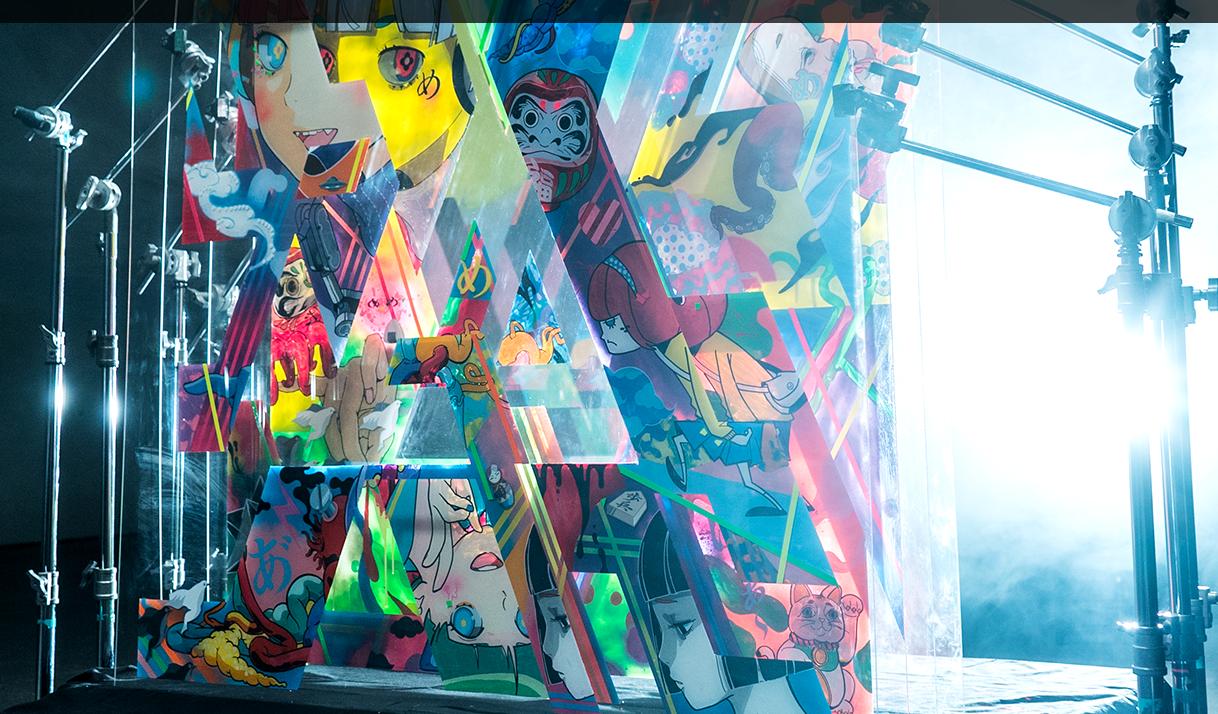


Smart IoT on OSGi with Apache OpenWhisk

David Bosschaert and Carsten Ziegeler



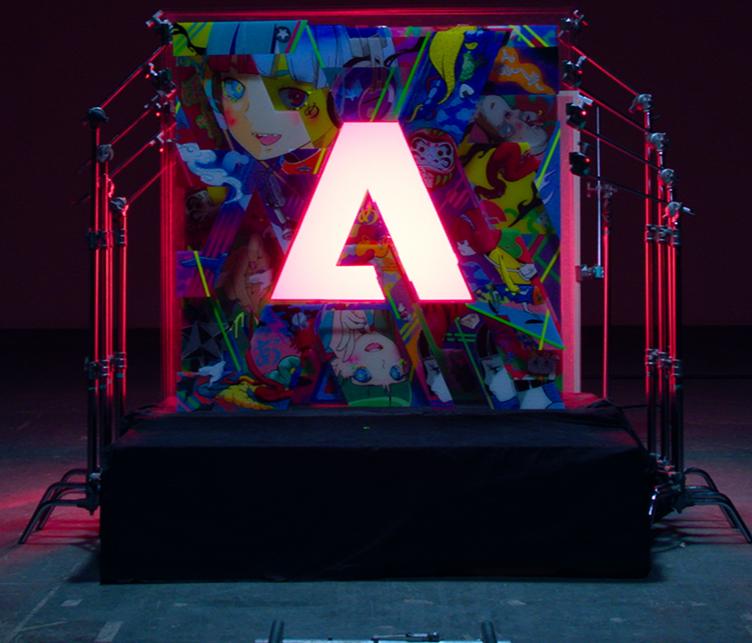
I am doing IoT !

I am doing IoT !

- Principal Scientist @ Adobe Research Switzerland
- Member of the Apache Software Foundation
- VP of Apache Felix and Sling
- OSGi Expert Groups and Board member

- R&D Adobe Ireland
- Co-chair OSGi Enterprise Expert Group
- Apache Felix, Aries PMC member and committer
- ... other opensource projects
- Cloud and embedded computing enthusiast

IoT

#AdobeRemix
Hiroyuki Mitsume

IoT Hello World!



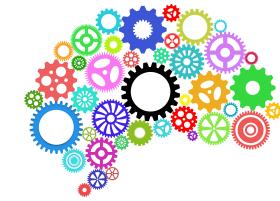
D

I am doing IoT ?

