (2), (3), and (4), and—

(a) is not in full-time employment, but—

(i) is seeking it; and

(ii) is available for it; and

(iii) is willing and able to undertake it; and

(iv) has taken reasonable steps to find it; or

(b) *[Repealed]*

(c) *[Repealed]*

(2) An applicant for an unemployment benefit—

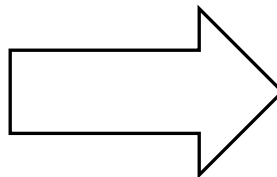
(a) must be aged at least 18 years, in the case of an applicant without a dependent child:

(b) must be aged at least 19 years, in any other case.

(3) An applicant for an unemployment benefit must meet the residential requirements in [section 74AA](#).

(4) An applicant for an unemployment benefit must have—

(a) no income; or



[b21.89(1)] [b1] the person is entitled to an unemployment benefit if

[b41.(a)] [~~b31~~] the person is not in full-time employment

and

all

[b61.(i)] [b51] the person is seeking full-time employment

and

[b81.(ii)] [b71] the person is available for full-time employment

and

[b101.(iii)] [b91] the person is willing and able to undertake full-time employment

and

[b121.(iv)] [b111] the person has taken reasonable steps to find full-time employment

and

[b131.(2)] either

[b141.(a)] both

[b151] the person is aged at least 18 years

and

[~~b161~~] the person does not have a dependent child

or

[b171.(b)] both

[b181] the person is aged 19 years or greater

and

[b161] the person has a dependent child

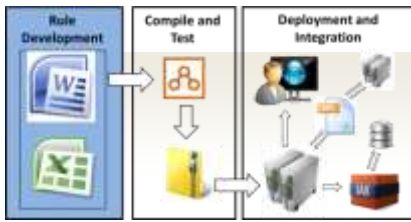
and

[b201.(3)] [b191] the person meets the residential requirements Social Security Act 1964, s 74AA

and

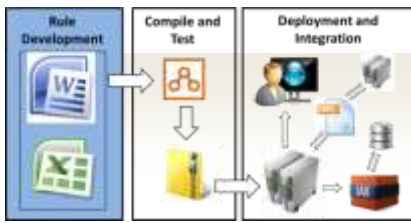
[b211.(4)] either

[b231.(a)] [b221] the person must have no income



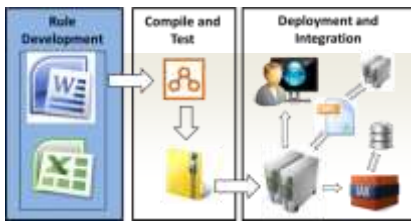
Rules in Excel

the customers age	the customer is a smoker	the weekly amount of the premium
18	TRUE	\$5.77
	FALSE	\$11.54
19	TRUE	\$5.96
	FALSE	\$11.92
20	TRUE	\$6.15
	FALSE	\$12.31
21	TRUE	\$6.35
	FALSE	\$12.69
22	TRUE	\$6.54
	FALSE	\$13.08
23	TRUE	\$6.73
	FALSE	\$13.46
24	TRUE	\$6.92
	FALSE	\$13.85
25	TRUE	\$7.12
	FALSE	\$14.23
26	TRUE	\$7.31
	FALSE	\$14.62
27	TRUE	\$7.50
	FALSE	\$15.00
28	TRUE	\$7.69
	FALSE	\$15.38
29	TRUE	\$7.88
	FALSE	\$15.77

