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Digital

Building a high-performing decision engine

When Risk meets RETE

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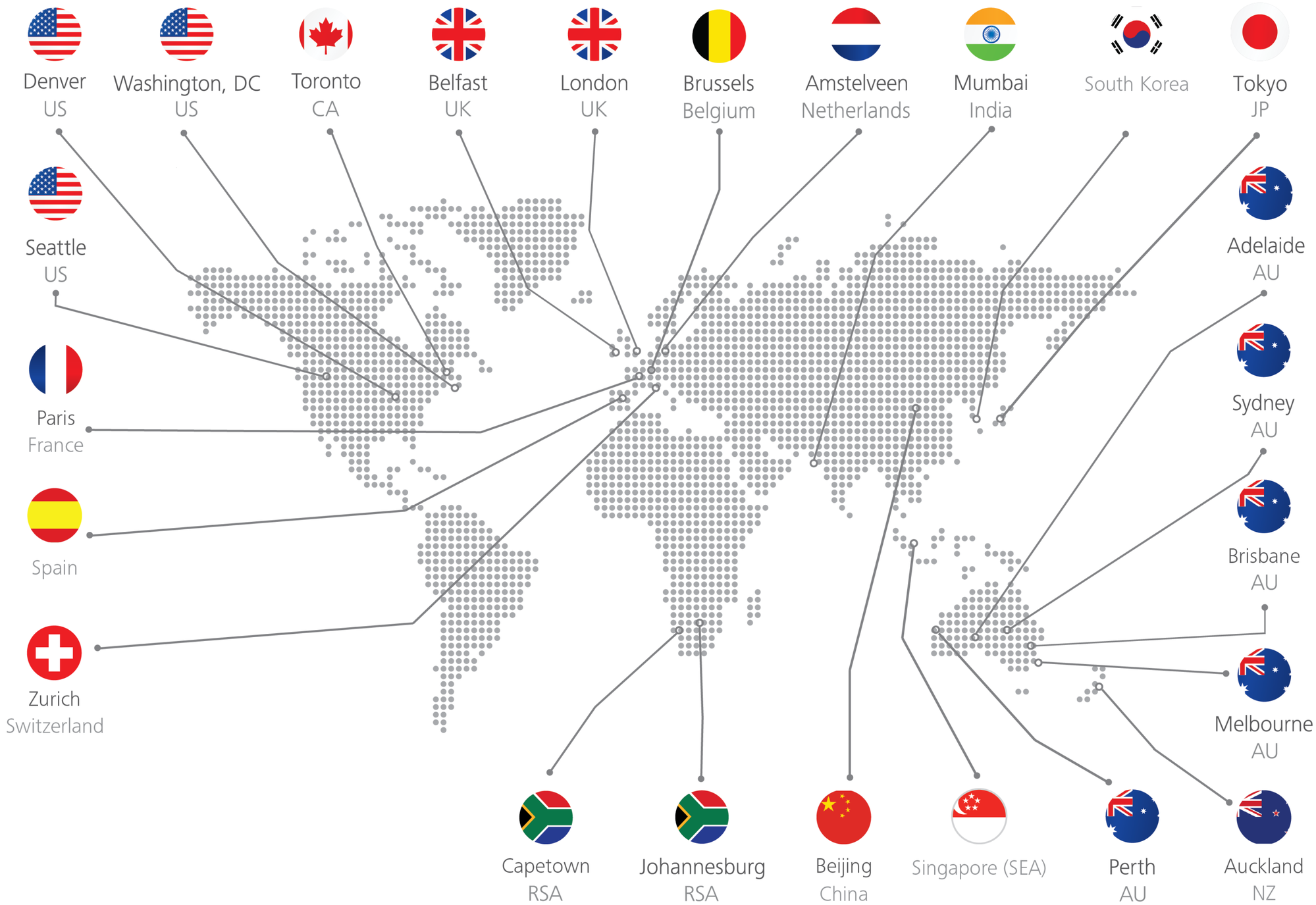
Deloitte Digital
2015

Who are we?

