

# SUST

Develops sustainable energy solutions  
with leading companies, entrepreneurs and scientists

## Bridging business silos with chatty things

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# About Sust



Founded in 2008 by leading Swedish companies and the Swedish Energy Agency.

Holds a unique position to realise sustainable energy solutions with leading companies, entrepreneurs and scientists thanks to its cross-sector/ private-public ownership structure.

Key areas of activity are Intelligent Energy Usage, Intelligent Energy Storage, Nearly Zero Energy Buildings, Transport/Logistics, Sustainable cities and Electric vehicles.

Direct results are environmental gains, financial savings and efficient energy usage achieved through Demonstration projects, Opinion forming activities, Networking and cooperation and Innovation Clusters for entrepreneurs.

# Unique cross-sector structure

LEADING COMPANIES:



SCIENTISTS:



ENTREPRENEURS:



# Device explosion

MORE THAN  
50 BILLION  
CONNECTED  
DEVICES

*“The vision of more than 50 billion connected devices by 2020 may seem ambitious today, but with the right approach, it is within reach”*

*Ericsson whitepaper, February 2011*



How many IP addresses can you have at home?

# Connect it to clouds



FTTT [Learn more](#) [Sign in](#) [Join](#)

## Put the internet to work for you

**Sensorpedia**  
 Explore. Contribute. Share.  
 Sensorpedia makes it easy to find and share sensor data.

Cosm is now Xively. [Read more](#)

**xively**™ by LogMeIn

PLATFORM SHOWCASE PARTNERS DEVELOPER CENTER LOGIN SIGN UP

Xively and ARM announce strategic collaboration, release Jumpstart Kit. >

**Internet of Things is Open for Business.**  
 your connected product, here and now.

**Paraimpu**

Workspace About The Team Developers Terms Contact

Admin Zone Friends

Add new Sensor [?]

Sensors	Actuators
<ul style="list-style-type: none"> <li>NumericSensor produce turner TEST ... UNDER APPROVAL</li> <li>PachubeTEMPSensor temperature test UNDER APPROVAL</li> <li>Foursquare Foursquare social ne ... PRIVATE</li> <li>SumoLevel test sump level</li> </ul>	<ul style="list-style-type: none"> <li>generic generic actuator PUBLIC</li> <li>map map test PRIVATE</li> <li>processing processing test PRIVATE</li> <li>quartz quartz act</li> </ul>