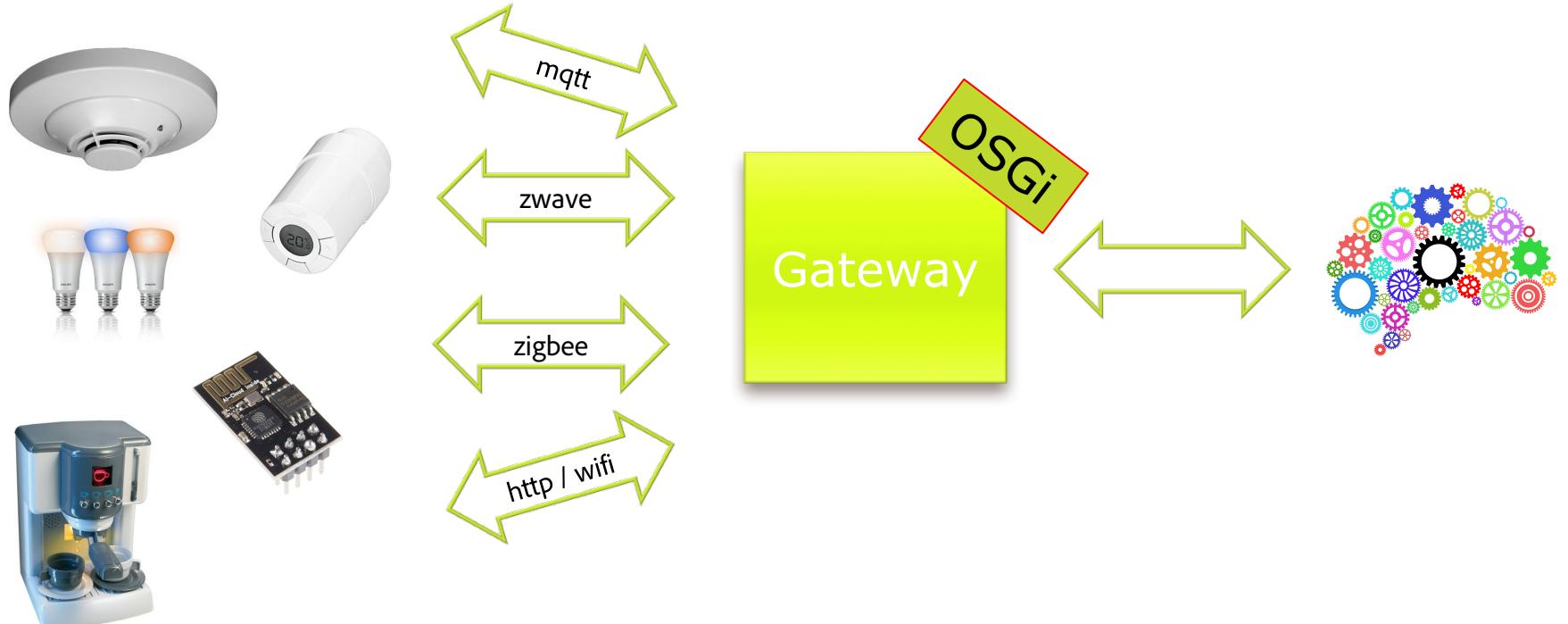
IoT devices



?



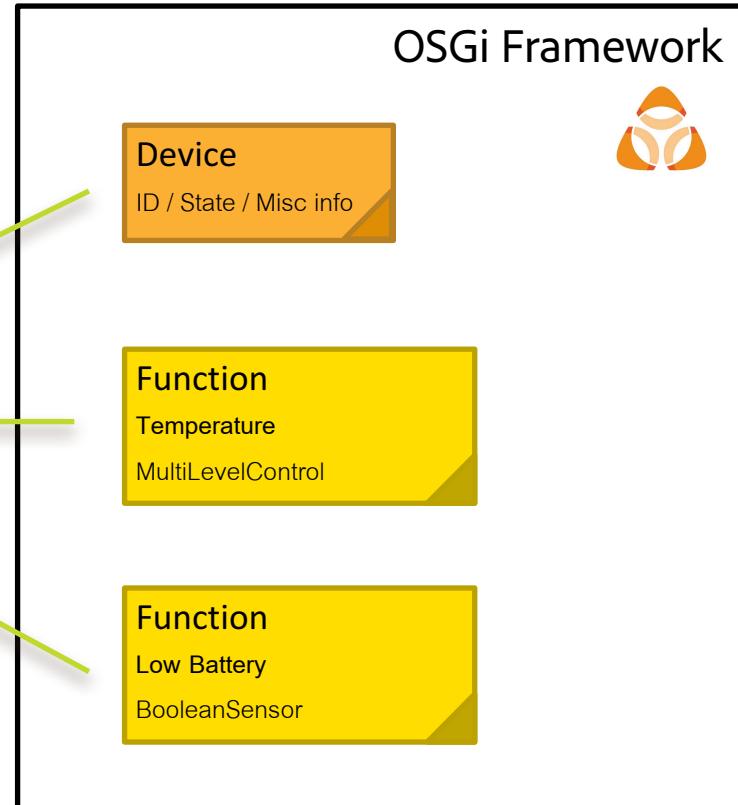
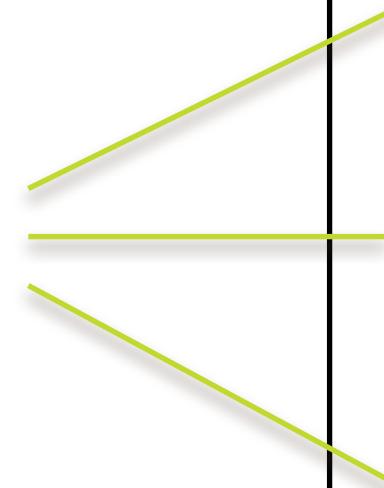
IoT and OSGi



- Unified platform
- Service Registry integration point
- IoT APIs
- Share & Reuse
- Provisioning, tooling...
- Dynamically updatable

OSGi Device Abstraction Layer

- Device and Function Services
- Protocol independent



D

DataTypes

Alarm

BooleanControl

BooleanSensor

Keypad

Meter

MultiLevelControl

MultiLevelSensor

WakeUp

... custom types ...