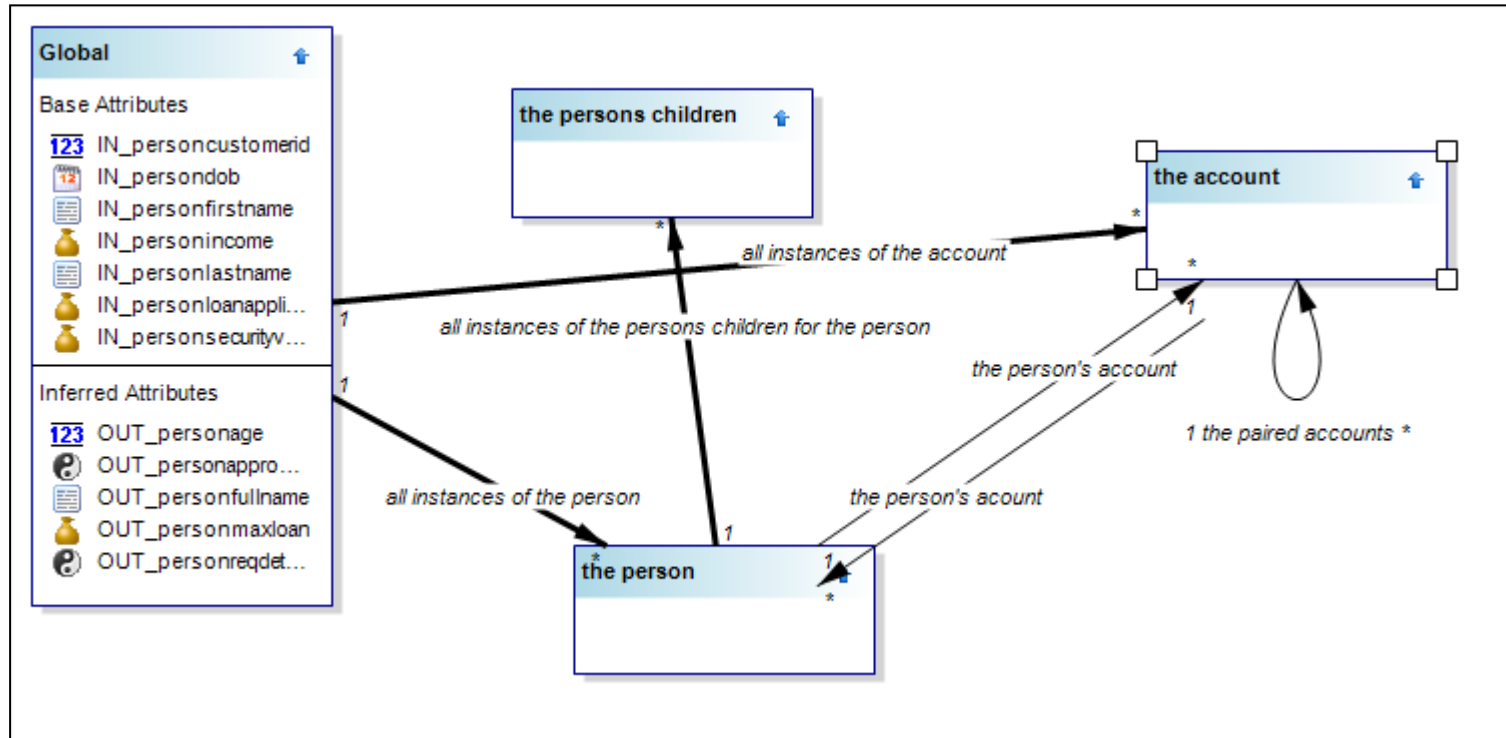


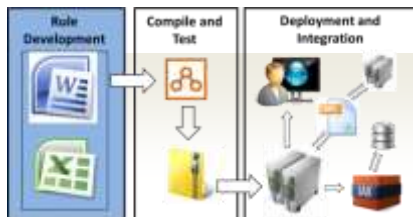
Time Based Reasoning

	2012-11-13	2012-11-15	2012-12-13	2012-12-14	2013-01-10	2013-01-17	2013-01-19	2013-02-07
Global								
Global								
💰 The person's loan account balance is {\$4,564.00}	4564.0	2476.0	5745.0		6876.0	3868.0		6546.0
🌐 The person's net position is credit.({true, false})	True				False	True		False
💰 The person's savings account balance is {\$5,469.00}	5469.0	6876.0		6543.0		8765.0	6577.0	6543.0