# Free or Service Included



MEMBER LOGIN

## Welcome to the Z-Wave Alliance

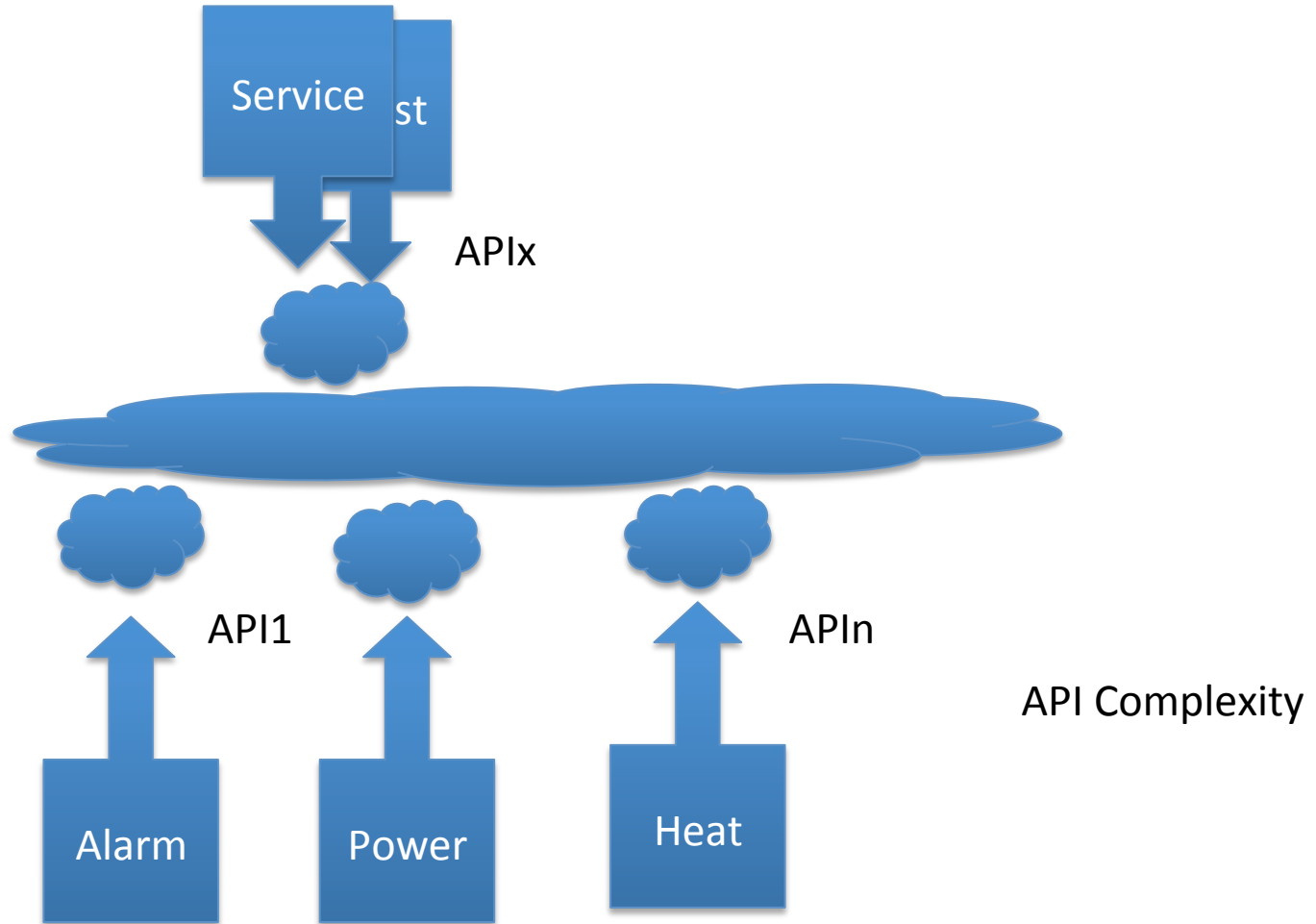
The Z-Wave Alliance is a consortium of over 250 leading manufacturers and service providers worldwide that are dedicated to interoperable wireless home control products based on the Z-Wave open standard. Z-Wave is a key enabling technology driving the "Internet of Things."



Empowering Intelligent Energy Solutions

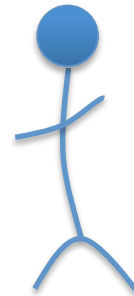
[Connection](#) | [Technical Resources](#) | [Certifications](#) | [News & E](#)

# Business silos



# Customer view

Securitas  
Verisure



Enertech  
Viessmann

A

Riksbyggen  
Ngenic  
Vattenfall



# Chat Charing information



Make friends  
You in charge  
Block friends  
Join groups

Language is crucial



**XMPP Standards Foundation**

iea.sust.se



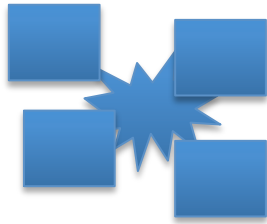
Bridging Business models for smart energy services

# Intelligent Energy Usage, iea.sust.se

- **VINNOVA – funded project**
  - Project management and research – SUST & SICS
  - Heating system – Enertech, Viessman
  - Ventilation system - Systemair
  - Alarm system – Securitas, Verisure
  - Energy, services, utility - Vattenfall
  - Real estates – Riksbyggen
  - Technology & integration - Maingate
  - Communications technology – H&D Wireless
  - Energy service – Ngenic (optimization of heating systems)

