

Introduction to FIWARE Open Ecosystem

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OPEN APIs FOR OPEN MINDS

www.fiware.org

@Fiware 

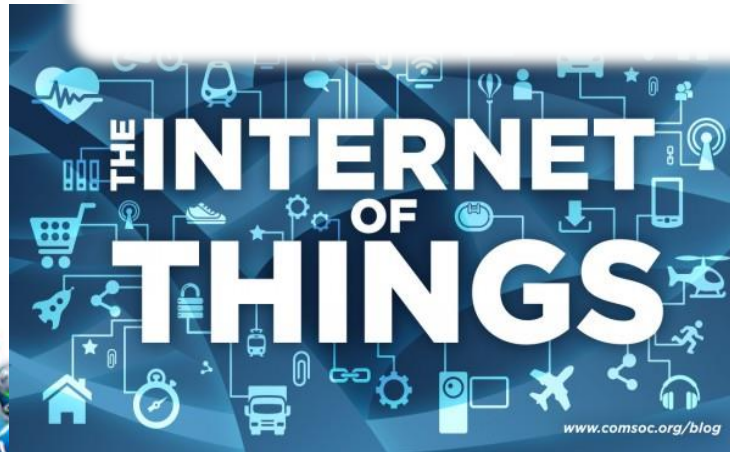


<http://tinyurl.com/fiware-open-ecosystem>

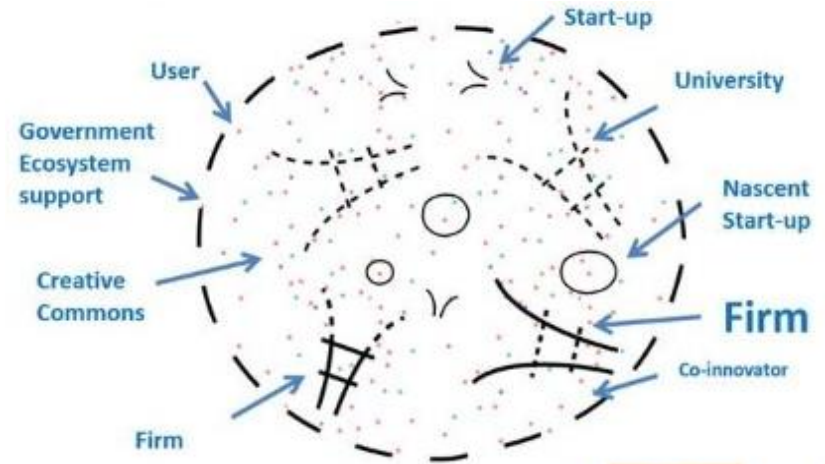
The Internet will again transform the daily life of individuals and businesses



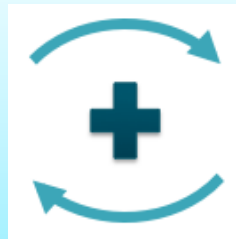
The Next Computer



Ecosystem and platform: two tied concepts



**Open Standard
Platform**



ecosystem

open sustainable global



FIWARE = advanced OpenStack-based Cloud + rich library of Generic Enablers



Driven by implementation



Sustainability ensured

Why an open standard platform is required

- Avoid vendor lock-in:
 - Standard Southbound APIs for sensor providers.
 - Standard Northbound APIs offered to applications.
 - Portability among platform providers.
 - Interoperability of solutions enabled by the platform.
- Larger community of developers
 - True innovation.
 - Better prices.
- Not any standard is enough
 - Modularity.
 - Allow different business models.
 - Integration with standard open data platform.
 - Non-intrusive.



FIWARE Generic Enablers (GEs)

- A FIWARE Generic Enabler (GE):
 - Set of general-purpose **platform functions** available through **APIs**.
 - Building with other GEs a **FIWARE Reference Architecture**.
- **FIWARE GE Specifications** are open (public and royalty-free).
- **FIWARE GE implementation (FIWARE GEi):**
 - Platform product that implements a given GE Open Spec.
 - There might be multiple compliant GEis of each GE Open Spec.
- **At least one open source reference implementation of FIWARE GEs (FIWARE GERis):**
 - Well-known open source license.
 - Publicly available **Technical Roadmap** updated in every release.
- Available FIWARE GEis, GERis and incubated enablers published on the **FIWARE Catalogue**.



FIWARE major differential features

Cloud



- Federation of infrastructures (private/public regions)
- Automated GE deployment

Data



- Complete Context Management Platform
- Integration of Data and Media Content

IoT



- Easy plug&play of devices using multiple protocols
- Automated Measurements/Action \leftrightarrow Context updates

Apps



- Visualization of data (operation dashboards)
- Publication of data sets/services

Web UI



- Easy support of UIs with advanced web-based 3D and AR capabilities
- Visual representation of context information.

I2ND



- Advanced networking capabilities (SDN) and Middleware
- Interface to robots

Security



- Security Monitoring
- Built-in Identity/Access/Privacy Management



FIWARE Lab: going beyond technology, the “meeting point” where innovation takes place

App Customers and Data providers

- Connect to entrepreneurs
- Put their data at work
- Bring new innovative services to end users
- Be more efficient
- Social Reputation

Entrepreneurs, Developers

- Develop once for a large market
- Easily meet potential customers
- Marketing, promotion
- Ability to test with real data and end users
- Simple yet powerful APIs that accelerate product development



FIWARE Technology Providers

- “Competitive” approach
- Connect to entrepreneurs: jointly exploit the opportunities

- 4,2 M€ promotion campaign
 - Campus Party events
 - Startup Weekend events
 - Chambers of Commerce
 - 870 K€ in prizes
- 100 M€ of funding devoted to entrepreneurs in phase 3 of the FIWARE program



FIWARE Lab (<http://lab.fiware.org>)




Click on the links to see the FIWARE video tutorials

Cloud Store Mashup Account

Blueprints Instances Object Storage

Blueprint Templates let you quickly create a template from which to build your application.

You can specify the software you need in the Tier Templates and easily deploy all the instances with one click.

 **Need Help?**
Ask a question.

 **Our GEs**
See our Catalogue.

 **FIWARE Lab nodes**
Learn about FIWARE Ops.


 **eLearning**
Train yourself.

The challenges are closing

POSTED APRIL 22, 2014 BY ADMIN

The Smart Society Challenge and the FI-WARE Excellence Award are nearing the deadline. After an extension to make room for more ideas and contestants, the call for ideas is closing on the 24th

Tweets [Follow](#)

 **IMPACT_acc** @IMPACT_acc 12 Sep
If u r a coder or an entrepreneur,

Take the most of infrastructures while keeping costs lower and under control



VM provisioning



Project Admin

Project Name

demo_project

Blueprint

Blueprint Instances

Blueprint Templates

Region

RegionOne

Compute

Instances

Images

Flavors

Security

Snapshots

Storage

Containers

Volumes

Network

Images

Name	Status	Visibility
Centos-6.2-etc	active	public
Centos-6.3-etc	active	public
PuppetAware-6	active	public
Ubuntu-12.0-etc	active	public
Ubuntu12.0	active	public
puppet-aware	active	public
puppetaware7	active	public
etc04RegularUpdates	active	private
etc07Regul		
etc09Regul		
snapshot-a		
testJC		
testJC		

Instances

Instance Name	IP Address	Size	Keypair	Status	Task	Actions
blueprint14-tomcat5-1	10.100.20.5	2048 MB RAM 1 VCPU 20GB Disk		SHUTOFF	None	<ul style="list-style-type: none"> Edit Instance Connect to Instance View Log Create Snapshot Pause Instance Unpause Instance Suspend Instance Resume Instance Change Password Reboot Instance Terminate Instance
		2048 MB RAM 1 VCPU 20GB Disk		SHUTOFF	None	
		2048 MB RAM 1 VCPU 20GB Disk		SHUTOFF	None	
		2048 MB RAM 1 VCPU 20GB Disk		SHUTOFF	None	
		2048 MB RAM 1 VCPU 20GB Disk		SHUTOFF	None	
		2048 MB RAM 1 VCPU 20GB Disk		ACTIVE	None	
		2048 MB RAM 1 VCPU 20GB Disk		SHUTOFF	None	

Launch Instances

1. Details 2. Access & Security 3. Networking 4. Post-Creation 5. Summary

Instance Name *
myinstance

Flavor
m1.tiny

Description
Specify the details for launching an instance. The chart below shows the resources used by this project in relation to the project's quotas.

Flavor Details

Name	m1.tiny
VCPUs	1
Root Disk	0 GB
Ephemeral Disk	0 GB
Total Disk	0 GB
RAM	512 MB

Project Quotas

Instance Count (8)	4 Available
VCPUs (6)	14 Available
Disk (20 GB)	NoN GB Available
Memory (2288 MB)	38912 MB Available

* Mandatory fields. Cancel Next

Launch Instances

1. Details 2. Access & Security 3. Networking 4. Post-Creation 5. Summary

Selected Networks
nic:1 demonetwork

Available Networks
storage_network

Description
Control access to your instance via keypairs, security groups, and other mechanisms.

* Mandatory fields. Back Next

Storage provisioning

The image displays two screenshots from the FIWARE Dashboard. The top screenshot shows the 'Volumes' management page, and the bottom screenshot shows the 'Containers' management page. Both pages include a sidebar with navigation options and a main content area with a table of resources and an 'Actions' menu.