Function Types

COLD

CONTACT

DOOR

FIRE

FLOW

GAS

HEAT

HUMIDITY

LIGHT

LIQUID

MOTION

NOISINESS

OCCUPANCY

POWER

PRESSURE

RAIN

SMOKE

TEMPERATURE

WATER

WINDOW

OSGi DAL demo

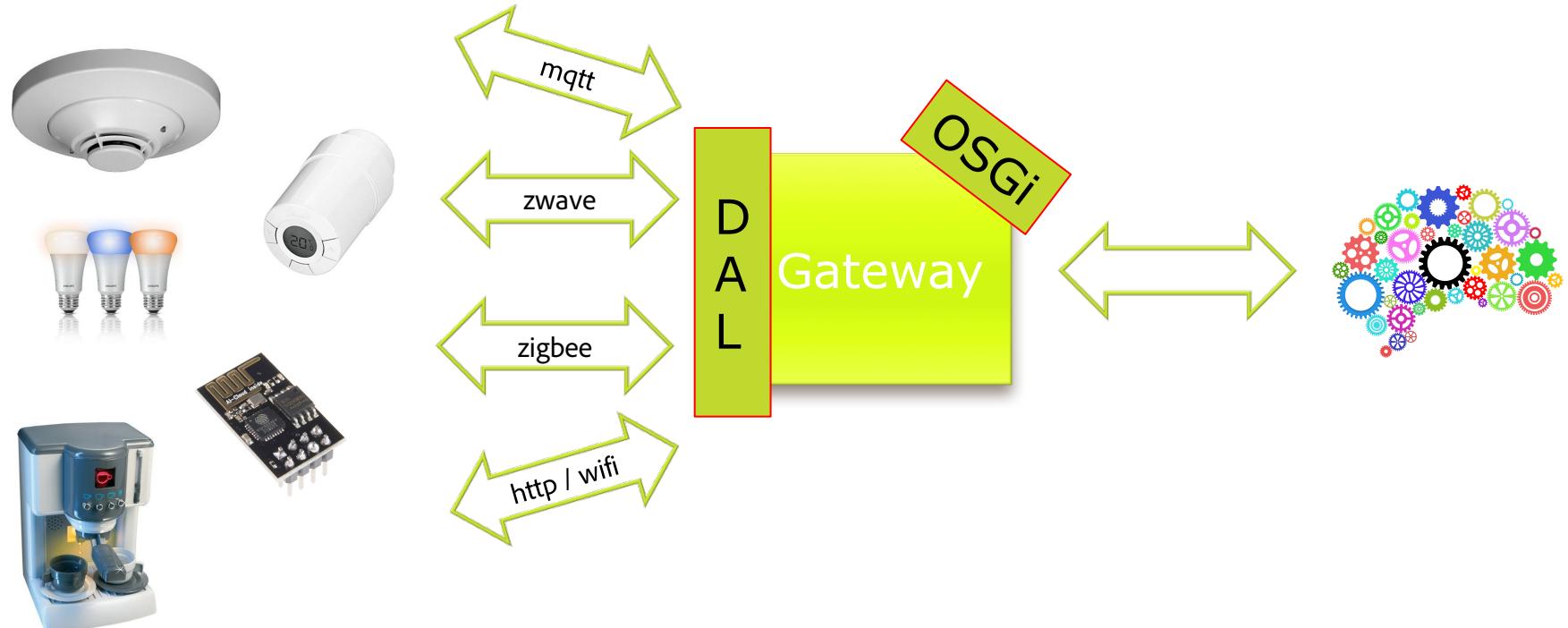


DAL allows for purely functional code

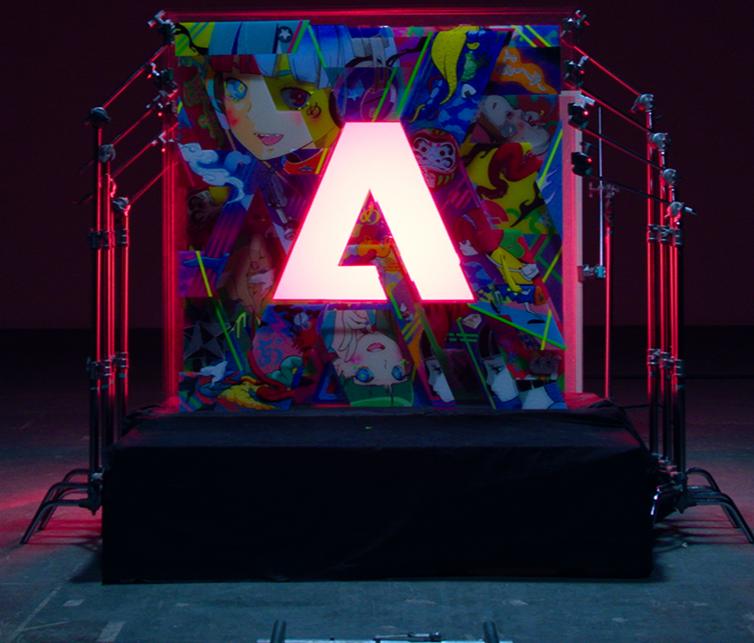
```
@Component(  
    property = {  
        "event.topics=org/osgi/service/dal/FunctionEvent/PROPERTY_CHANGED",  
        "event.filter=(dal.function.UID=pir1:motion)"}  
public class RadiatorLogic implements EventHandler {  
  
    @Reference(target = "(dal.function.UID=rad1:setpoint)")  
    Function radiator;  
  
    @Override  
    public void handleEvent(Event event) {  
        MultiLevelControl radCtrl = getControl(radiator);  
  
        // Get the updated PIR sensor data  
        BooleanData data = (BooleanData) event.getProperty(FunctionEvent.PROPERTY_VALUE);  
  
        // Set the radiator temperature  
        radCtrl.setData(data.getValue() ? 21 : 7, "degrees");  
    }  
}
```