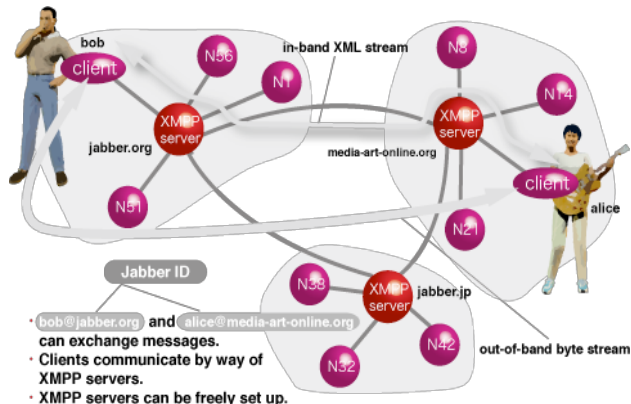


# SMTP



- Proven messaging for 30 years
- Addressing scheme “name@domain”
- Any SMTP to any SMTP server
- SPAM
- The operator was the closest server
- More and more SMTP traffic cloudbased

# XMPP



- Proven messaging over 10 years
- JID “name@domain/resource”
- Only federated servers
- Defined process for trust and revoke
- Prone to Spam
- The HGI the closest server/gateway?

# Generic XMPP servers

Many languages

Combine server with any client

## Servers



isode

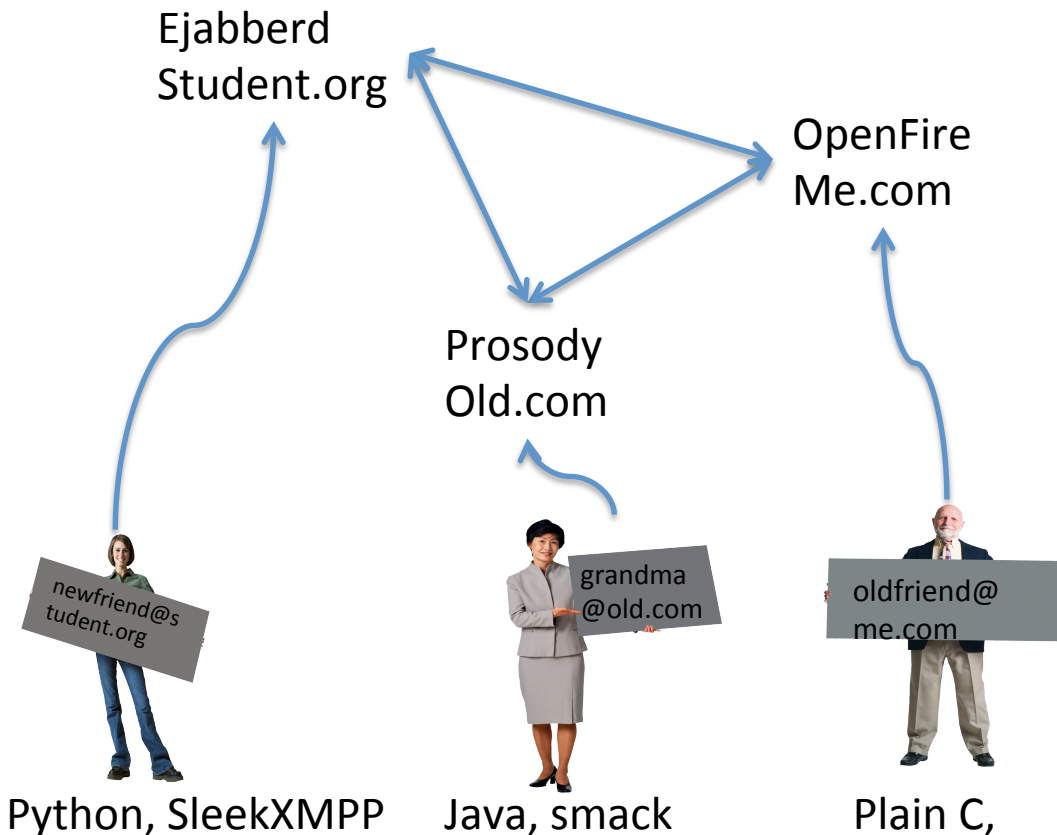


## Clients

Xabber android

Talkanout ios