Volumes Management

Logged in as: admin | Settings | Sign Out

Volumes

Project: admin

Name	Description	Size (GB)	Status	Attachments
24372804-storage.occ... 24372804-storage.o...	24372804-storage.o...	1	available	-
FIWARE-demo-videos	Videos for FIWARE...	10	available	-
SafeCity_DataFusion	Test purposes only	1	available	-
SafeCity_DataFusion_64bit_logs	-	-	in-use	1
TICVirtualDisk	-	-	in-use	1
VolumeVideo1	Demo	1	available	-
couchdb	-	500	in-use	1
create_net_test	-	-	-	-
glikson-vol1	-	-	-	-
iosb-volume	volume for iosb	-	-	-
my hard drive	-	-	-	-
pilot_vol	-	-	-	-

Actions: Create Volume, Edit Attachments, Create Snapshot, Delete Volumes

Manage Volume Attachments

Detach Volumes

Instance	Device	Actions
Displaying 0 items		

Attach To Instance

Attach to Instance *

 Device Name *

* Mandatory fields. Cancel Attach Volume

Containers Management

Logged in as: admin | Settings | Sign Out

Containers

Project: admin

Name	Objects	Size
OUTSMART	0	0 bytes
cdmi_test_top_container_1354623164.802175	2	23 bytes
cdmi_test_top_container_1354623167.064051	2	23 bytes
cdmi_test_top_container_1354623434.610547	2	23 bytes
cdmi_test_top_container_1354623436.736778	2	23 bytes
cdmi_test_top_container_1354623543.109470	2	23 bytes
cdmi_test_top_container_1354623545.464213	2	23 bytes
cdmi_test_top_container_1354623770.524726	2	23 bytes
cdmi_test_top_container_1354623772.657127	2	23 bytes
cdmi_test_top_container_1354623884.122284	2	23 bytes
cdmi_test_top_container_1354623886.357285	2	23 bytes
cdmi_test_top_container_1354624127.190521	2	23 bytes

Actions: Create Container, List Objects, Upload Objects, Delete Containers

Network provisioning

The screenshot displays the FIWARE Dashboard interface for network provisioning. The main view shows a list of networks under the 'demo_project' blueprint. A 'Create Network' modal is open, allowing the user to create a new network or subnet.

Networks List:

Name	Subnets associated	Shared	Status	Admin State
shared-net	172.31.0.0/24	Yes	ACTIVE	UP
storage_network	subnet 10.100.84.0/25	No	ACTIVE	UP

Create Network Modal (Subnet Tab):

- Subnet Name:** subnetnet
- Network Address*:** 10.200.40.0/25
- IP Version:** IPv4 (selected)
- Disable Gateway:**
- Description:** You can create a subnet as network, in which case 'Net' specified. If you wish to create subnet, uncheck the 'Create' checkbox.
- Admin State:**

Create Network Modal (Network Tab):

- Network Name:** demonetwork
- Description:** From here you can create a new network. In addition a subnet associated with the network can be created in the next panel.
- Admin State:**

Networks List (Detailed View):

Shared	Status	Actions
No	ACTIVE	Edit Network Add Subnet Delete Networks
Yes	ACTIVE	
No	ACTIVE	

Multi-Region Management

The screenshot displays the fi-ware Dashboard interface for managing instances across multiple regions. The top panel shows the 'demo_project' in 'RegionTwo' with one instance 'myinstance' in 'ACTIVE' status. The bottom panel shows the same project in 'RegionOne' with seven instances, including 'blueprint14-tomcat5-1' through 'blueprint16-mysql-1' (all 'SHUTOFF') and 'testPuppet-1-testPupp...' (ACTIVE).

RegionTwo Instances:

Instance Name	IP Address	Size	Keypair	Status	Task	Power State
myinstance	172.31.0.4	2048 MB RAM 1 VCPU 20GB Disk		ACTIVE	None	RUNNING

RegionOne Instances:

Instance Name	IP Address	Size	Keypair	Status
blueprint14-tomcat5-1	10.100.20.5	2048 MB RAM 1 VCPU 20GB Disk		SHUTOFF
blueprint15-mysql-1	10.100.20.6	2048 MB RAM 1 VCPU 20GB Disk		SHUTOFF
blueprint16-mysql-1	10.100.20.7 130.206.81.131	2048 MB RAM 1 VCPU 20GB Disk		SHUTOFF
blueprint16-tomcat5-1	10.100.20.8 130.206.81.132	2048 MB RAM 1 VCPU 20GB Disk		SHUTOFF
testPuppet-1-testPupp...	10.100.20.4 130.206.81.135	2048 MB RAM 1 VCPU 20GB Disk		ACTIVE
testPuppet-10-testPup...	10.100.20.2	2048 MB RAM 1 VCPU 20GB Disk		SHUTOFF

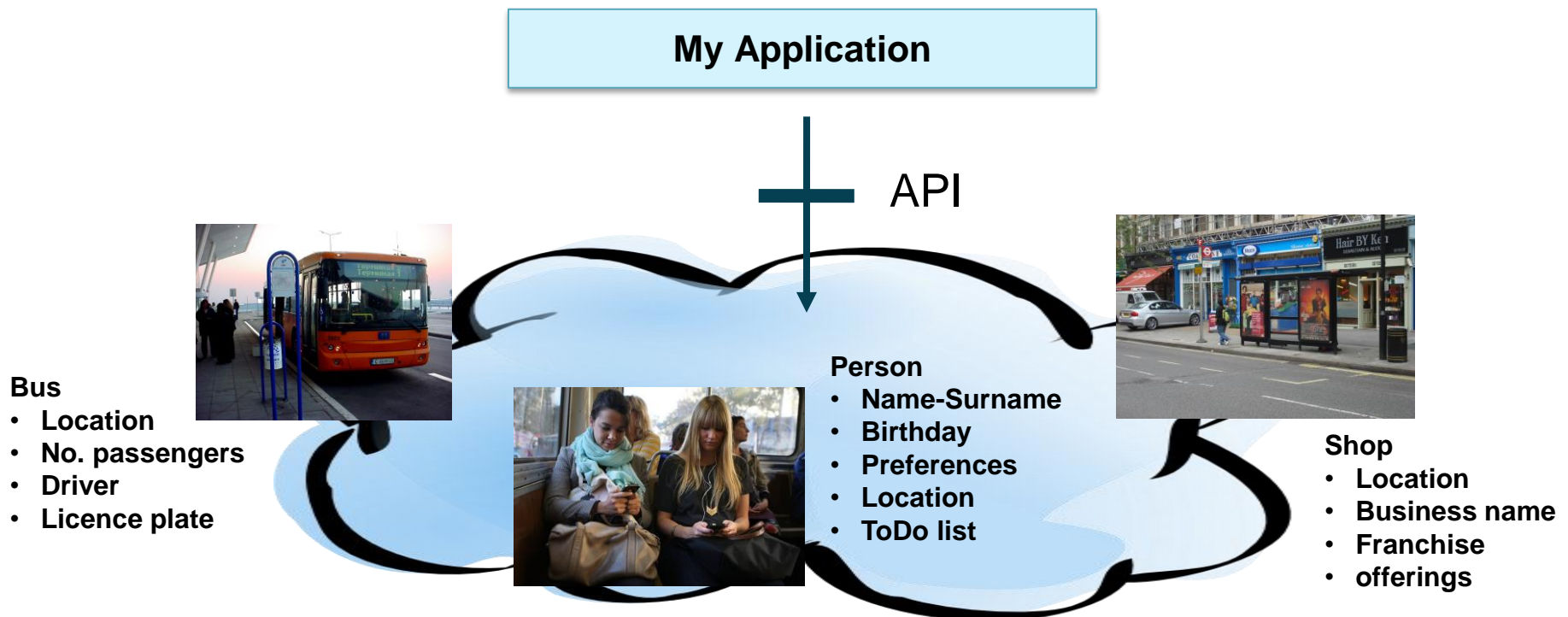
Management of Blueprints

Gathering, publishing, processing and analyzing private and open data at large scale



Context Management in FIWARE

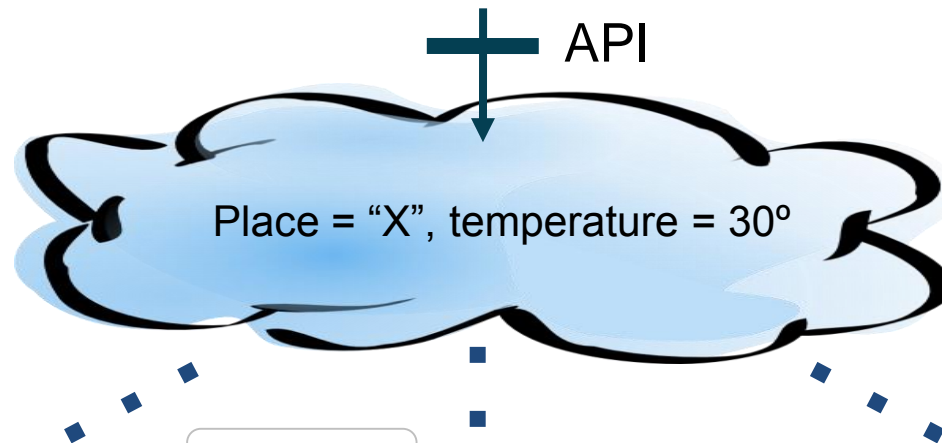
- A simple yet powerful standard API should be defined that helps programmers to manage Context information.
- Context information refers to the values of attributes characterizing entities relevant to applications



Context Management in FIWARE

- Context information may come from many sources using different interfaces and protocols ... but programmers should just care about entities and their attributes ...

What's the current temperature in place "X"?