Complexity in Data Models

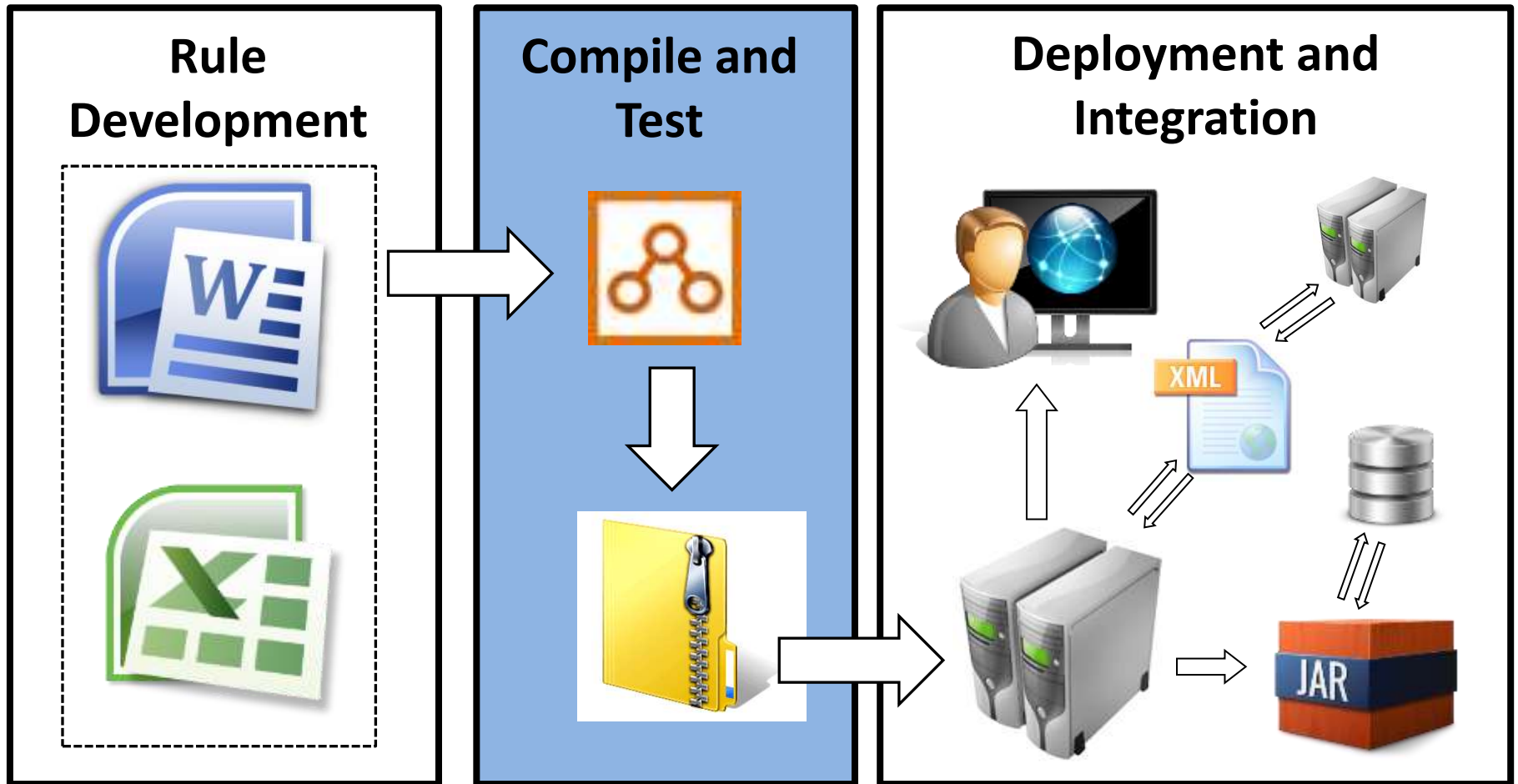


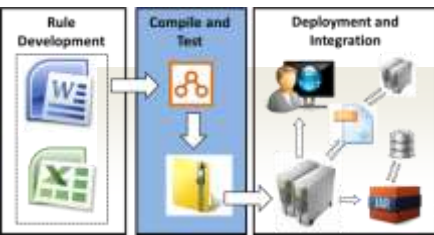


Managing Changes in Rules

[p1]. the weekly amount of the major disaster grant under the Major Disaster Grant Act 1990, s 75	
[100]. \$100	[p2 < #1995-04-01]. the date of the assessment < 1995-04-01
[110.50]. \$110.50	[p2 >= #1995-04-01]. the date of the assessment >= 1995-04-01 and [p2 < #1999-04-01]. the date of the assessment < 1999-04-01
[122.80]. \$122.80	[p2 >= #1999-04-01]. the date of the assessment >= 1999-04-01 and [p2 < #2005-04-01]. the date of the assessment < 2005-04-01
[135.98]. \$135.98	[p2 >= #2005-04-01]. the date of the assessment >= 2005-04-01
[uncertain]. uncertain	otherwise

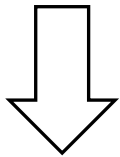
Compile and Test





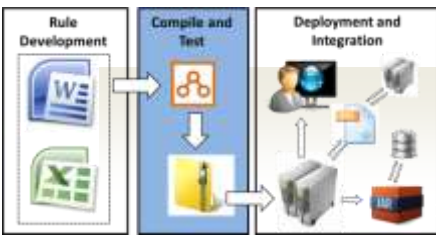
Compile and Test

Compile, Build and Test



- Compile
- Debugging
- Testing
- Test script coverage
- Rule visualisation

Debugging



Debug

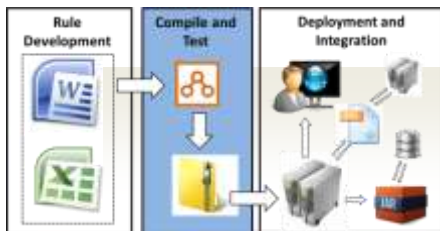
Data Decision

Temporal Options... Import Export

Show All Search

Name	Value	Text
b6@Rules_DemoRules_doc	<Unknown>	Has Alex's house been destroyed by the major disaster?
a2	<Unknown>	Alex's date of birth is unknown.
p12@Properties_DemoProperties_...	<Unknown>	Alex's region is unknown.
a1	Alex	The person is Alex.
p10@Properties_DemoProperties_...	<Unknown>	Alex's child component payment is unknown.
b3@Rules_IsoExample_doc	False	Alex is not in full-time employment.
b5@Rules_IsoExample_doc	<Unknown>	Is Alex seeking full-time employment?
b7@Rules_IsoExample_doc	<Unknown>	Is Alex available for full-time employment?
b9@Rules_IsoExample_doc	True	Alex is willing and able to undertake full-time employment.
b11@Rules_IsoExample_doc	<Unknown>	Has Alex taken reasonable steps to find full-time employment?
b15@Rules_IsoExample_doc	True	Alex is aged at least 18 years.
b16@Rules_IsoExample_doc	<Unknown>	Does Alex have a dependent child?
b18@Rules_IsoExample_doc	<Unknown>	Is Alex aged 19 years or greater?
b19@Rules_IsoExample_doc	<Unknown>	Does Alex meet the residential requirements Social Security Act 1964, s 74AA?
b22@Rules_IsoExample_doc	<Unknown>	Does Alex have no income?
b24@Rules_IsoExample_doc	<Unknown>	Does Alex have an income of less than the amount that would fully abate the benefit?
Inferable Attributes:		
b4@Rules_DemoRules_doc	True	Alex is eligible for an other factors component.
a3	<Unknown>	Alex's age is unknown.
a4	<Unknown>	Alex's number of dependent children is unknown.
p13@Properties_DemoProperties_...	<Unknown>	The regional payment component is unknown.