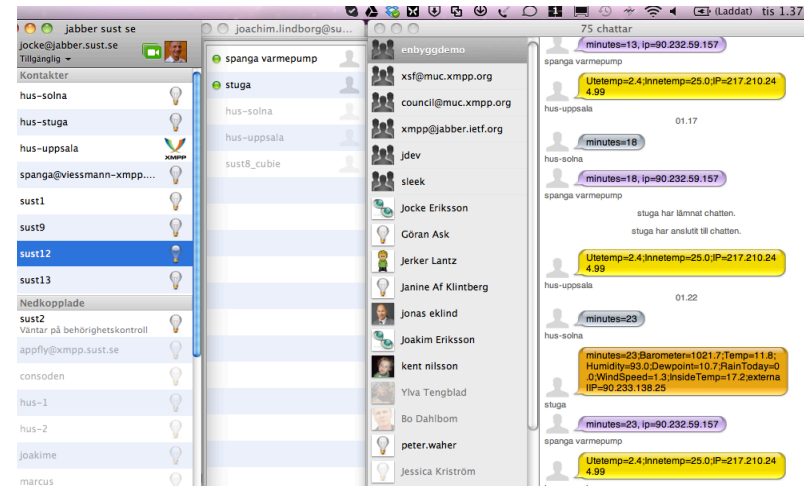
Psi, pidgin,



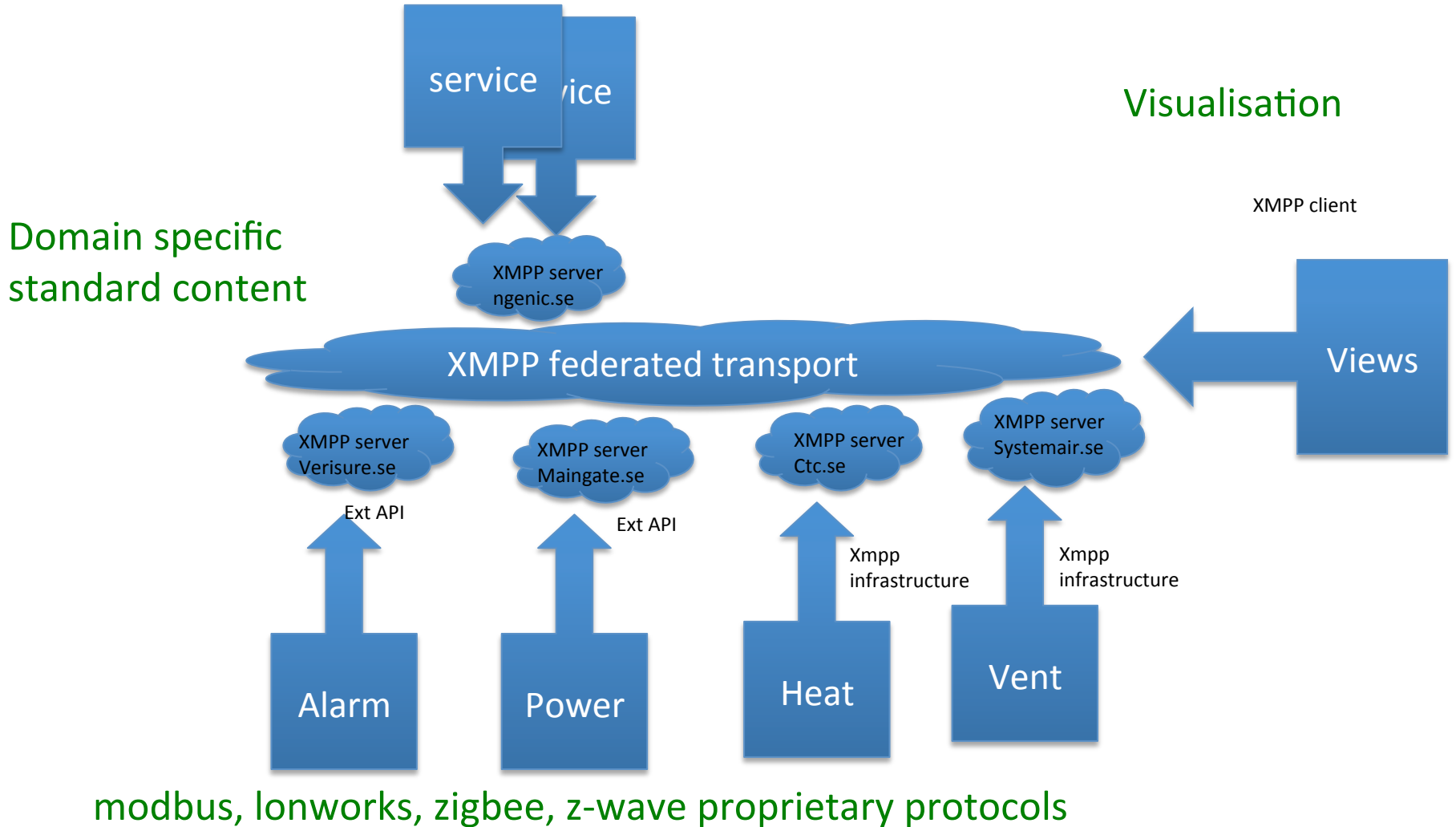
# XMPP open, any klient

XMPP to solve ,

- sensor data transport
- smart metering large systems
- distributed control
- fine granulated access
- authentication
- efficient transport
- indisputably proven technology



# Bridging domain silos



# Standardisation

**Xeps ([xmpp.org/extensions/](http://xmpp.org/extensions/)) No standard without implementations**

<a href="#">XEP-0321 (PDF)</a>	Remote Roster Management	Standards Track	Experimental	2013-04-16
<a href="#">XEP-0320 (PDF)</a>	Use of DTLS-SRTP in Jingle Sessions	Standards Track	Experimental	2013-04-16
<a href="#">XEP-0322 (PDF)</a>	Efficient XML Interchange (EXI) Format	Standards Track	Experimental	2013-04-16
<a href="#">XEP-0323 (PDF)</a>	Internet of Things - Sensor Data	Standards Track	Experimental	2013-04-16
<a href="#">XEP-0324 (PDF)</a>	Internet of Things - Provisioning	Standards Track	Experimental	2013-04-16
<a href="#">XEP-0325 (PDF)</a>	Internet of Things - Control	Standards Track	Experimental	2013-05-06
<a href="#">XEP-0326 (PDF)</a>	Internet of Things - Concentrators	Standards Track	Experimental	2013-05-06
<a href="#">XEP-0327 (PDF)</a>	Rayo	Standards Track	Experimental	2013-05-06