A sensor in a pedestrian street



A person from his smartphone

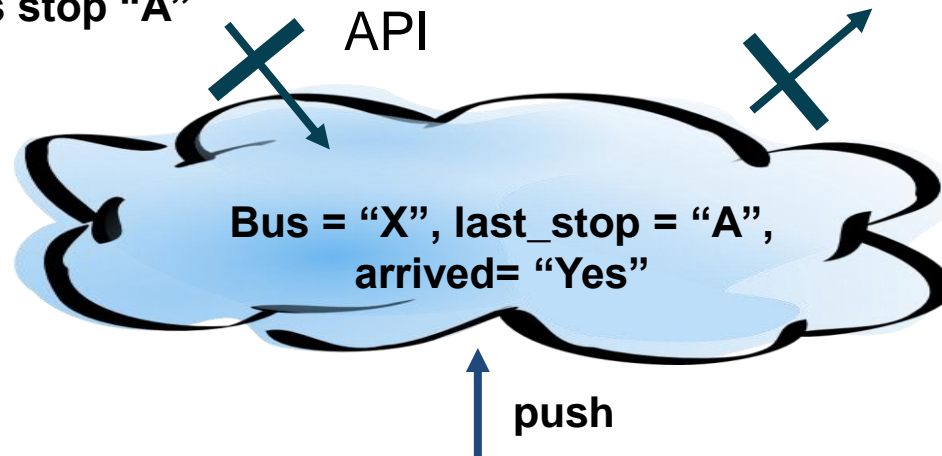


The Public Bus Transport Management system

Context Management in FIWARE

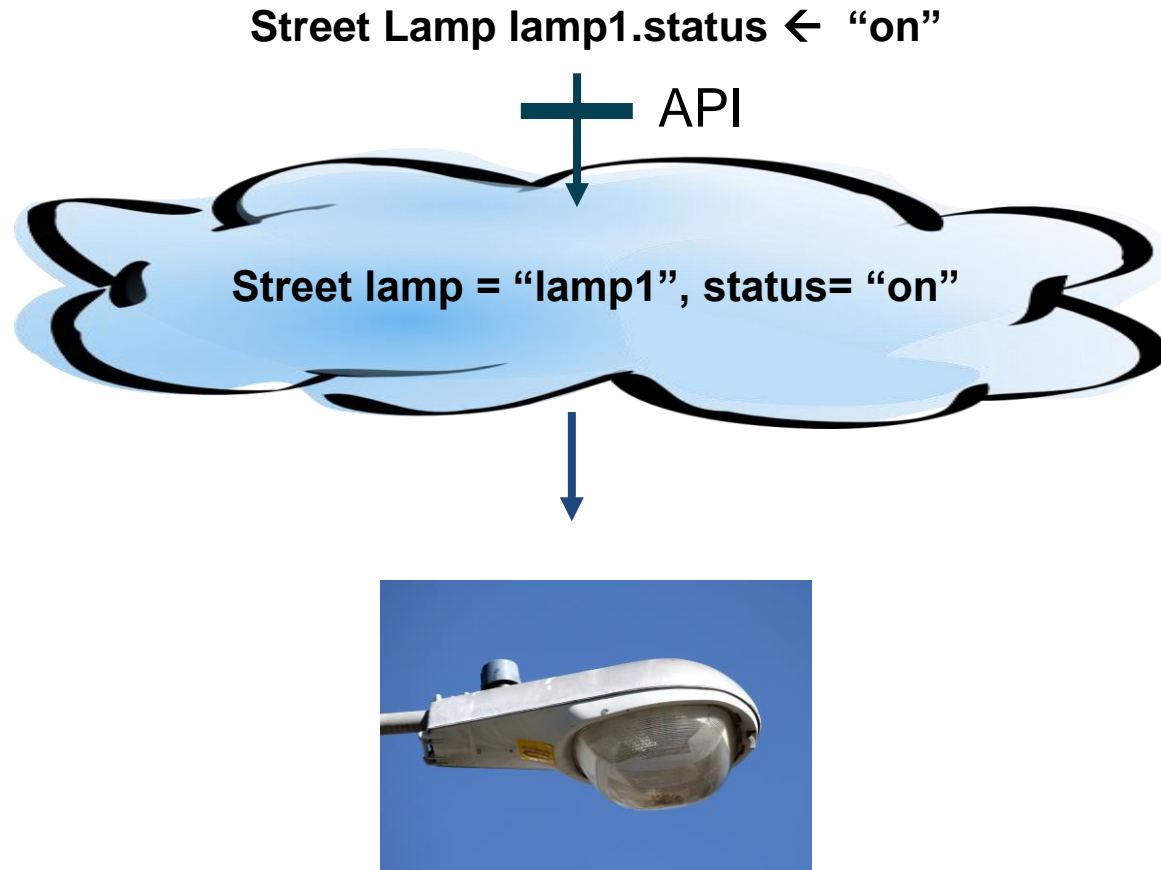
- Programmers may want to get notified when an update on context information takes place ...

Notify me when bus “X”
arrives at the bus stop “A”



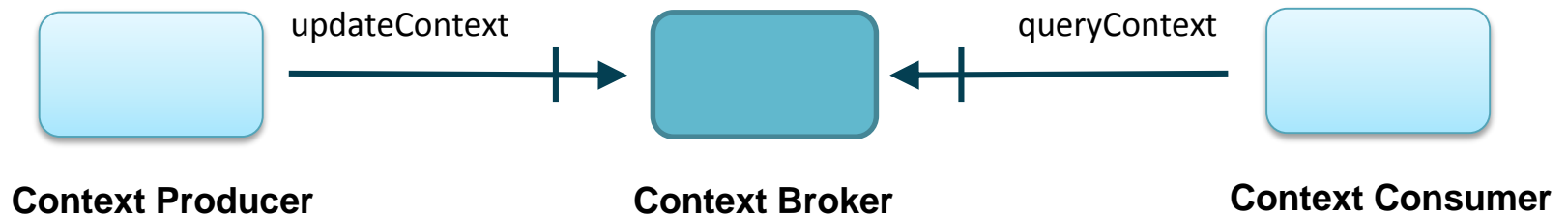
Context Management in FIWARE

- Acting on certain devices should be as easy as to change the value of attributes linked to certain entities



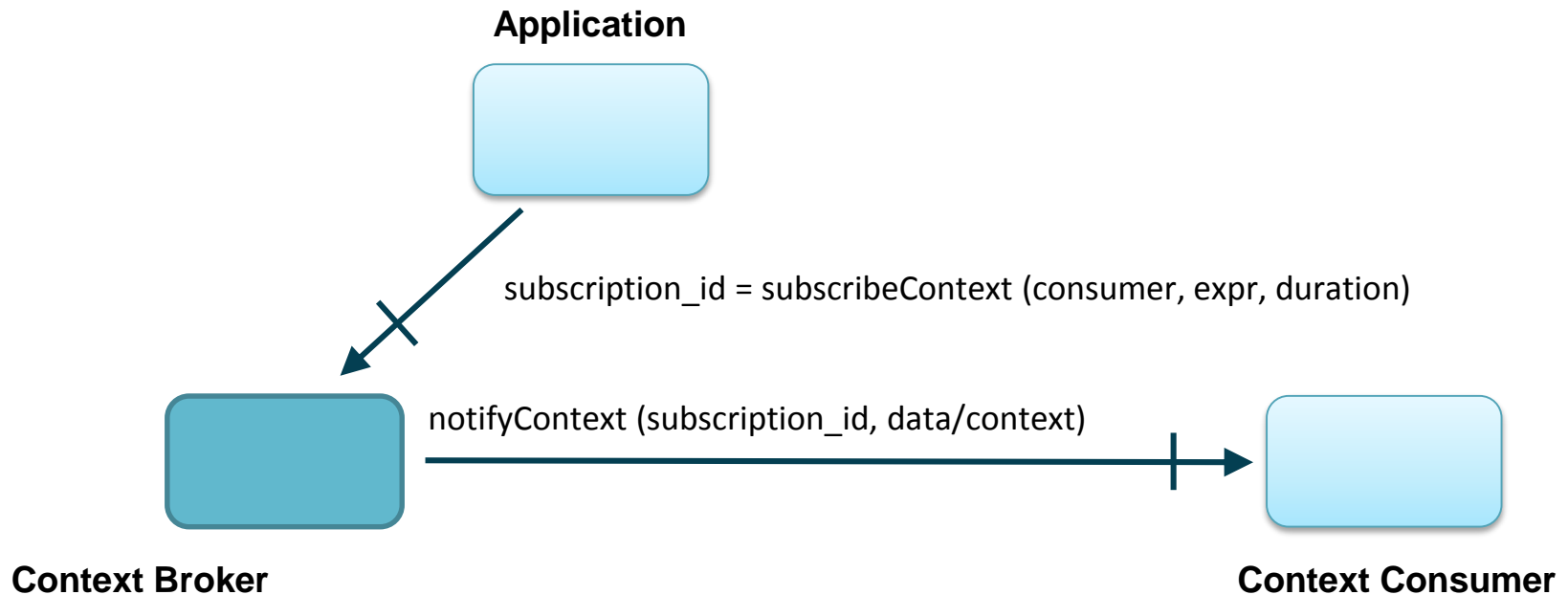
Basic Context Broker operations (1)

- **Context Producers** publish data/context elements by invoking the **updateContext** operation on a Context Broker.
- **Context Consumers** can retrieve data/context elements by invoking the **queryContext** operation on a Context Broker