Demo

Let's make it smarter!

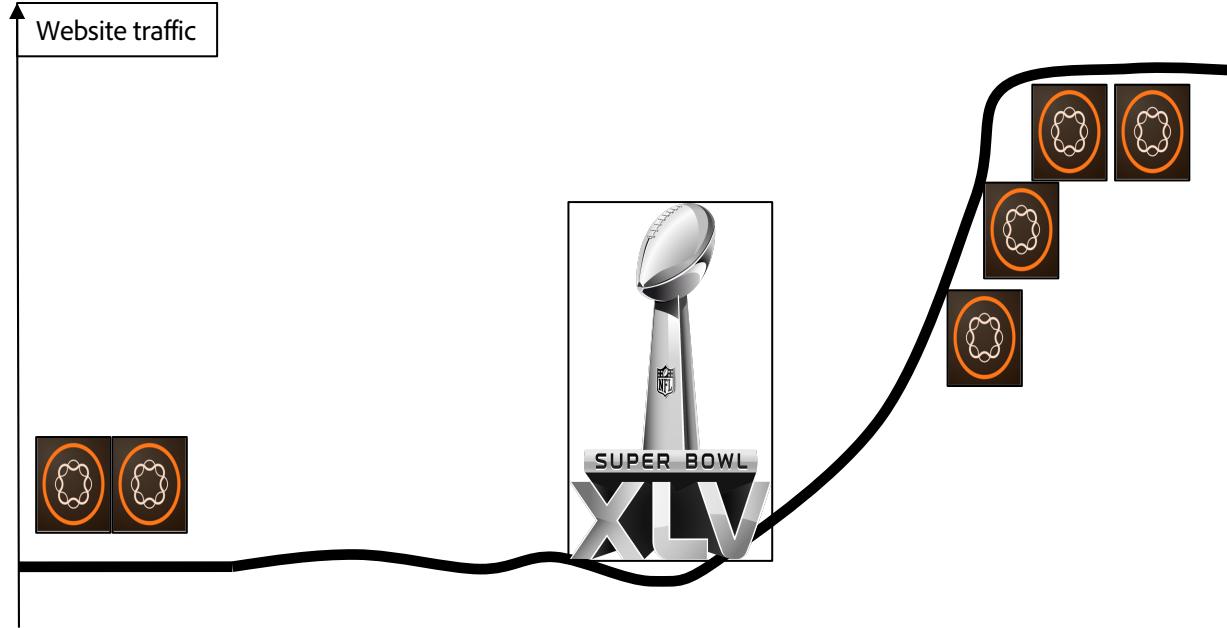


Less Server?