**ISO/IEC/ IEEE P21451-1-4**

**Coordinating standard with proposed XEP's  
openADR.org, Stanford, Berkley, cisco**



# Chat XMPP for devices

Precense

Make friends

Needs a best friend (parent)to trust

Different personalities

Publish subscribe

Provisioning

newfriend@  
student.org

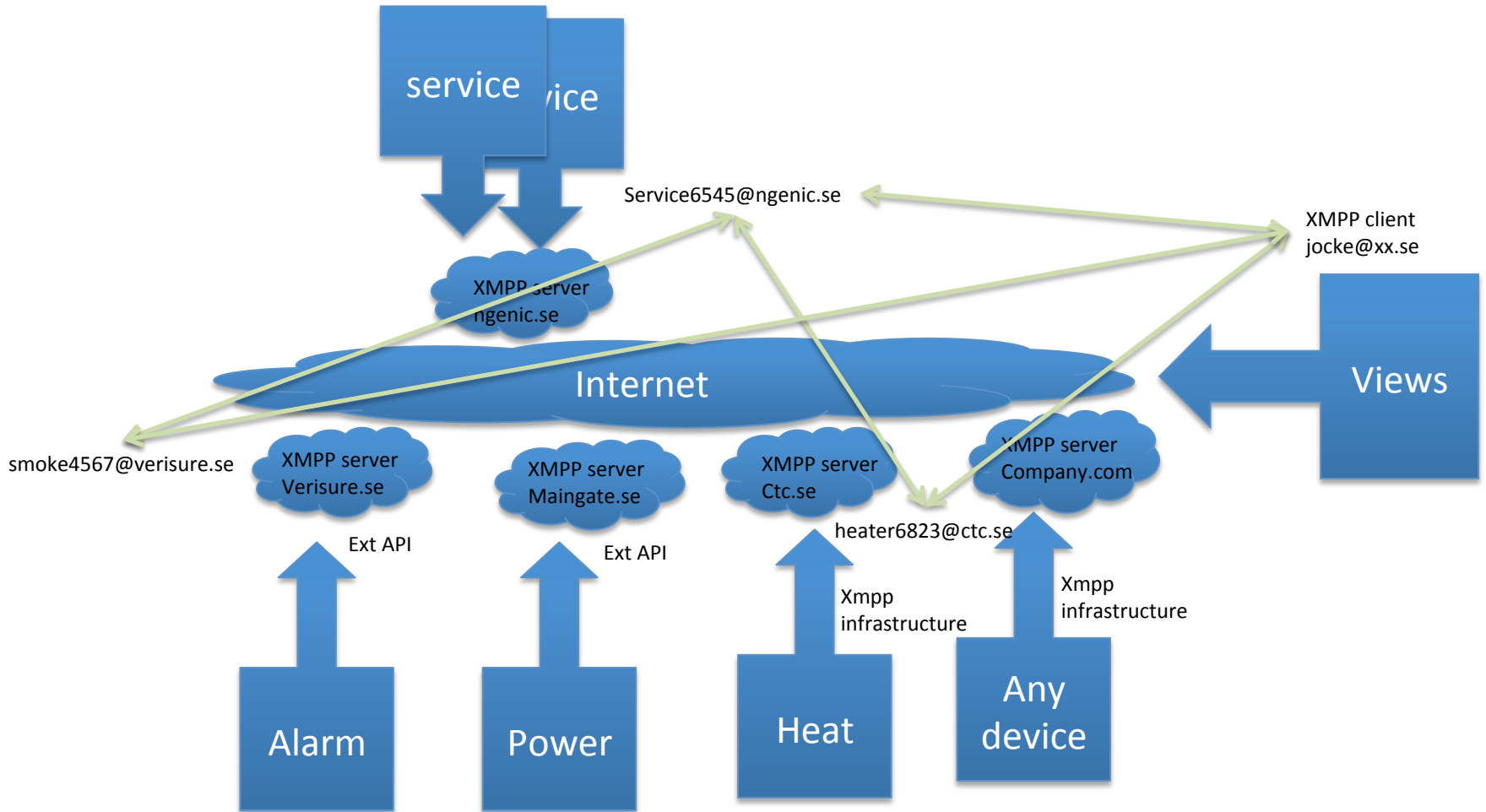
grandmaPublic  
@old.com  
grandmaPrivate  
@old.com  
grandmaSecret  
@old.com