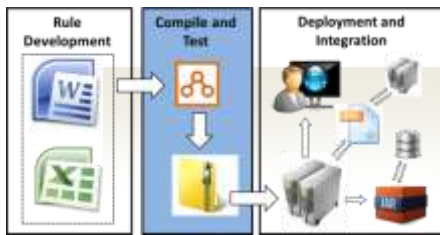
Constructing a Test Script



The screenshot shows a software interface with a table of attributes. The table has three columns: Name, Value, and Text. The attributes are grouped into 'Base Attributes' and 'Inferable Attributes'. The 'Inferable Attributes' section contains several entries, some of which are highlighted in yellow.

Name	Value	Text
— Base Attributes: —		
IN_personfirstname	<Unknown>	The person's first name is unknown.
IN_personlastname	<Unknown>	The person's last name is unknown.
IN_persondob	<Unknown>	The person's date of birth is unknown.
IN_personincome	<Unknown>	The person's annual income is unknown.
IN_personloanapplicationamount	<Unknown>	The amount of the personal loan the person has applied for is unknown.
IN_personsecurityvalue	<Unknown>	The value of the security the person has provided is unknown.
123IN_personcustomerid	<Unknown>	The person's customer ID number is unknown.
— Inferable Attributes: —		
OUT_personapproved	<Unknown> [<lg...	Is the person approved for the loan?
OUT_personreqdetails	<Unknown>	Has the person provided the required details?
OUT_personfullname	<Unknown>	The person's full name is unknown.
123OUT_personage	<Unknown>	The person's age is unknown.
OUT_personmaxloan	<Unknown> [<lg...	The maximum amount the person can borrow is unknown.

Testing and Test Scripts



Regression Tester Report

Generated 30/01/2013 2:51 p.m.

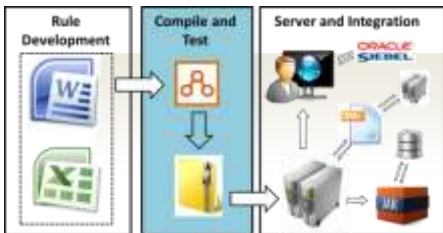
Summary

Test cases		Attributes	
Number of test cases:	4	Number of outcomes:	4 (4 significant)
Test cases passed:	3 (75%)	Matching outcomes:	3 (75% of total). Of these, 3 (100 % of matching) matched exactly and 0 (0 % of matching) matched after allowance for defined thresholds.
Test cases failed:	1 (25%)	Different outcomes:	1 (25%)
Test cases ignored:	0 (0%)	Ignored outcomes:	0 (0%)
Test cases with errors:	0 (0%)		

Test case comparison results

Cases	Entities	Outcomes	Expected	Actual
Test 1 Pass (1 exact, 0 threshold and 0 ignored)	global[global 1]	p19@Rules_DemoRules_doc	240.0	240.0
Test 2 Pass (1 exact, 0 threshold and 0 ignored)	global[global 1]	p19@Rules_DemoRules_doc	150.0	150.0
Test 3 Pass (1 exact, 0 threshold and 0 ignored)	global[global 1]	p19@Rules_DemoRules_doc	40.0	40.0
Test 4 Fail (1 out of 1 items)	global[global 1]	p19@Rules_DemoRules_doc	150.0	145.0

Test Script Coverage Report



Test Script Coverage

Organize By Document Coverage Threshold: 80 % Analysis based on 16 goals Regenerate

- SocialServicesScreening
 - Rules - (545/3423)
 - Source - (436/2854)
 - Supplemental Nutrition Assistance Program.doc - (21/43)
 - Eligibility - (19/41)
 - May be eligible - (5/14)
 - Household includes person 60 or older or person who is disabled or blind - (3/6)**
 - Household member is blind, disabled or aged 60 years or older - (2/4)
 - Calculate Deductions - (4/12)
 - Calculate Adjusted Income - (1/1)
 - Calculate Shelter Costs - (2/2)
 - Calculate Excess Shelter Deductions - (1/1)
 - Calculate Monthly Food Stamp Net Income - (1/1)
 - Benefit Amount - (2/2)
 - Temporary Assistance for Needy Families.doc - (34/45)
 - Low Income Home Energy Assistance Program.doc - (7/10)
 - School Meals.doc - (10/18)
 - Women Infants Children.doc - (5/11)
 - Earned Income Tax Credit.doc - (25/45)
 - Child and Dependent Care Credits.doc - (12/20)
 - Child Care Assistance.doc - (1/32)
 - Thresholds.xls - (152/686)
 - Poverty Guidelines.xls - (78/1200)
 - State Median Income.xls - (91/744)
 - System - (109/569)