#AdobeRemix
Hiroyuki Mitsume

Surviving the Super Bowl



A Short History of Infrastructure/Deployment

2000
Physical Hardware



2006
Virtual Servers
Hardware disappeared



2013
Containers
Operating systems disappeared

Microsoft Azure



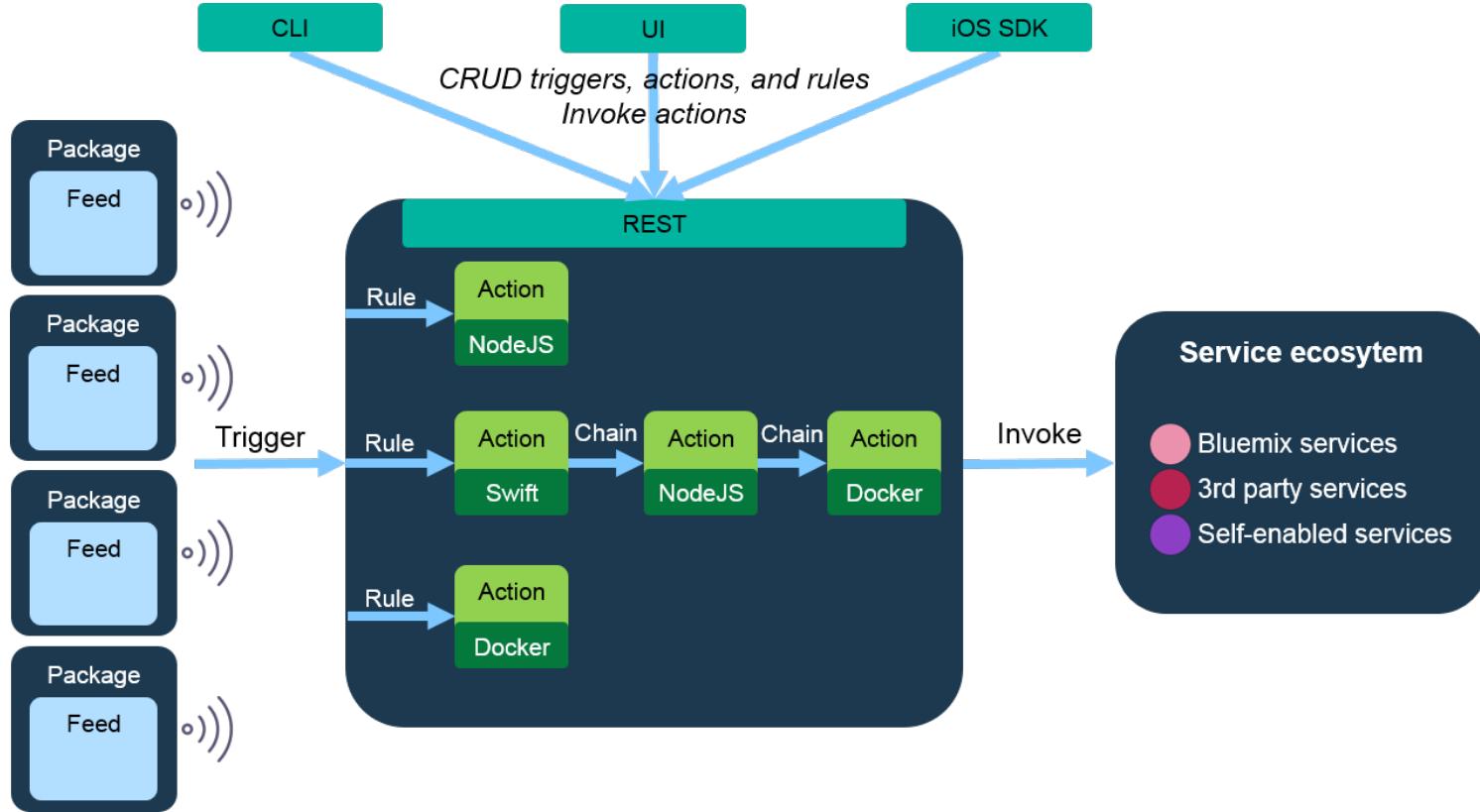
2016
Serverless
Language runtime disappeared