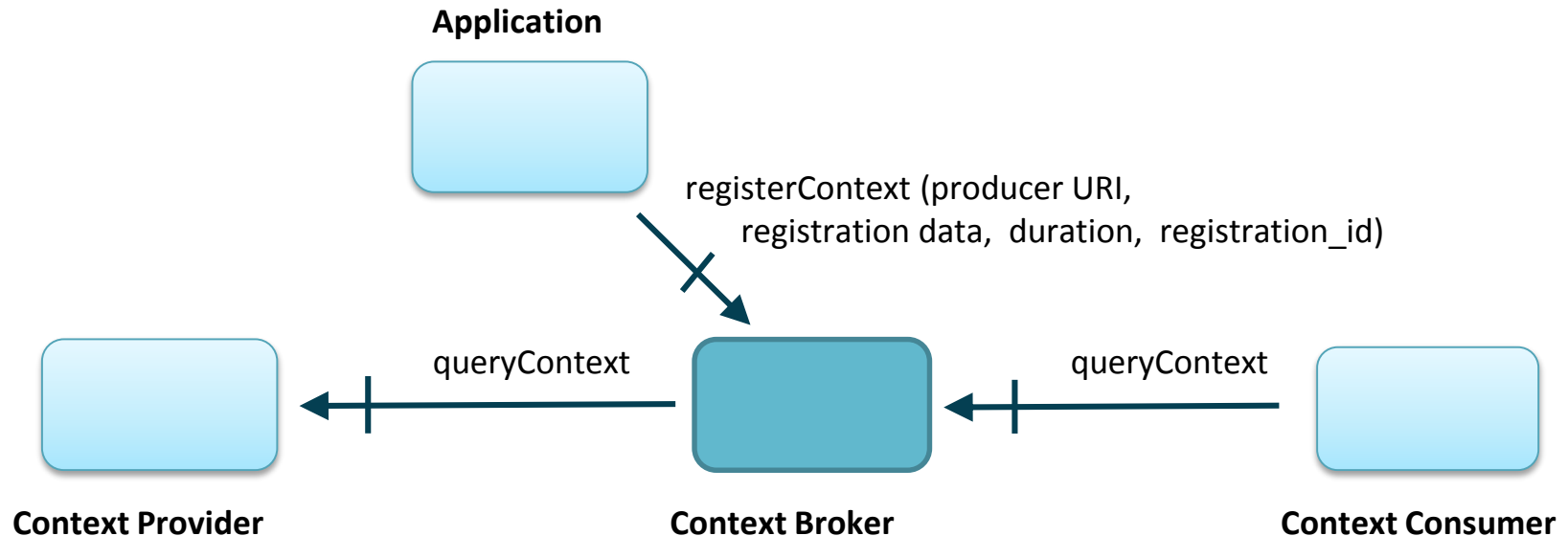
Basic entities and operations (2)

- **Context Consumers** can be subscribed to reception of context information complying with certain conditions, using the **subscribeContext** operation a ContextBroker exports. Such subscriptions may have a duration.
- The Context Broker notifies updates on context information to subscribed Context Consumers by invoking the **notifyContext** operation they export



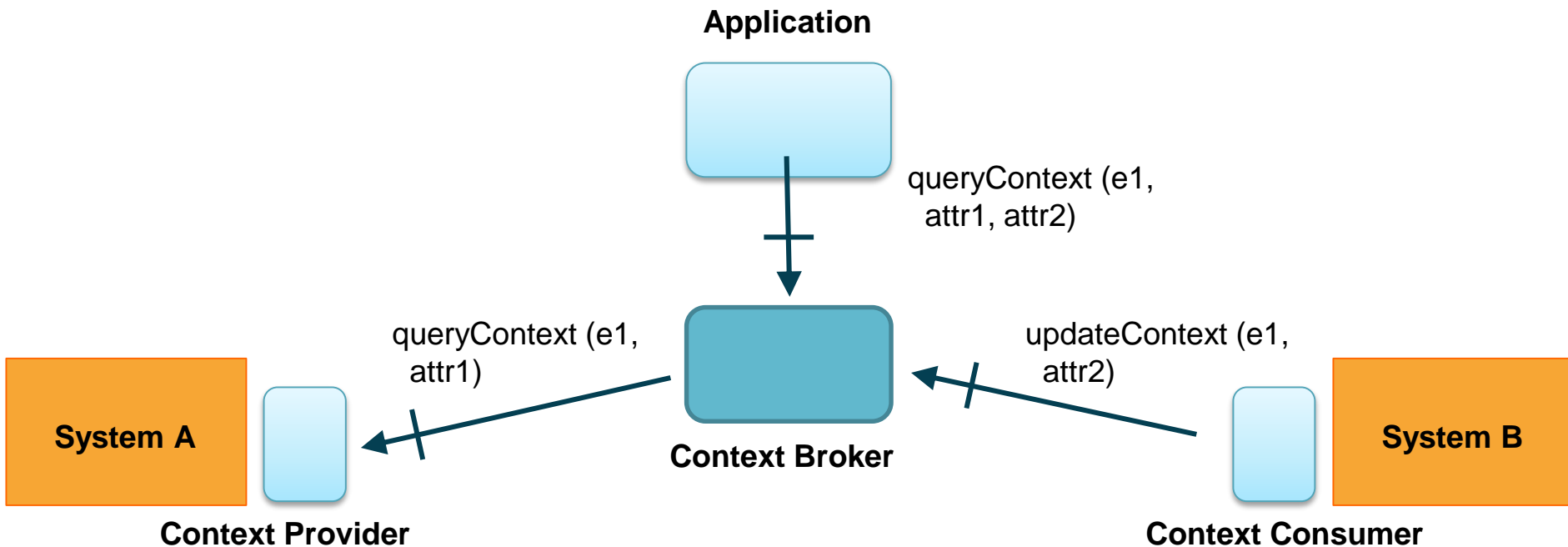
Basic entities and operations (3)

- Context Providers can be registered to the Context Broker linked to certain context information.
- A Context Broker will invoke the queryContext operation exported by Context Providers whenever they are queried for context information or have to notify updates in context information



Integration with existing systems

- Context adapters will be developed to interface with existing systems (e.g., municipal services management systems in a smart city) acting as Context Providers, Context Producers, or both
- Some attributes from a given entity may be linked to a Context Provider while other attributes may be linked to Context Producers