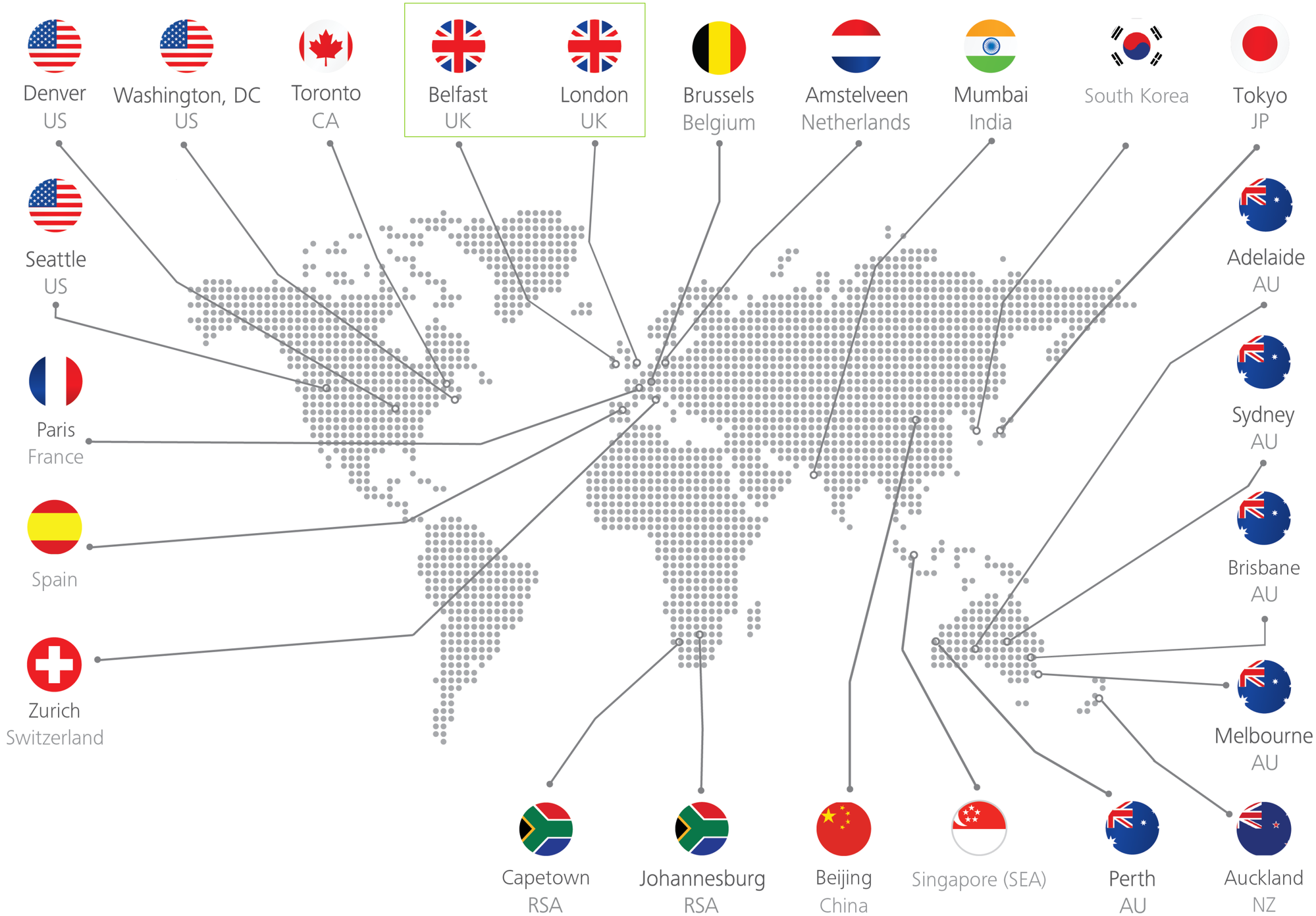

Strategy
Digital ERP
Mobile
Deloitte.
Digital
Digital content
Social
Web



23
STUDIOS

10
TIME ZONES

05
CONTINENTS



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Who am I?