Microsoft Azure



- Function as a Service (FaaS)
- Event triggering
- Scale as needed

Apache OpenWhisk

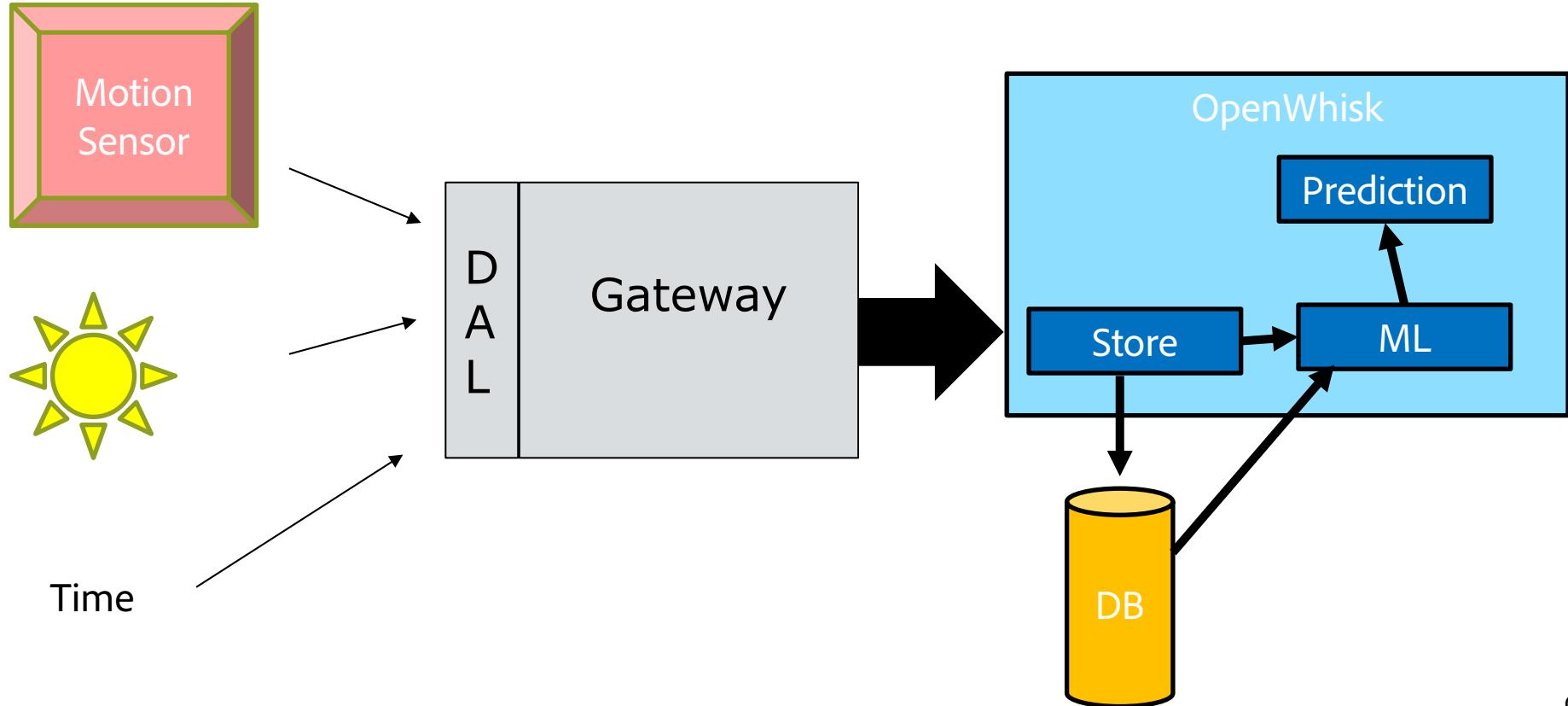


Source: <https://github.com/apache/incubator-openwhisk/blob/master/docs/about.md>