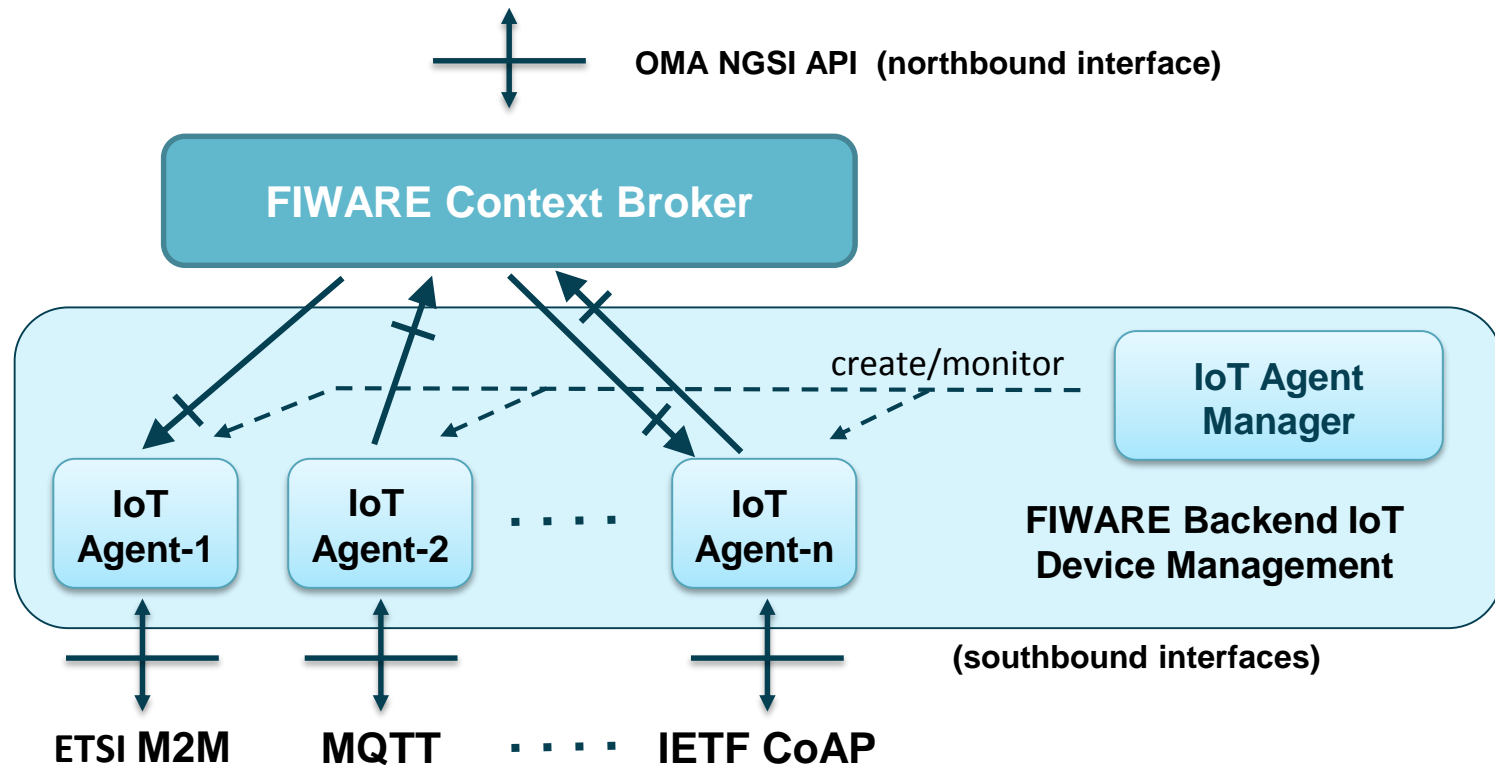


Easing connection to the physical world

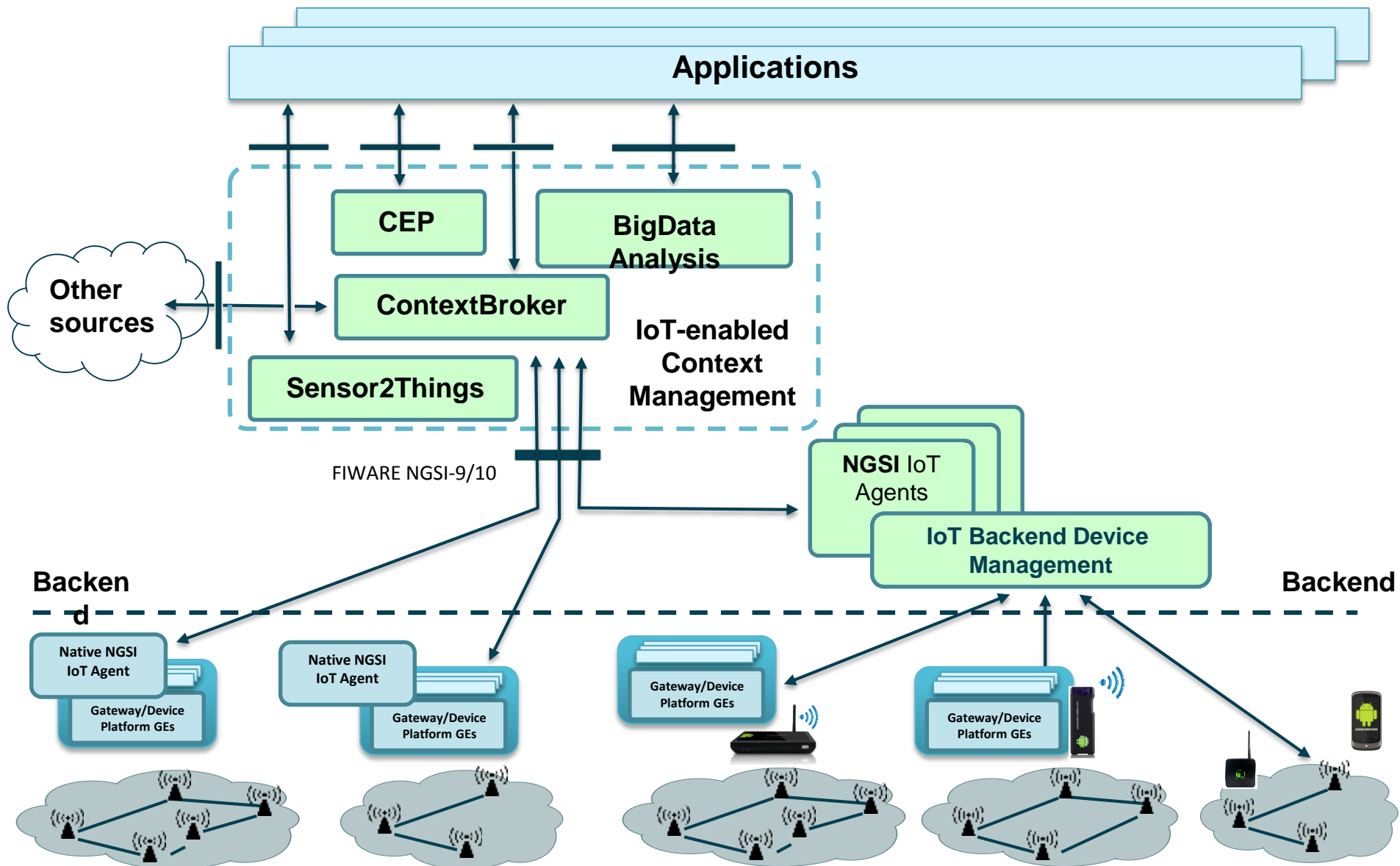


Integration with sensor networks

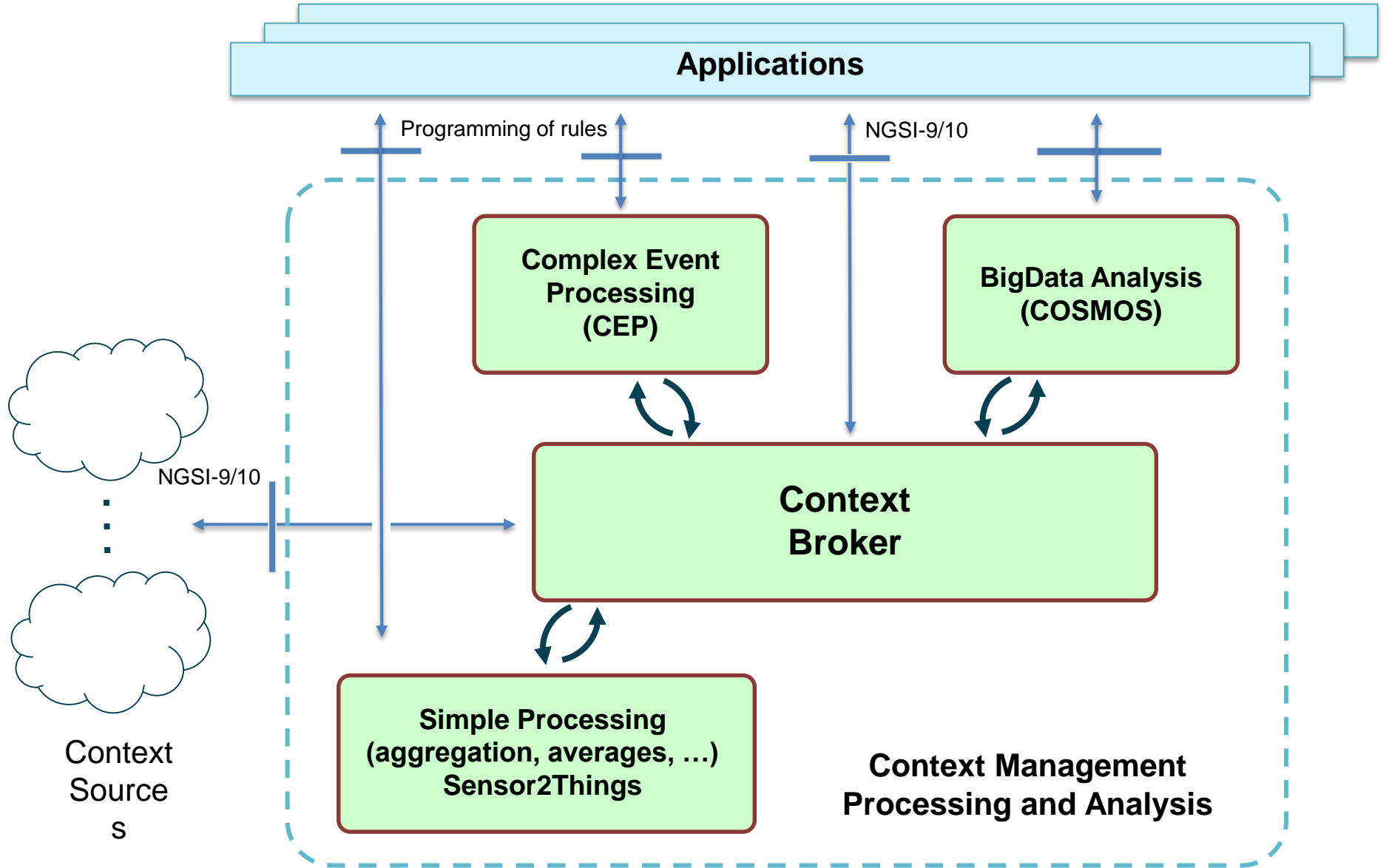
- The backend IoT Device Management GE enables creation and configuration of NGSI IoT Agents that connect to sensor networks
- Each NGSI IoT Agent can behave as Context Consumers or Context Providers, or both