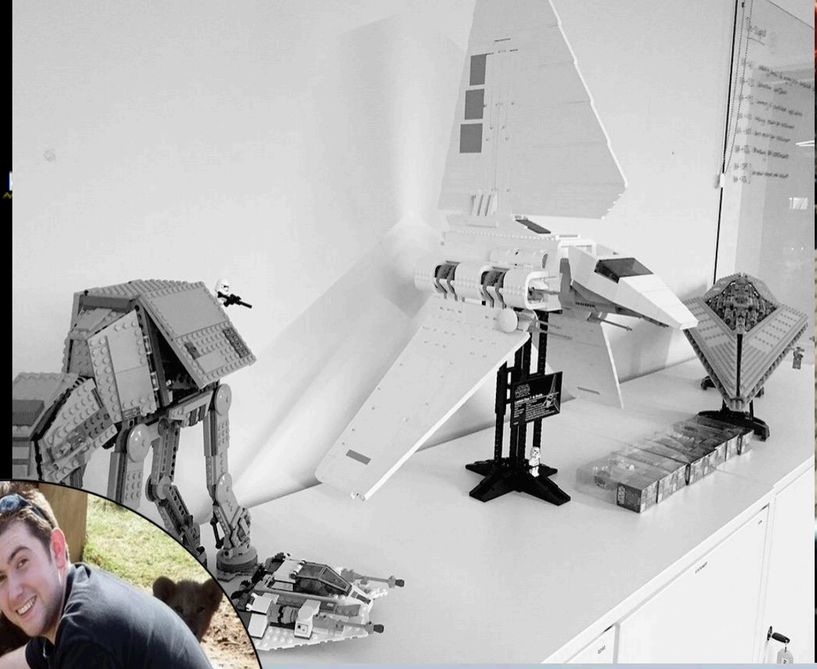
```
 * @param facts           the fact base to assert on
 * @param eventListeners Required event listeners
 * @param ksession       Session to act upon
 * @throws RuleServiceException
 */
protected void fireAllRulesInKnowledgeBase(Map<String, Object> globals, Map<String, Object> facts,
                                           List<WorkingMemoryEventListener> eventListeners, StatefulKnowledgeSession

    try {
        // fire rules, and obtain a handle to the inserted facts
        final Map<String, FactHandle> factHandles = fireRulesWithSession(globals, facts, eventListeners, ksession);

        // retrieve facts and return
        for (String factName : factHandles.keySet()) {
            final FactHandle fh = factHandles.get(factName);

            // retrieve fact if we have a handle for it (will be null if no handle)
            Object retrievedFact = null;
            if (null != fh) {
                retrievedFact = ksession.getObject(fh);
            }

            // update the object in the *ORIGINAL* map instance
```



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Our Challenge.

What was the big deal?

- In depth risk assessment was critical for the client

- Complex workflows are causing headaches for staff

- No ability to modify existing workflows

- One assessment alone had **523** individual decisions

What did we look at?

- Bespoke build
- Survey tools
- Rule Engines

What did we look at?