Coverage for this rule: 3/6

the household includes a household member who is aged 60 years or older or who is disabled or blind, if

either

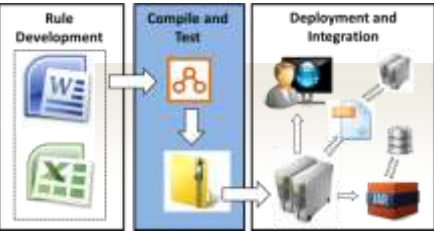
either

true **false** the applicant is aged 60 years or older **or**

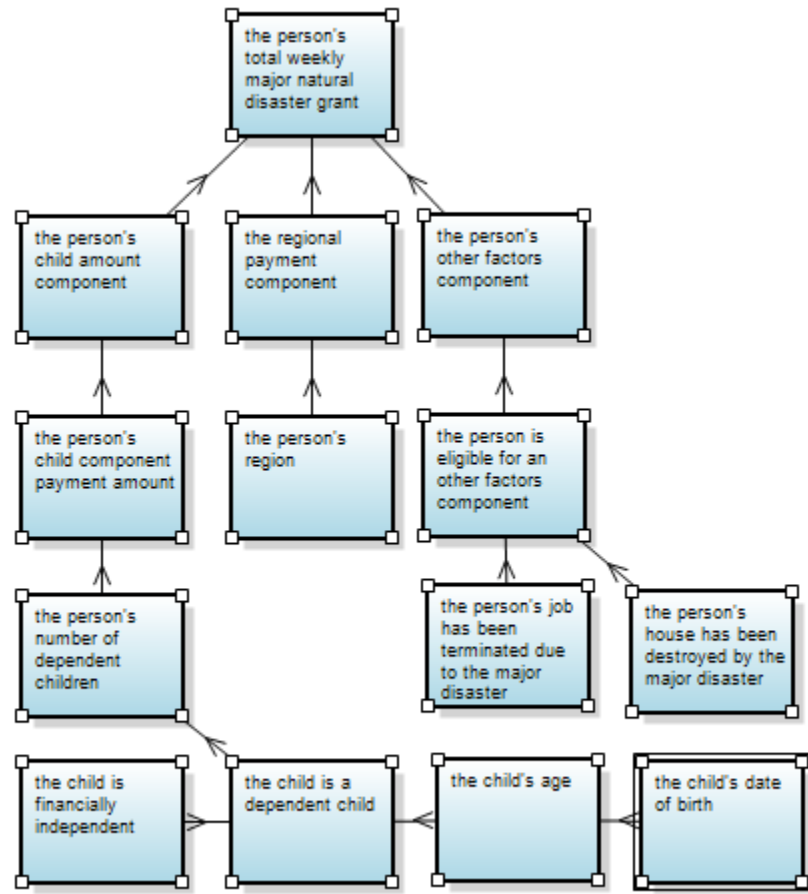
true **false** the applicant is blind or permanently disabled

or

true **false** **Exists**(householdmembers, the household member is blind, disabled or aged 60 years or older)