FIWARE IoT-M2M & Context/Management altogether

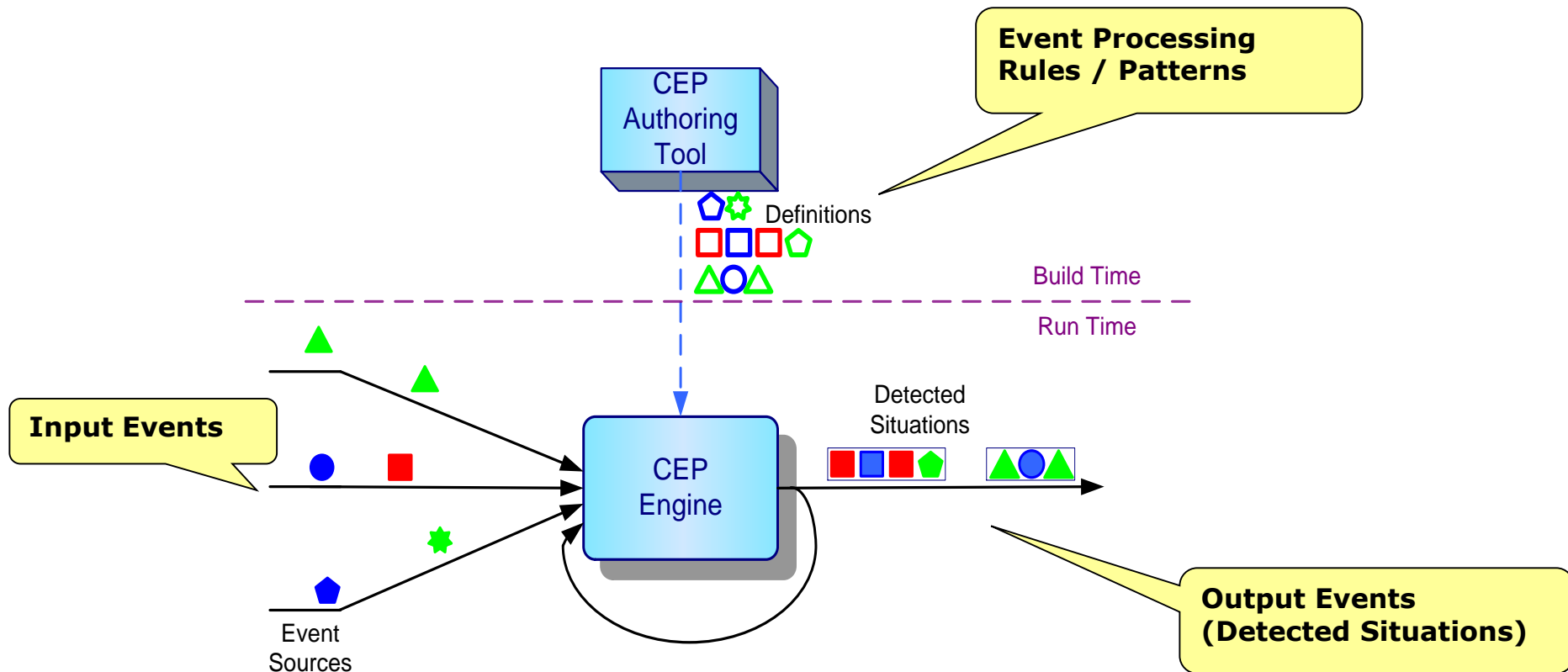


Context Processing and Analysis



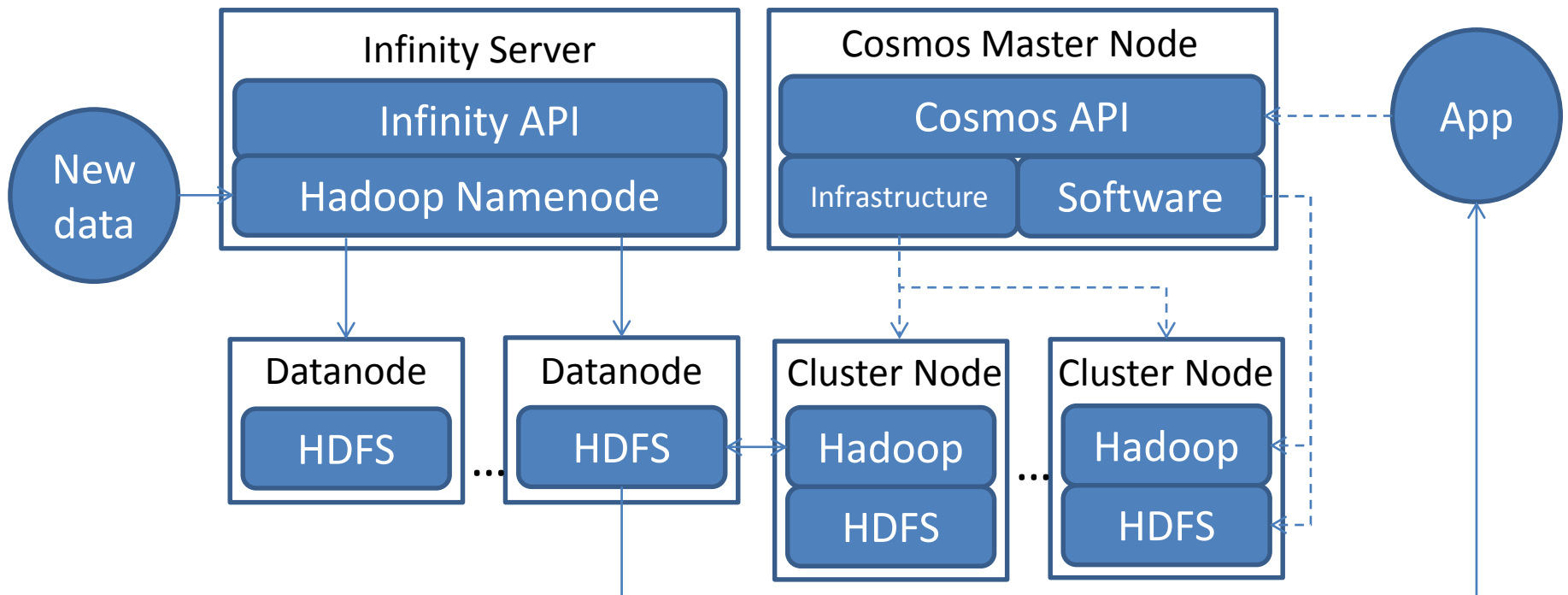
CEP Technology – expanding the ECA paradigm

- From Event-Condition-Action to Pattern-Condition-Action
- In certain scenarios, single events are insignificant, a CEP engine can detect combinations of events which are meaningful, called situations, and generate derived events.



Cosmos / Big Data overview

- Cosmos + Infinity
 - Ephemeral private Hadoop computing clusters management
 - Security enhanced HDFS-based permanent storage



The Stream Oriented Generic Enabler

Infrastructure-based streaming architecture

Media infrastructure



- Most important protocols and codecs (WebRTC, H.264)
- Real Time communications (B2B UA, MCU router and mixer)
- VoD: Media recording & Media playing
- Seamless Computer Vision algorithms: detection, tracking...
- 2D Augmented reality: 2D overlays, alpha blending,...

ckan (Open) Data Platform

- Search & Discover Data:
 - keywords, browse by facets, previews & visualization
 - REST/Json APIs to access data and metadata
- Data Management for publishers
 - Easy store & update of metadata.
 - Workflows & authorization
 - Support of private datasets acquisition from FIWARE Store & Data Portal.

Offering rich web-based user interfaces



Data/Applications Visualization and Delivery



Reaching target users, monetize



Ensuring Privacy, Security and Trust



Access from everywhere, taking the most of the network and capabilities of devices



 **OpenFlow**

 **Open EPC**
Evolved Packet Core



FIWARE Catalogue (<http://catalogue.fiware.org>)

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FIWARE Catalogue



Welcome to the FIWARE Catalogue! Here you will find all the information, documentation and tools you need as a developer to start using a Generic Enabler Implementation.

About the Catalogue



Connecting...

View the Enablers



Time Tracker

Tools



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FIWARE Catalogue

Hosting enablers
for creating
FUTURE IN
APPLICATIONS

Welcome to the FIWARE
a Generic Enabler In

About the Catalogue



Generic Enablers

Home / Generic Enablers

Browse by Chapter

- Any -

3D-UI-XML3D



Extend the current declarative, rich media content model of HTML-5 to also include interactive 3D graphics.

ADVANCED MIDDLEWARE AND WEB USER INTERFACES

☆☆☆☆

No votes yet

3DUI - WebTundra



realXtend's Web client for realtime collaborative 3d applications

ADVANCED MIDDLEWARE AND WEB USER INTERFACES

☆☆☆☆

No votes yet

Access Control - THA Implementation



Administration & Enforcement of RESTful API Authorization Policy

SECURITY

★★★★★

Time Tracker

FI-WARE

3D Printing: new contents, new formats

IoT Business (R)Evolution

FoodLoop: responsible consumption, sustainable society!

ECFI: 80 Million Euros to be awarded to SMEs and Startups

FIWARE Jump Conference: Boost SME's and Startups with FIWARE

More

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Generic Enablers

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Browse by Chapter

- Any -


3D-UI-XML3D

 Extend the current declarative, rich media content model
ADVANCED MIDDLEWARE AND WEB USER INTERFACES

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SECURITY

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FIWARE Catalogue

Publish/Subscribe Context Broker - Orion Context Broker

Home / Generic Enablers / Publish/Subscribe Context Broker - Orion Context Broker

Overview Creating Instances Documentation Downloads Instances Terms and conditions



Chapter:
Data/Context Management
Version:
Updated:
2014-06-13
Rating:

Average: 5 (2 votes)

What you get

The Orion Context Broker is an implementation of the Publish/Subscribe Context Broker GE, providing the NGS19 and NGS10 interfaces. Using these interfaces, clients can do several operations:

- Register context producer applications, e.g. a temperature sensor within a room
- Update context information, e.g. send updates of temperature
- Being notified when changes on context information take place (e.g. the temperature has changed) or with a given frequency (e.g. get the temperature each minute)
- Query context information. The Orion Context Broker stores context information updated from applications, so queries are resolved based on that information.

Why you get

If you are developing a Data/Context scenario, a broker like the Orion Context Broker is a must. You would need a component in the architecture able to mediate between consumer producers (e.g. sensors) and the context consumer applications (e.g. a smartphone applications taking advantage of the context information provided by the sensors). The Orion Context Broker fulfils this functionality in your architecture.