- Bespoke build
- Survey tools
- Rule Engines

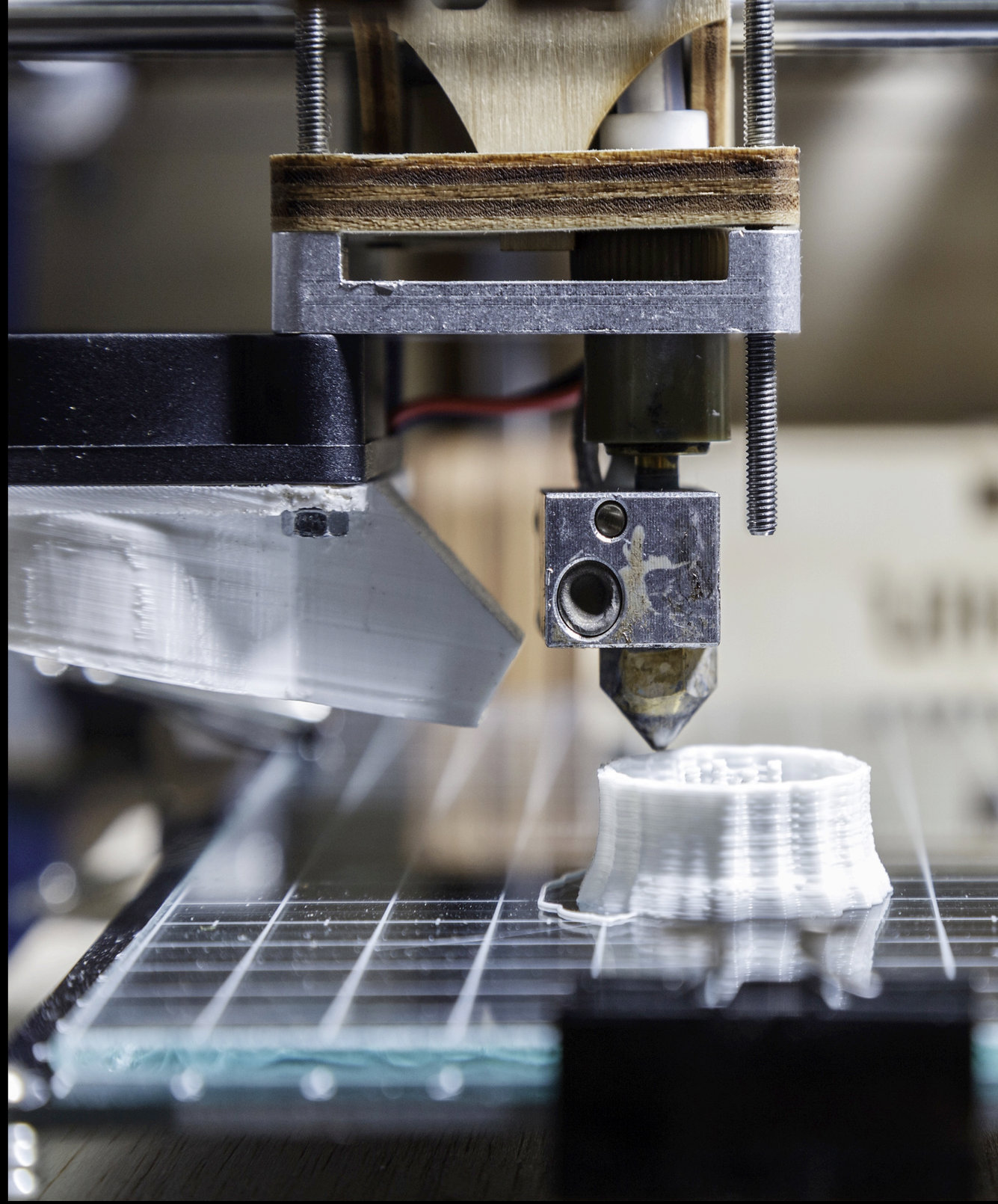
Answer: Rule Engines

What did we look at?

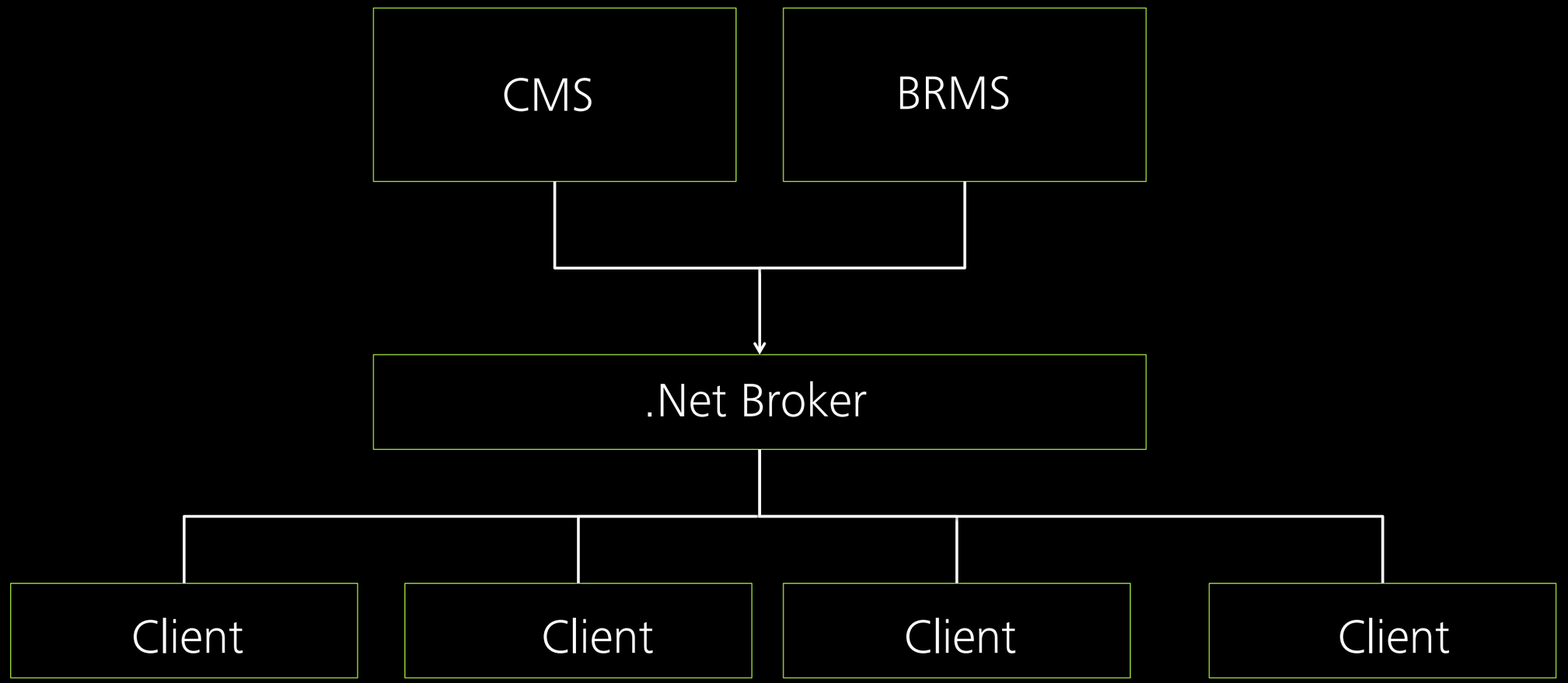
- IBM Ilog (JRules)
- Drools .Net
- BRMS