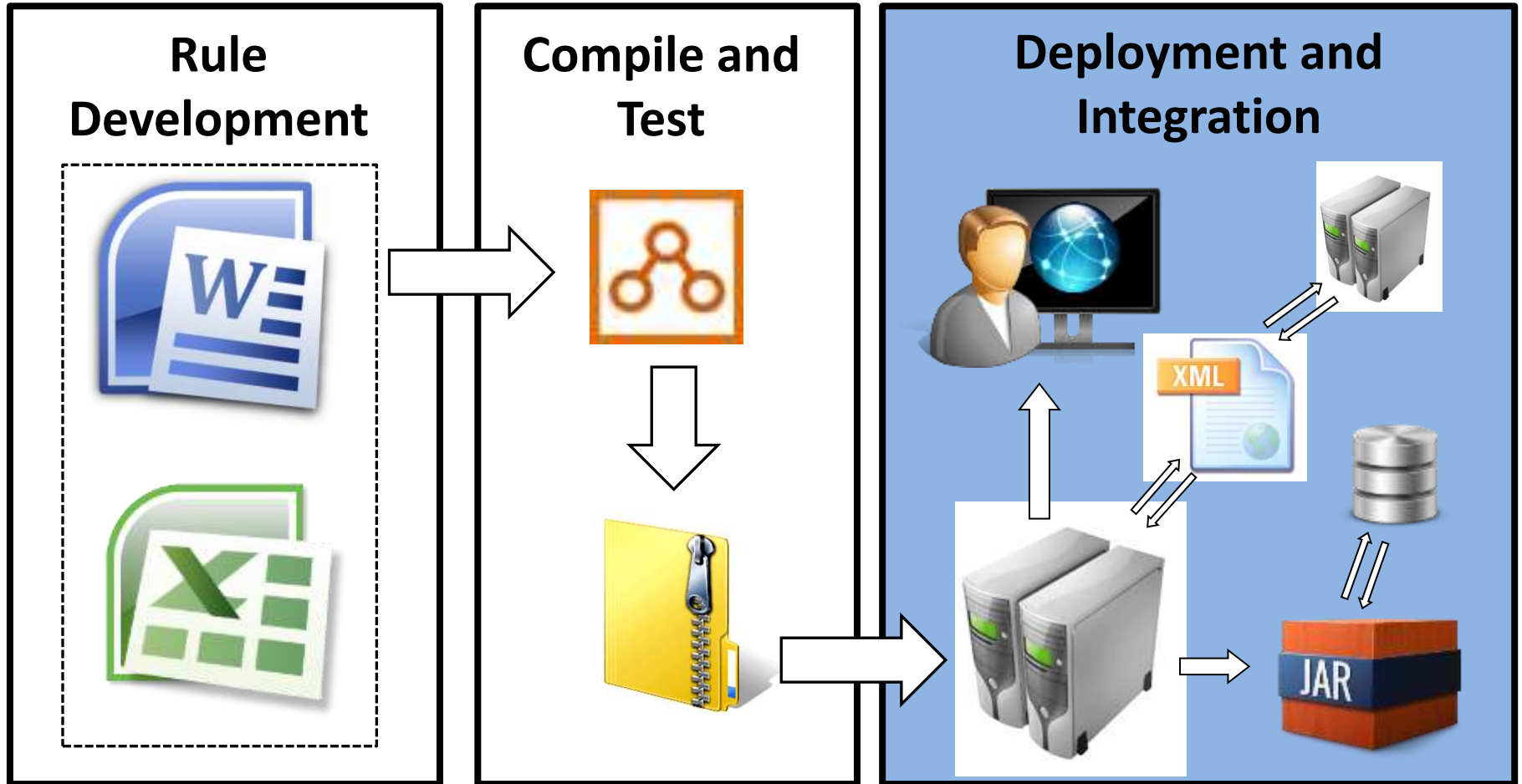


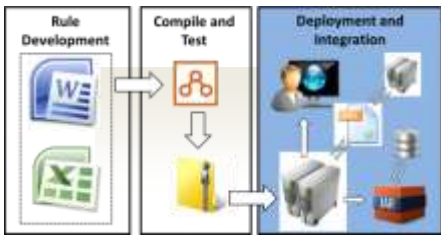
Data Visualisation



- Provides an overview
- Visual verification of dependencies
- Supports demos, training and sign off

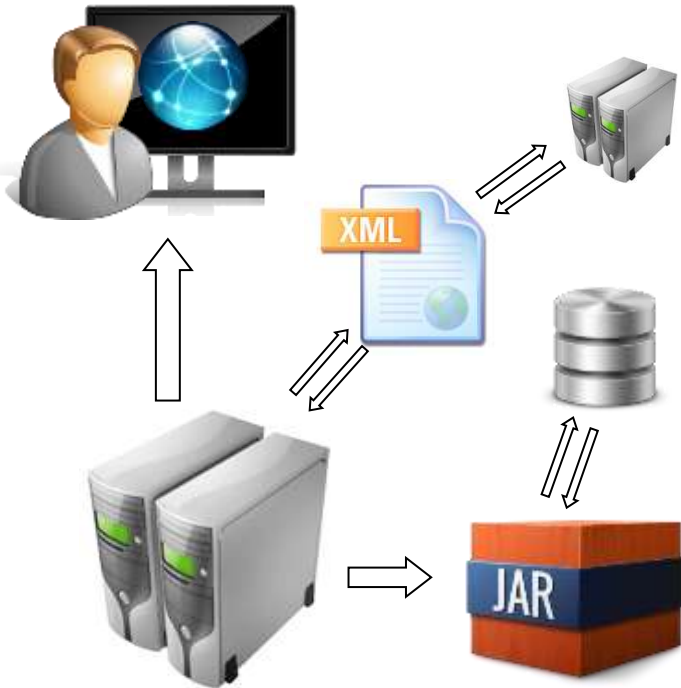
Components





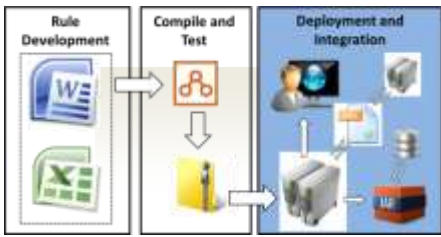
Deployment and Integration

Deployment and Integration

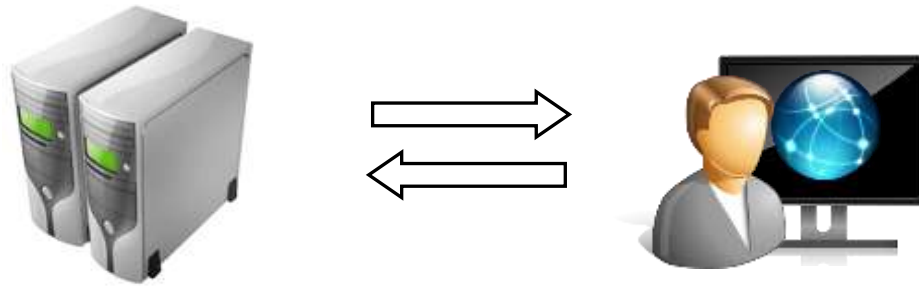


3 ways of accessing OPA:

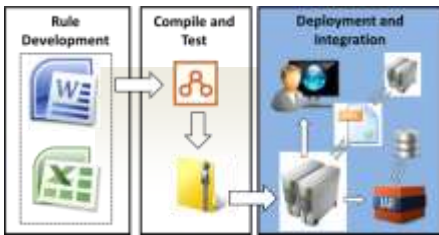
- **Online interviews**
(web determinations)
- **Web Service**
(determinations server)
- **Batch Processor/API**
(determination engine)



Web Determinations



- Self service interactive interviews
- Guides and estimates
- Knowledge base/call centre pages



Example of Interview Screen

ORACLE Web Determinations

[Summary](#) | [Data Review](#) [Save](#) | [Save As](#) | [Load](#) | [Restart](#) | [Close](#)

Rulebase: OPA Demo Locale: en-US User ID: guest

The Customers Details

The Customers Details:

What is the person's first name? *

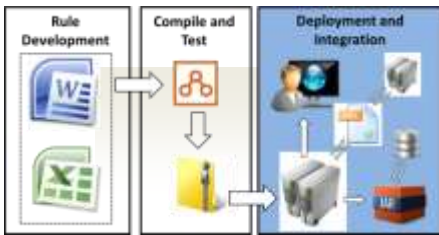
What is the person's last name? *

What is the person's date of birth? *

What is the person's region? *

Has the person's house been destroyed by the major disaster? * Yes No

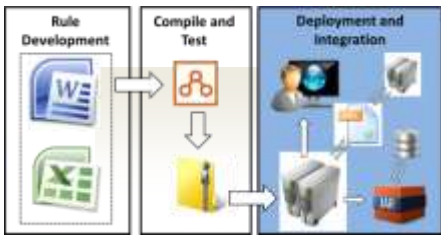
Has the person's job been terminated due to the major disaster? * Yes No



Auditable decision trails

The person's total weekly major natural disaster grant is \$245.00.

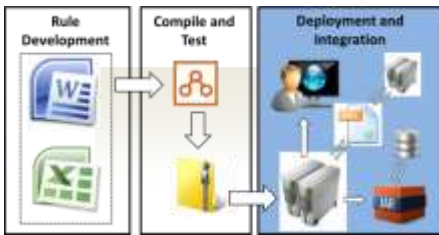
- ☐ The person's child amount component is \$100.00.
 - ☐ all instances of The Child
 - ☐ Sam
 - ☐ The person's child component payment amount is \$100.00.
 - ☐ The person's number of dependent children is 1.
 - ⊕ all instances of The Child
 - ☐ Sam is a dependent child.
 - ⊕ Sam's age is 14.
 - ☐ Sam is not financially independent.
- ☐ The regional payment component is \$45.00.
 - ☐ The person's region is Lower North Island.
- ☐ The person's other factors component is \$100.00.
 - ☐ The person is eligible for an other factors component.
 - ☐ The person's house has been destroyed by the major disaster.



Web Service



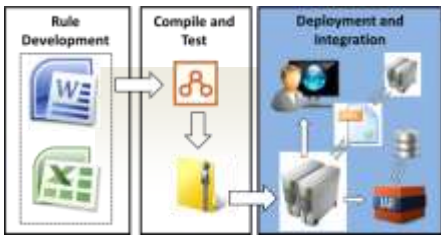
- SOA components
- B2B / API
- Back end processing



Example of SOAP Message

```

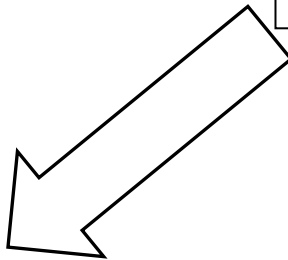
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:typ="http://orac
  <soapenv:Header/>
  <soapenv:Body>
    <typ:assess-request>
      <typ:global-instance>
        <typ:IN_personcustomerid>
          <typ:number-val>6654545</typ:number-val>
        </typ:IN_personcustomerid>
        <typ:IN_persondob>
          <typ:date-val>1977-07-05</typ:date-val>
        </typ:IN_persondob>
        <typ:IN_personfirstname >
          <typ:text-val>Alex</typ:text-val>
        </typ:IN_personfirstname>
        <typ:IN_personincome >
          <typ:number-val>88325</typ:number-val>
        </typ:IN_personincome>
        <typ:IN_personlastname>
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        </typ:IN_personlastname>
        <typ:IN_personloanapplicationamount>
          <typ:number-val>12000</typ:number-val>
        </typ:IN_personloanapplicationamount>
        <typ:IN_personsecurityvalue>
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        </typ:IN_personsecurityvalue>
    
```



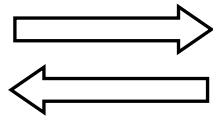
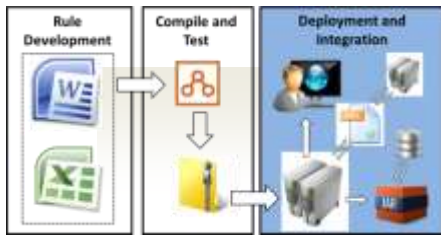
Web service as an API

TestProject

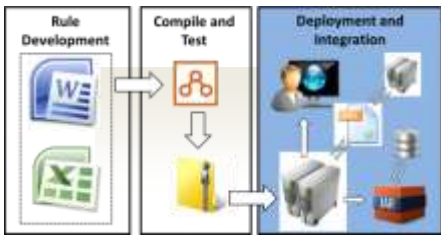
- </determinations-server/assess/soap/specific/TestProject?wsdl>
- </determinations-server/assess/soap/generic/TestProject?wsdl>
- </determinations-server/assess/soap/specific/10.4/TestProject?wsdl>
- </determinations-server/assess/soap/generic/10.4/TestProject?wsdl>
- </determinations-server/assess/soap/specific/10.3/TestProject?wsdl>
- </determinations-server/assess/soap/generic/10.3/TestProject?wsdl>