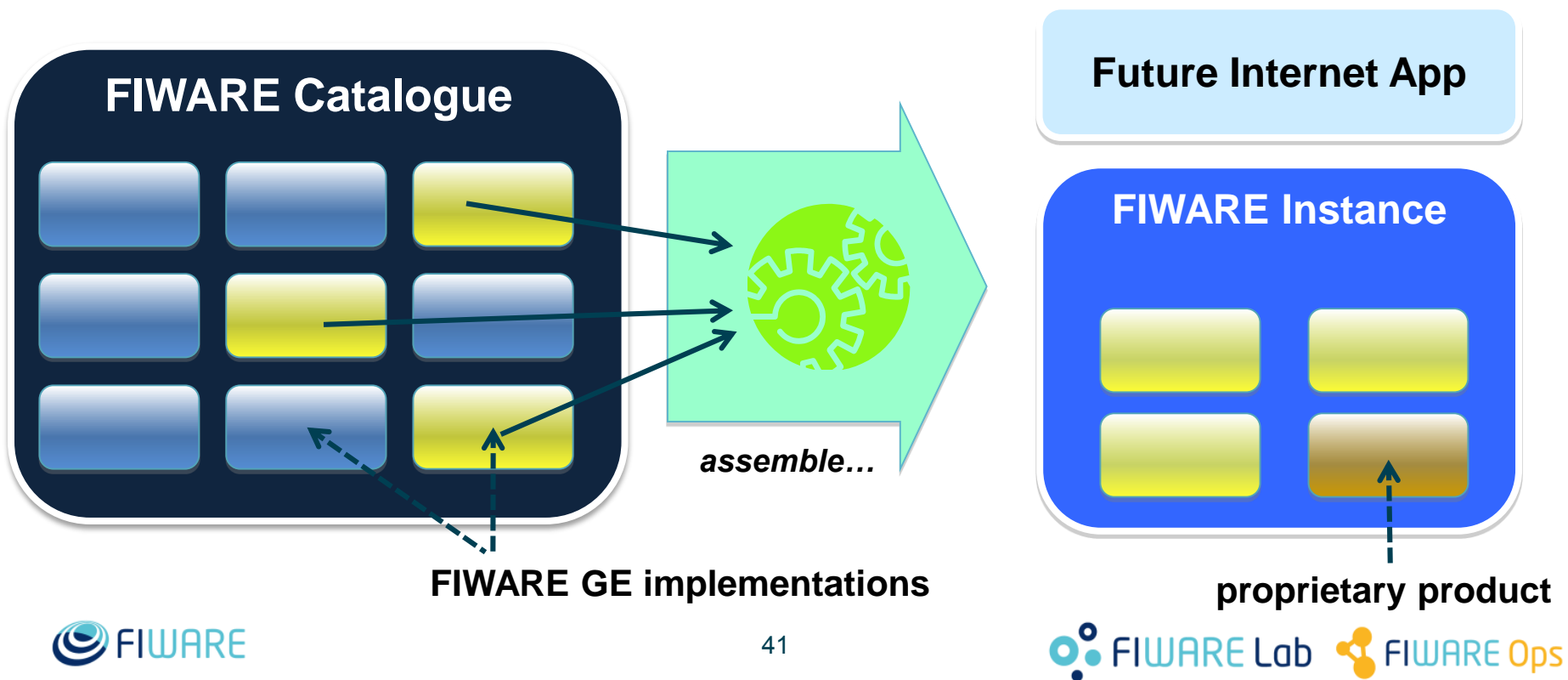
Open specification reference

This component has been designed according to the [Publish/Subscribe Context Broker GE Open Specification](#). Please check also the [NGS19](#) and [NGS10 REST API](#)

Provide Feedback

FIWARE Instances

- Future Internet Applications run on top of “FIWARE Instances” that are built by “FIWARE Instance Providers” upon:
 - selection of FIWARE GEIs (products) from the FIWARE Catalogue.
 - assembly of selected FIWARE GEIs with proprietary added-value products.



FIWARE University (<http://edu.fi-ware.org>)



You are not logged in. (Login)



Home Available Courses My Courses My Dates My Activities News

Navigation

Home
> Courses

Welcome

Welcome to the FI-WARE eLearning platform, where you can find training courses, lessons and many other contents regarding FI-WARE technology.

Feel free to start browsing our offering from the [categories](#) listed below (or from the Available Courses section), click on them and access the lessons.

Few quick steps and you can easily get access to all the public courses published in this platform.



1 Select a Category

- Cloud Hosting (2)
- Data/Context Management
- Internet of Things (IoT) Services Enablement (1)
- Applications and Services Ecosystem and Delivery

2 Select a Course

FI Application Project Management

This course introduces the concepts and usage of the FI Application Project Management (FI-APM) tool, to create and manage FI application projects.

3 Log in as Guest (if necessary)

Some courses may allow guest access

Login as guest

4 Select the Course Topic

1. Data Collection

Data Collection

This tutorial explains how to set Eclipse and Trace A in order to collect the SAR and TCPDump data used by Tr...

5 Confirm the Course Topic

Mode: Preview Normal

Start

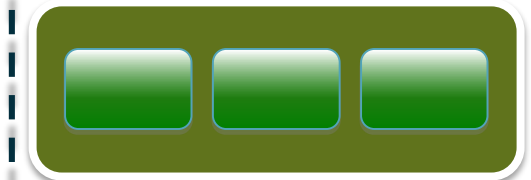
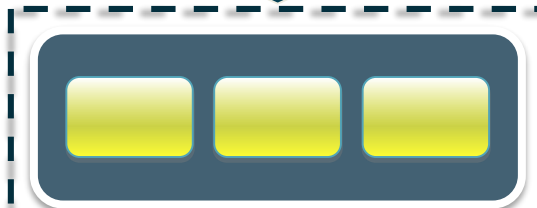
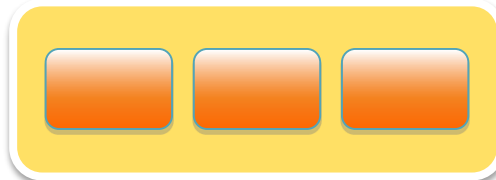
6 Start the Course

START

Domain-specific platforms = FIWARE + specific enablers



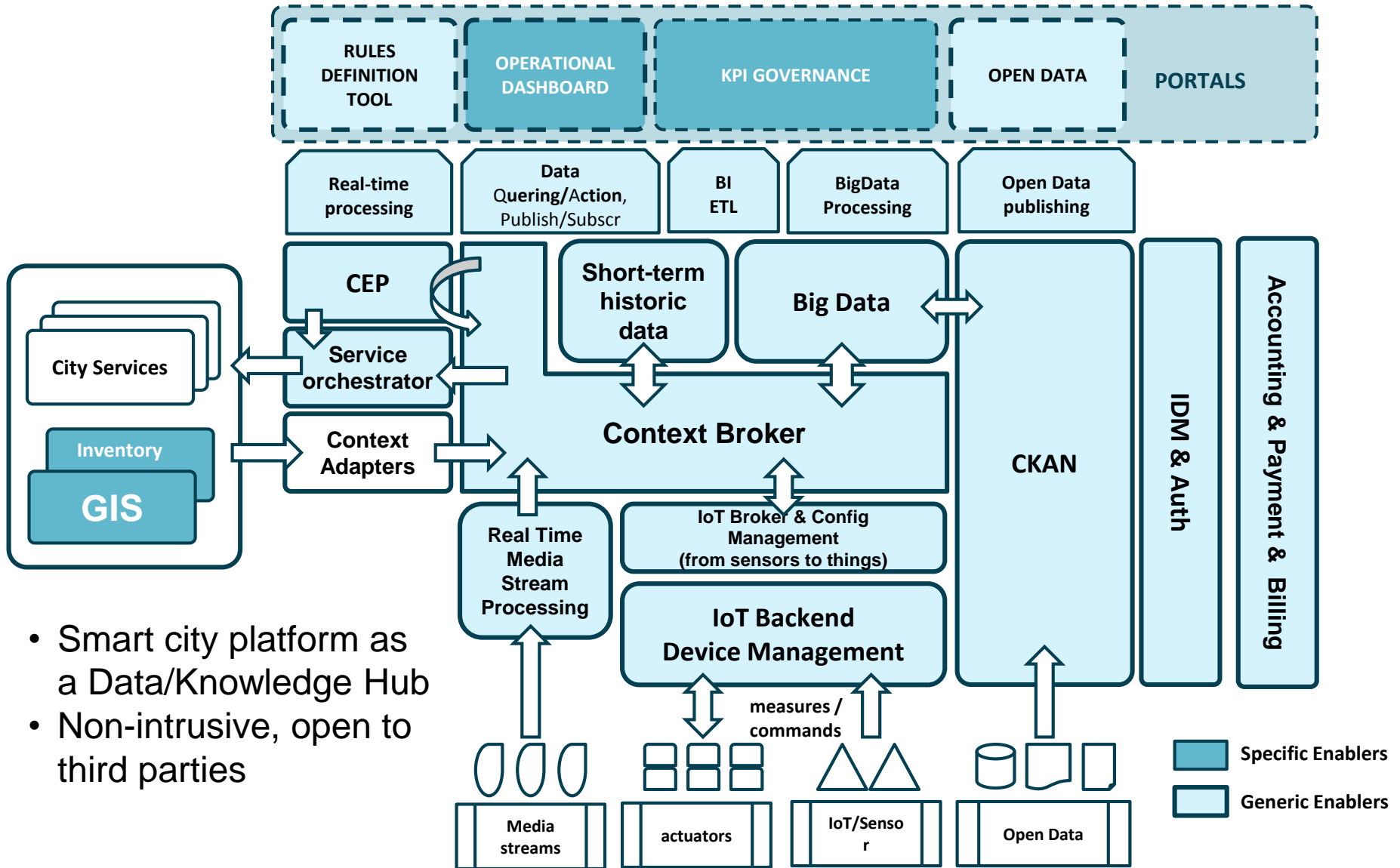
Domain specific enablers



FIWARE

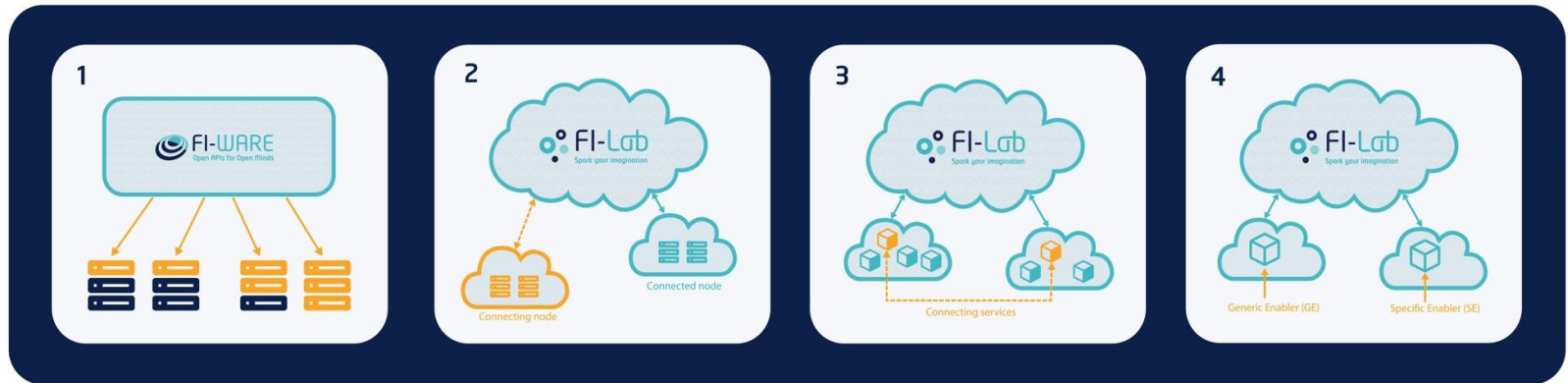


Envisioned target Smart City platform



- Smart city platform as a Data/Knowledge Hub
- Non-intrusive, open to third parties

FIWARE Ops: paving the way for FIWARE providers



Deployment

Deployment of basic Cloud Hosting GEs and Monitoring Adapters in a FIWARE node

Federation Management

Federate a new FIWARE node within a given FIWARE instance (e.g., the FIWARE Lab)

Connectivity Management

Manage connectivity of services across FIWARE nodes of a FIWARE instance

Service Offert Management

Registration and deployment of additional Generic Enablers, Specific Enablers and complementary Future Internet Facilities



Thanks!