Why BRMS?

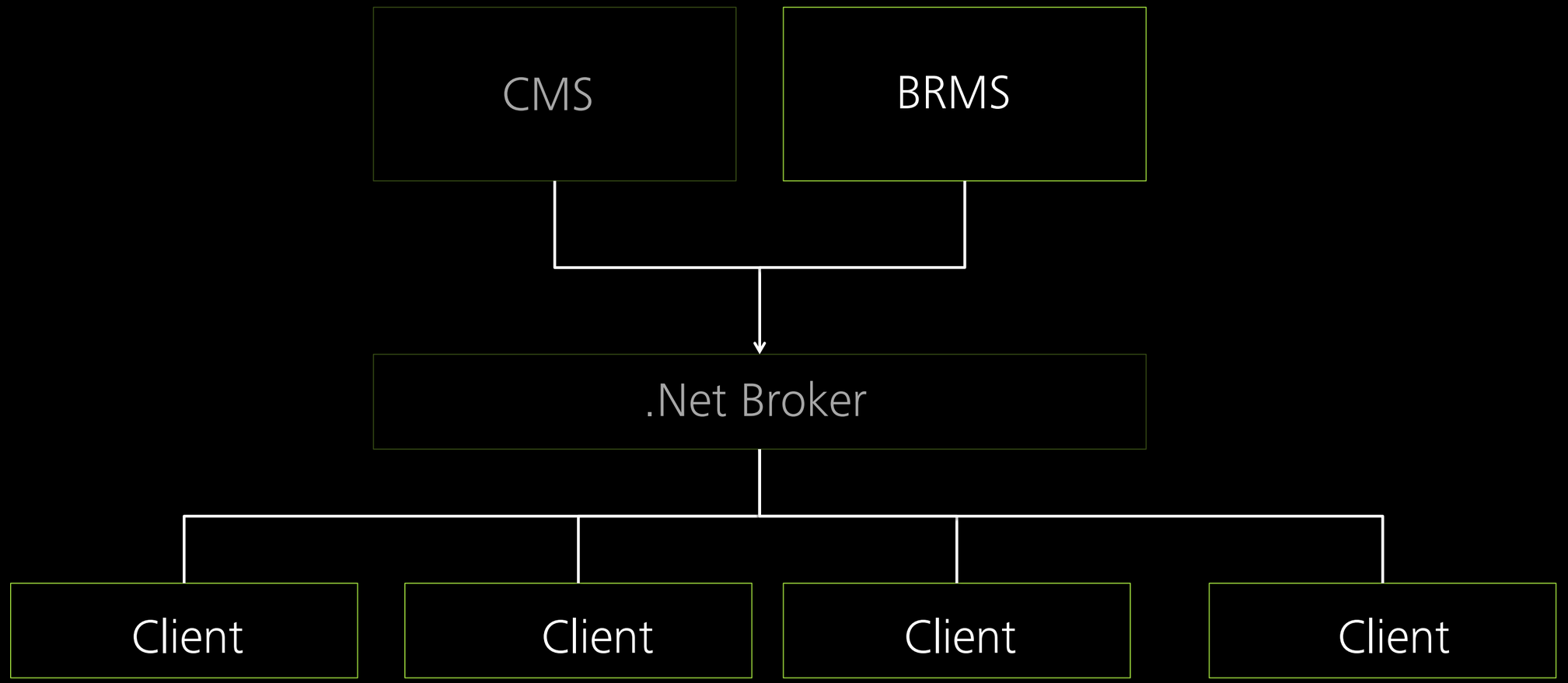
- Tohu for inspiration
- Performance
- Customization
- Domain specific language