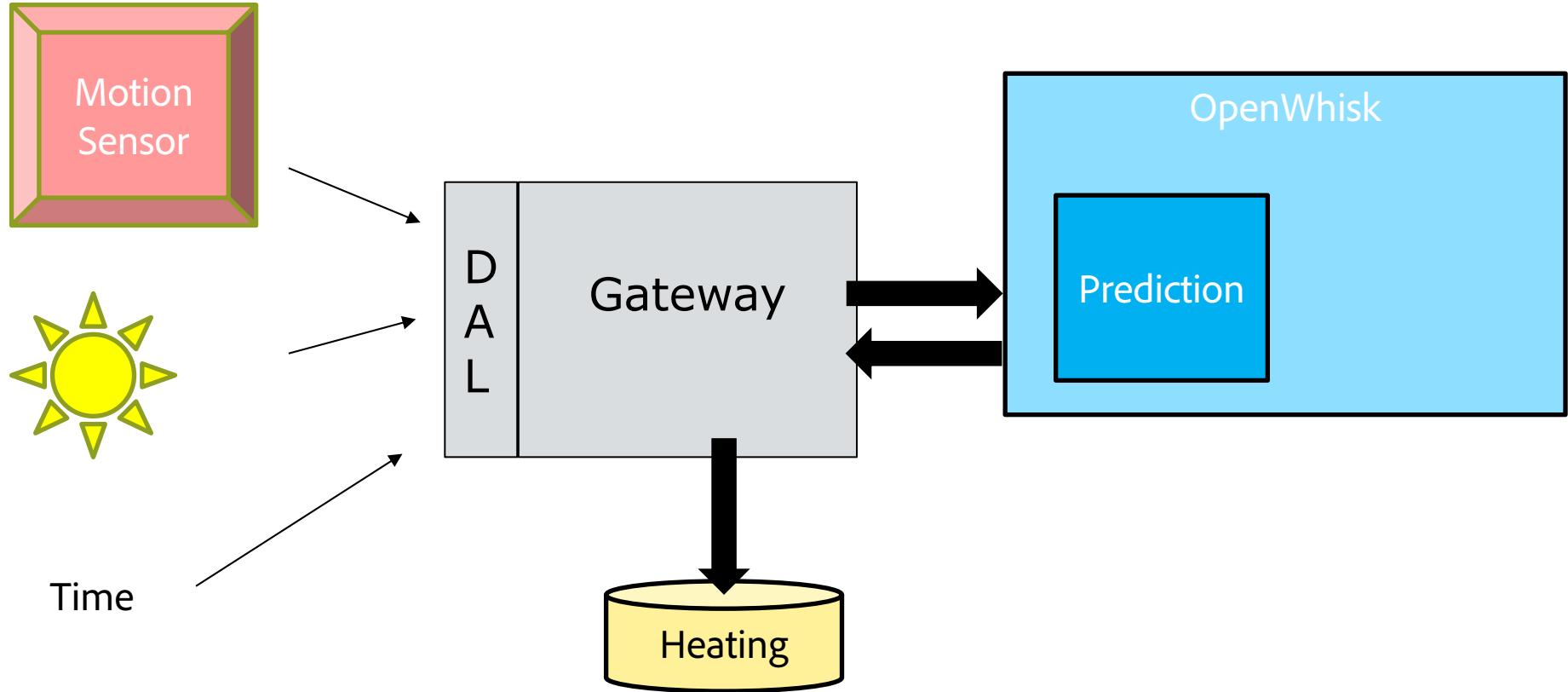
Smart Home Logic



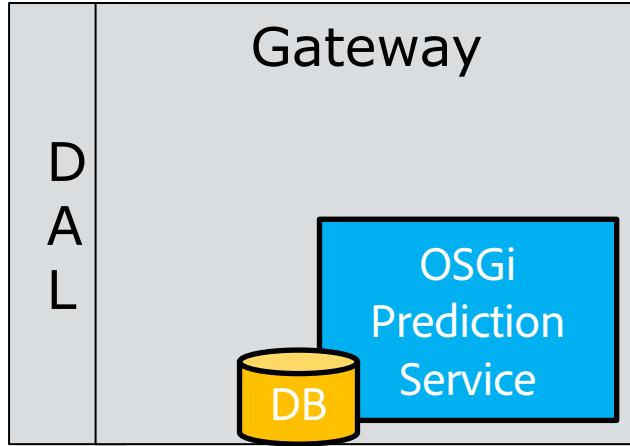
Machine Learning @ Work



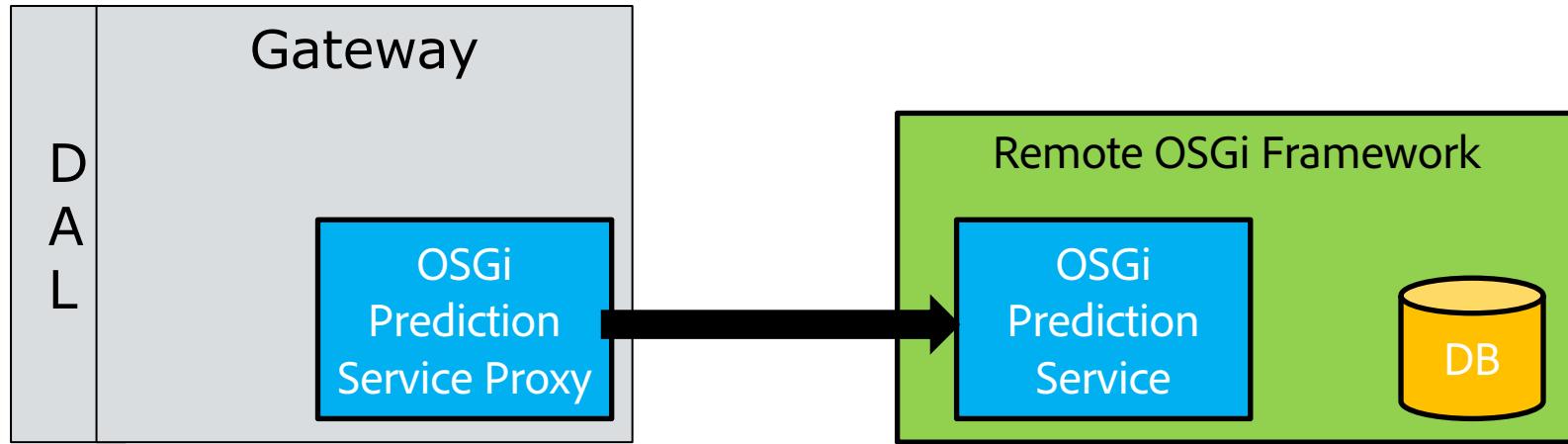
Machine Learning @ Work



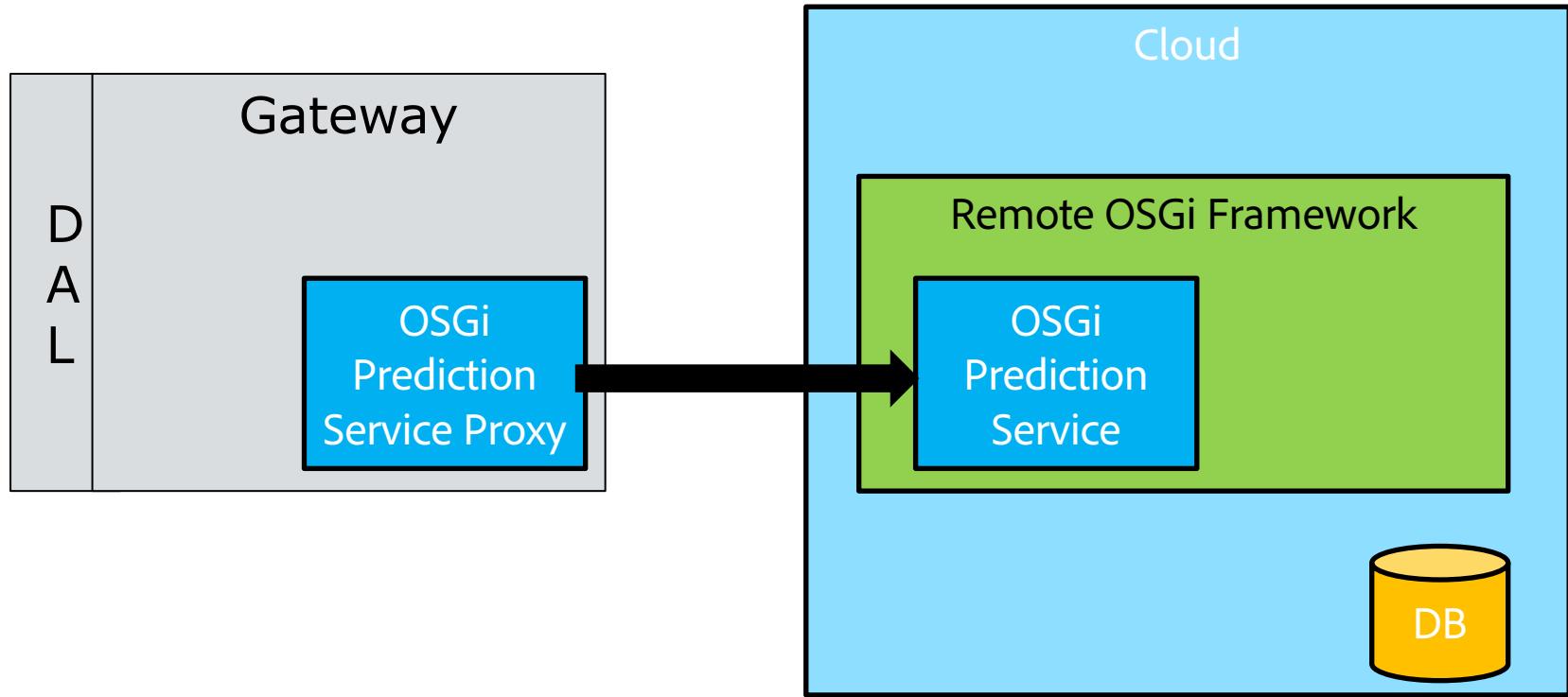
Seamless Integration