OPEN APIs FOR OPEN MINDS

Join us!

www.lab.fiware.org

www.fiware.org

@Fiware 



BACKUP SLIDES

Internet: a transformation engine

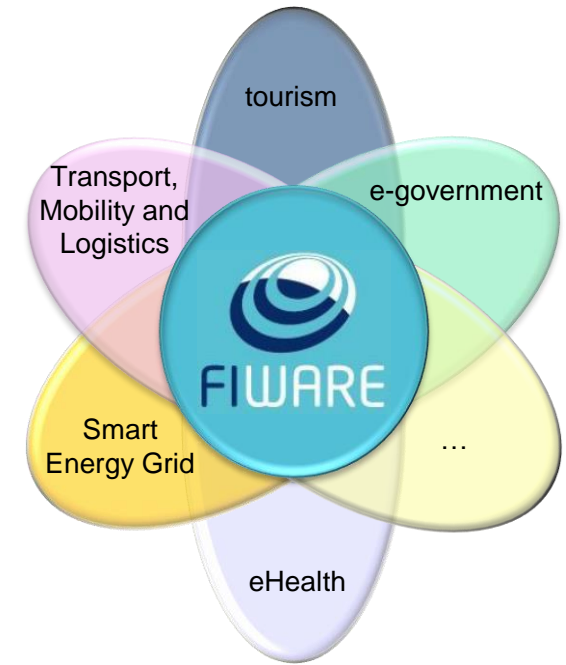


Navigation, Calling a taxi (Uber), Recruiting (LinkedIn)...



The FIWARE Program (formerly known as Future Internet PPP)

- **Goal:** capture opportunities derived from the new wave of digitalization of life and businesses
- **Strategy:** Build an ecosystem that will work as catalyst for capturing the opportunities. Lead standards for Smart Cities and APIs for IoT (Internet of Things)
- **Pillars:**
 -  **FIWARE:** a generic, open standard platform which serves the needs of developers in multiple domains
 -  **FIWARE Lab:** a meeting point where innovation takes place, an opportunity can be incubated
 -  **Accelerate:** a program that funds developers and entrepreneurs, and ignites roll-out of the ecosystem
 -  **FIWARE Ops:** the suite of tools easing deployment and operation of FI-WARE instance nodes
- **Global footprint:** open to regions sharing the ambition



How can the new opportunities be captured and ultimately translated into local economy growth and creation of jobs?

App Sponsors and Data providers

- Connect to entrepreneurs
- Put their data at work
- Bring new innovative services to end users
- Be more efficient
- Social Reputation

Entrepreneurs, Developers

- Develop once for a large market
- Easily meet potential customers
- Marketing, promotion
- Ability to test with real data and end users
- Simple yet powerful APIs that accelerate product development

Technology Providers

- Ability to “coopete”
- Connect to entrepreneurs: jointly exploit the opportunities

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ecosystem



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ecosystem

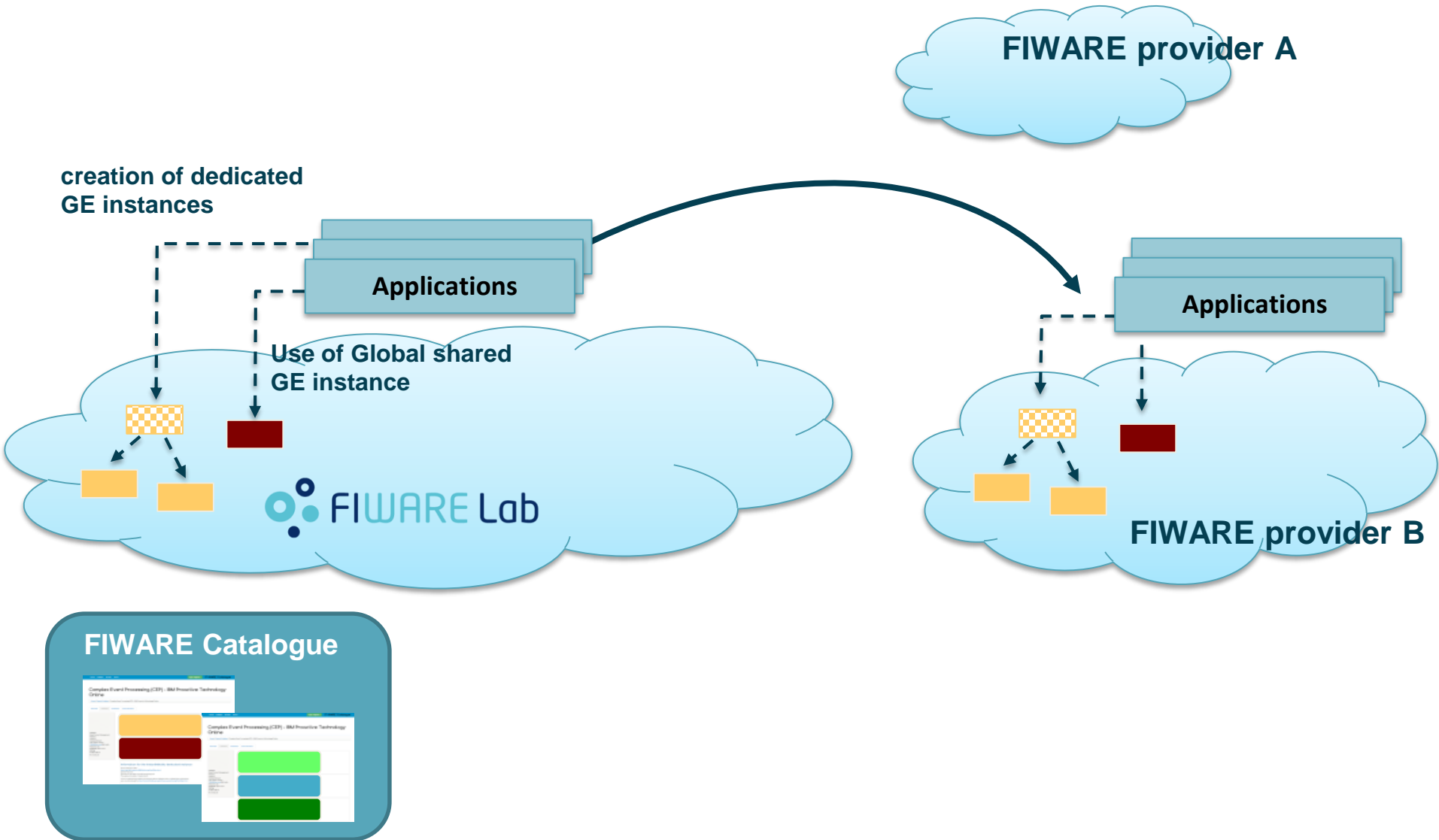
open sustainable global



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Building the FIWARE ecosystem: the vision



How the ecosystem is actually emerging: the case of Smart Cities

- Some cities already connecting to FIWARE Lab:
 - Italy: Trento, Torino, Veneto
 - Spain: Valencia, Sevilla, Málaga, Santander, Logroño, Vigo, Lleida, Sabadell, ...
 - Finland: Helsinki, Espoo
 - Netherlands: Amsterdam
 - Portugal: Lisbon
 - Discussion with cities in other countries ongoing
- FIWARE Challenge on Smart Cities:
 - Launched end of October
 - 300+ teams (individuals, startups, SMEs – few researchers) applied to the challenge ([ES](#), [EN](#))
 - 20 final teams run the [final in CPBR 14](#)
 - quite amazing results!



Why FIWARE

Driver	What is needed?	What does FIWARE bring?
Technology	<p>Open, driven by implementation, specs (open source reference implementation)</p> <p>Sustainable investment over time</p>	<p>Open specifications backed by open source reference implementations (see [1], [2])</p> <p>100+ M€ of investment (2011-2016)</p>
Experimental environment	<p>Ability to experiment with real data coming from cities (not just open historic datasets but real-time data).</p> <p>Free Cloud capacity enabling entrepreneurs to test and host a permanent showcase of their applications.</p>	<p>15 cities (7 in Spain) already working on setting up a connection to FIWARE Lab [3]</p> <p>3000+ cores, 16Tb RAM and 750+ Tb HD will be the free computing capacity provided by the FIWARE Lab Cloud across 16 nodes distributed in Europe</p>
Incentives for creating the ecosystem	<p>Engagement of technology providers, entrepreneurs, data providers, customers</p> <p>Funding for first entrepreneurs joining the ecosystem.</p> <p>Investment in promotion and dissemination activities</p>	<p>52 partners, 13 countries (just FIWARE)</p> <p>100 M€ devoted to fund entrepreneurs in 2014-2016. Additional opportunities in Horizon 2020.</p> <p>6,2+ M€ devoted to dissemination</p>
Global footprint	<p>Helping entrepreneurs and technology providers to create opportunities not just in Europe but other regions (Latam, Asia and, why not, USA)</p>	<p>FIWARE Lab nodes in Mexico and Brazil.</p> <p>Conversations between EC and public authorities in Mexico and Brazil to explore collaboration opportunities</p>

[1] – http://wiki.fi-ware.org/Summary_of_FIWARE_Open_Specifications

[2] – <http://catalogue.fi-ware.org>

[3] – <http://lab.fi-ware.org>

Extending the FIWARE Lab offering for service providers and developers