What did we build?



What am I going to talk about?



The language

```
rule "add broken build over weekend risk if the build is broken on a Friday"
    when
      Question “Is-The-Build-Broken" has an answer of True
      Question “What-Day-Of-Week-Is-It" has an answer of "Friday"
    then
        Add risk “Broken-Build-Over-Weekend"
        Show question “Will-You-Fix-Build"
end
```

The language

Question What day of the week is it has an answer of Friday

The language

[condition][]Question "{id}" has an answer of {answer}

The language

[condition][]Question "{id}" has an answer of {answer}=Question(controlId == "{id}", hasAnswer == **true**, answer == {answer})

The language

- Iteration was key
- Spend time with the end user
- Understand how the user talked about risk
- End result? Better adoption

[condition][]Question "{id}" has an answer of {answer}=Question(controlId == "{id}", hasAnswer == **true**,

[condition][]Question "{id}" answer is **not** {answer}=Question(controlId == "{id}", hasAnswer == **true**, ans

[condition][]Question "{id}" has **not** been answered or answer is **not** {answer}=**not** Question(controlId ==

[condition][]Question "{id}" has **not** been answered or has an answer of {answer}=**not** Question(controll

[condition][]Question "{id}" list of answers **contains** "{answer}"=Question(controlId == "{id}", "{answer}"

[condition][]Question "{id}" has **not** been answered or list of answers **contains** {answer}=**not** Question(co

[condition][]Question "{id}" list of answers does **not** contain {answer}=Question(controlId == "{id}", hasA

[condition][]Question "{id}" has **not** been answered or list of answers does **not** contain {answer}=**not** Qu

[condition][]Question "{id}" answer is **true**=Question(controlId == "{id}", answer == **true**)

[condition][]Question "{id}" answer is **false**=Question(controlId == "{id}", answer == **false**)
[condition][]Question "{id}" has **not** been answered or answer is **false**=**not** Question(controlId == "{id}",
[condition][]Question "{id}" has **not** been answered or answer is **true**=**not** Question(controlId == "{id}", a
[condition][]Question "{id}" is **not** shown=**not** Question(controlId == "{id}")
[condition][]Question "{id}" is shown=Question(controlId == "{id}")
[condition][]Question "{id}" does **not** have answer=Question(controlId == "{id}", hasAnswer == **false**)

Demo Time

Play as you go (don’t hate me for the WiFi)

http://app-amckee.rhcloud.com/

How does it all work?

User answers question

Load existing state from DB

Add existing state to rule session

Fire Rules and listen to events

Add events as show / hide operations

Save new assessment state

Return new events to the user

What did we learn?

- Managing large rule sets is hard
- Avoid being too generic
- Don’t use Statefull sessions, they hurt!
- Explore rule substitution rather than authoring

What did we learn?

- Test, test and test some more
- Even with custom domain languages never underestimate users ability to break your product
- Think of coupling and cohesion when writing your rules
- Use common sense

What would we do differently?

- Add a custom authoring UI
- BRMS is awesome but make sure it’s the right tool for the job
- Start with simple then make it enterprise

Questions?

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