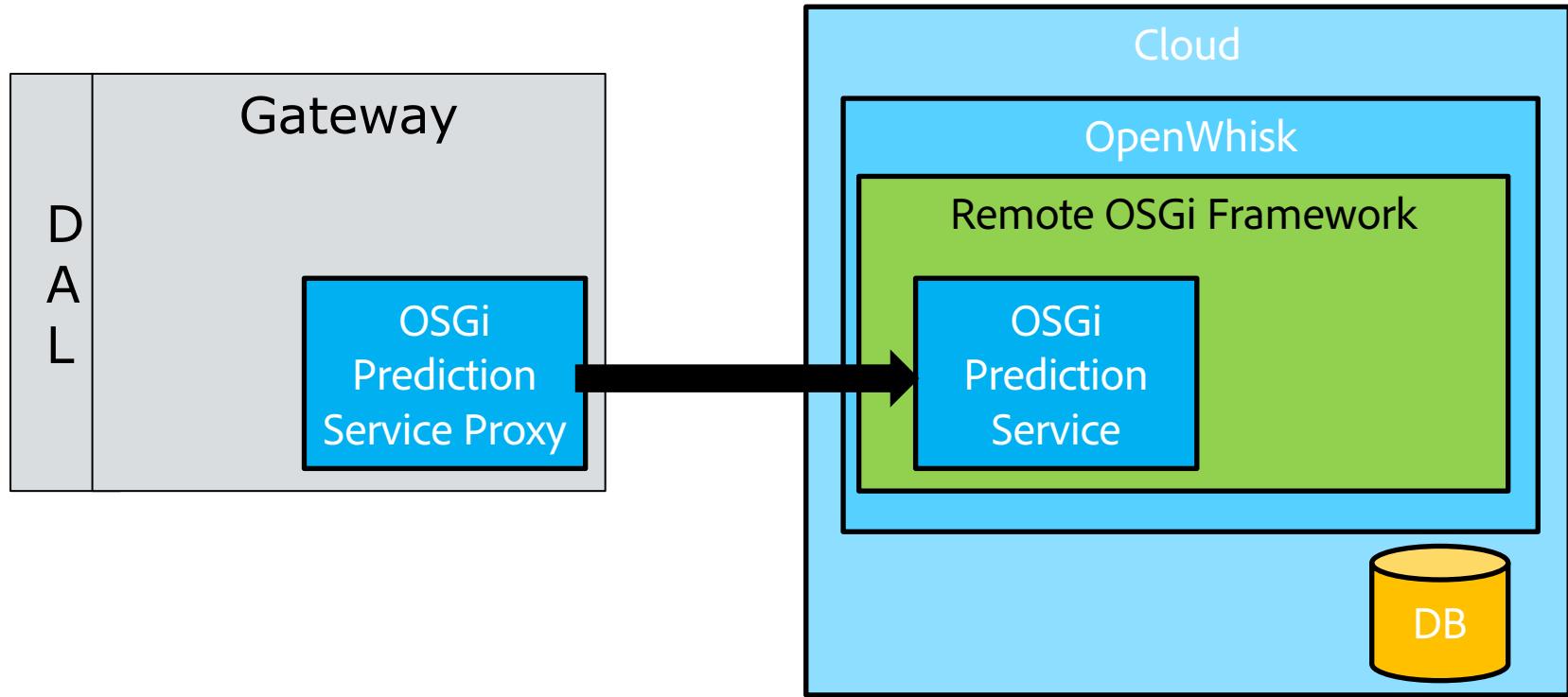
Seamless Integration



Seamless Integration



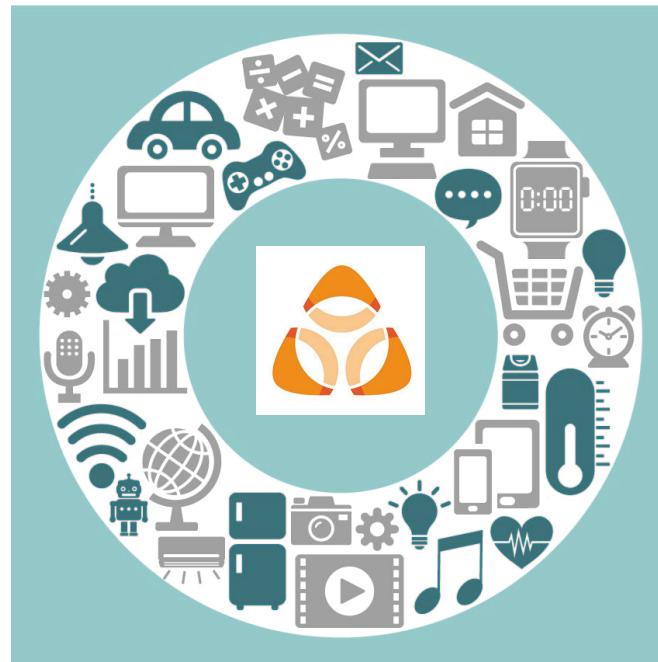
Seamless Integration



Demo

Endless possibilities with IoT

OSGi + OpenWhisk: the ideal base for IoT



THANK YOU.