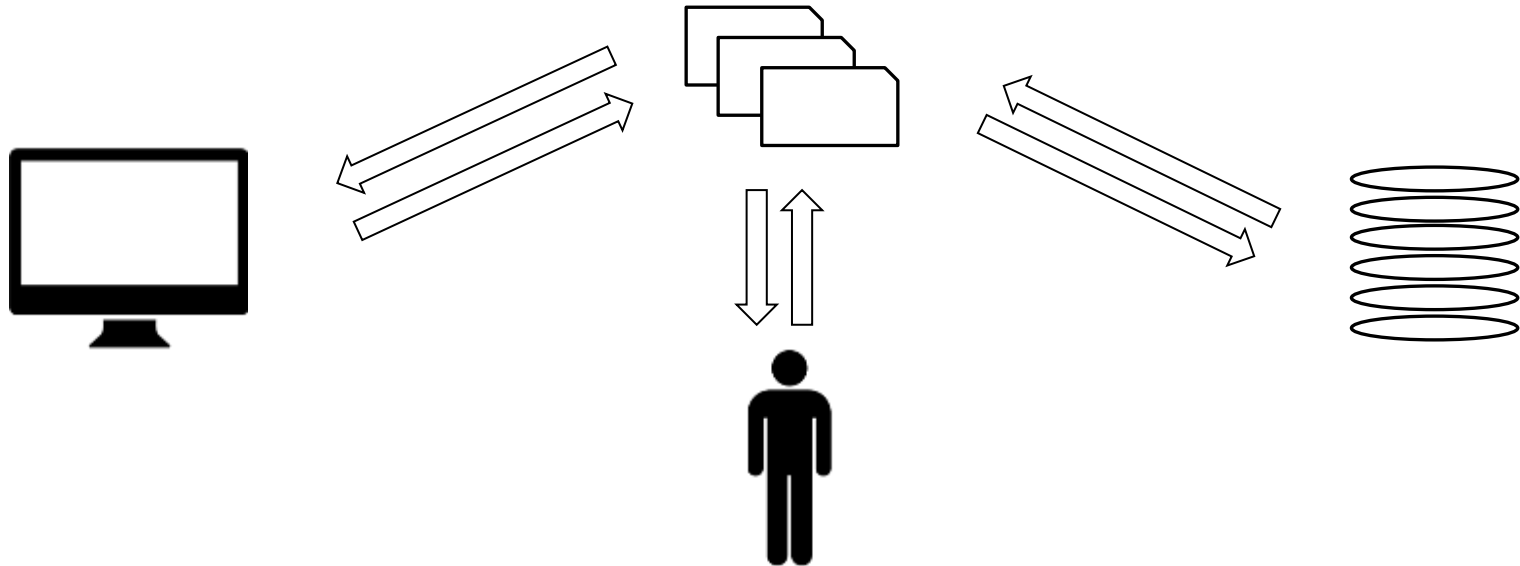
Determinations Engine



- Batch processing
- Tightly bound with java applications
- Highest number of transactions/sec

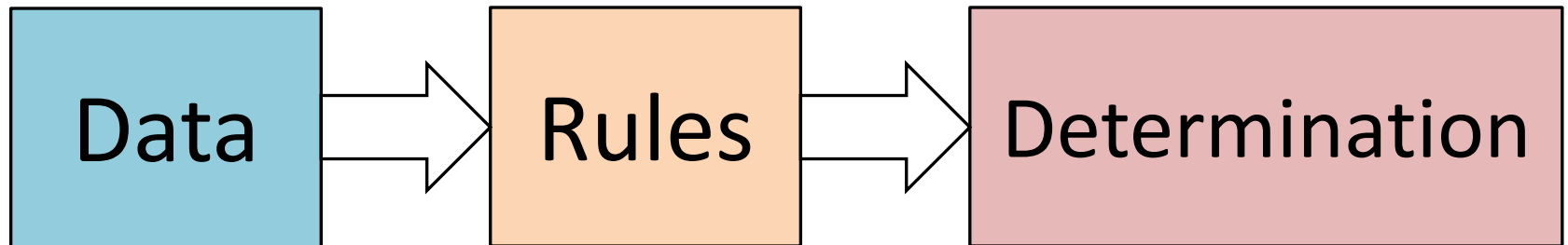


Consistency across channels



The same core rules are used to deliver the determination across all channels

Summary: Oracle Policy Automation



- Complex or simple, structured data
- Complex or simple rules
- Consistent and auditable determinations

In summary:

What happens when you externalise your business rules with OPA:

- Single set of rules, **reused** across all applications
- Streamlined, quick and easy **changes** to rules
- Reduced IT dependencies with business ownership of business rules

Questions?



Looking for more information?

OPA in Social Media:



<https://twitter.com/OracleOPA>



<http://www.facebook.com/pages/Oracle-Policy-Automation/365522920199101>



<http://www.linkedin.com/groups/Oracle-Policy-Automation-3431282/about>



<http://www.youtube.com/user/OraclePAVideos>



<https://forums.oracle.com/forums/forum.jspa?forumID=828>

Other materials

(for those downloading this slide show)

Maximizing Performance and Scalability of a Policy Automation Solution

June 2010, Davin Fifield:

<http://www.oracle.com/technetwork/apps-tech/policy-automation/learnmore/opaonengineeredsystemswhitepaper-1713414.pdf>

Is Oracle Policy Automation a Good Fit for My Business?

May 2012, Jasmine Lee:

<http://www.oracle.com/technetwork/apps-tech/policy-automation/learnmore/isopaagoodfitformybusiness-1653261.pdf>

State of Texas Employees Retirement System (ERS)

2012, Accenture:

<http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture-Employees-Retirement-System-Business-Rules-Engine.pdf>