*Ask for  
permissions*

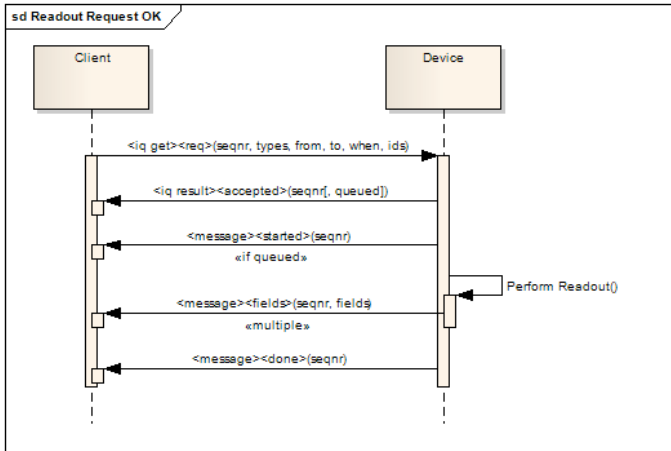
Parent@  
provision  
ing.com

oldfriend  
@me.com

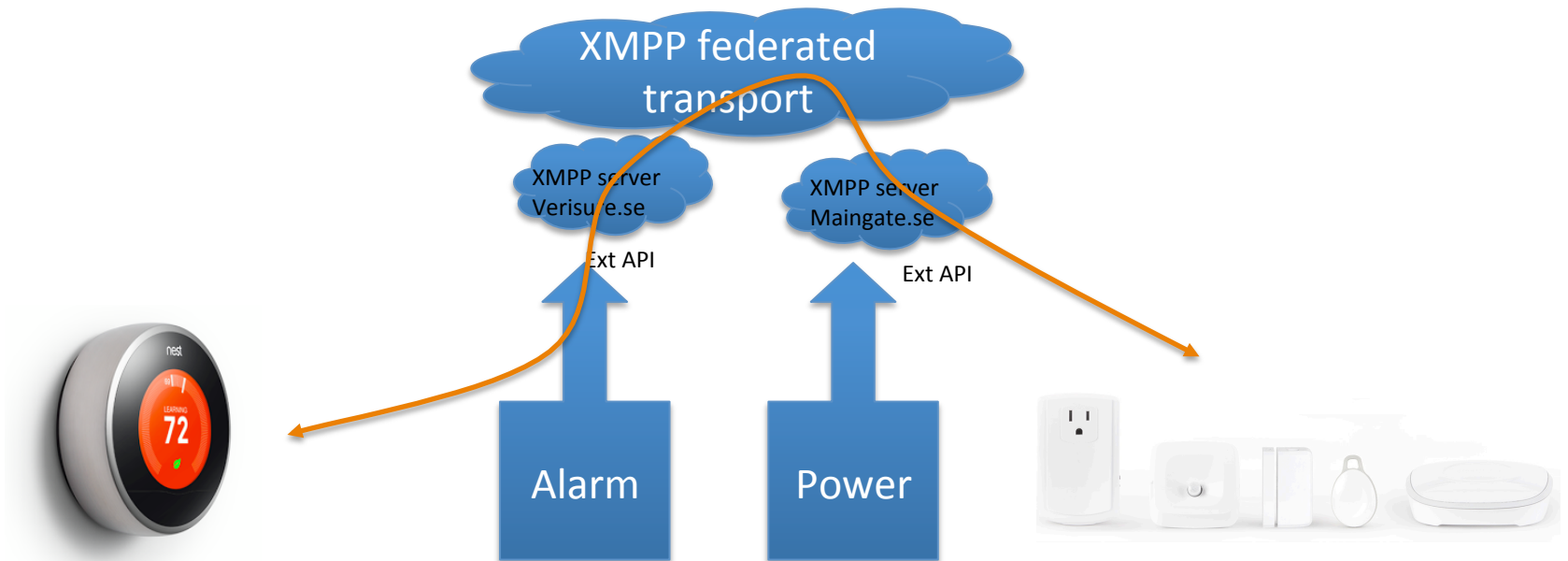
# IEA.sust.se services over XMPP



# XEP 323 IoT sensor data



Readout data from device  
 Need to be friends  
 More granularity on security  
 Big readouts

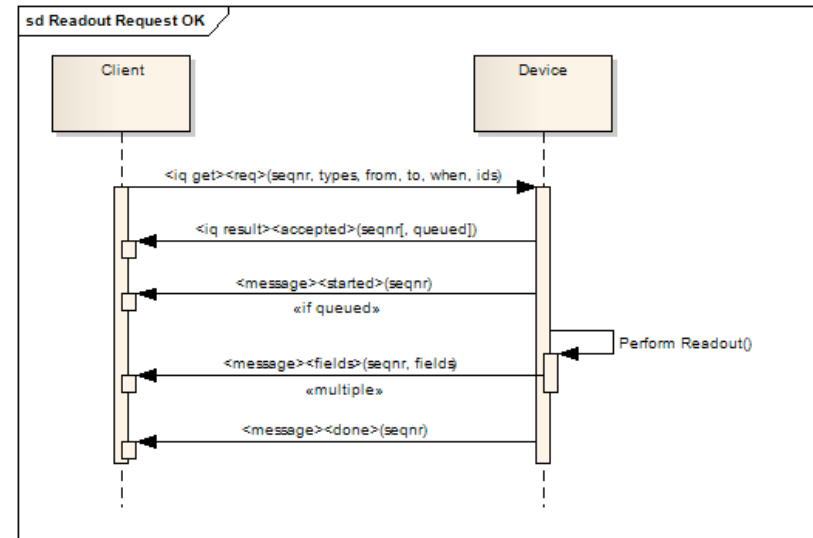


# Example XEP 323

```
<iq type='get'
  from='master@clayster.com/amr'
  to='device@clayster.com'
  id='1'>
  <req xmlns='urn:xmpp:sn' seqnr='1' momentary='true'/>
</iq>
```

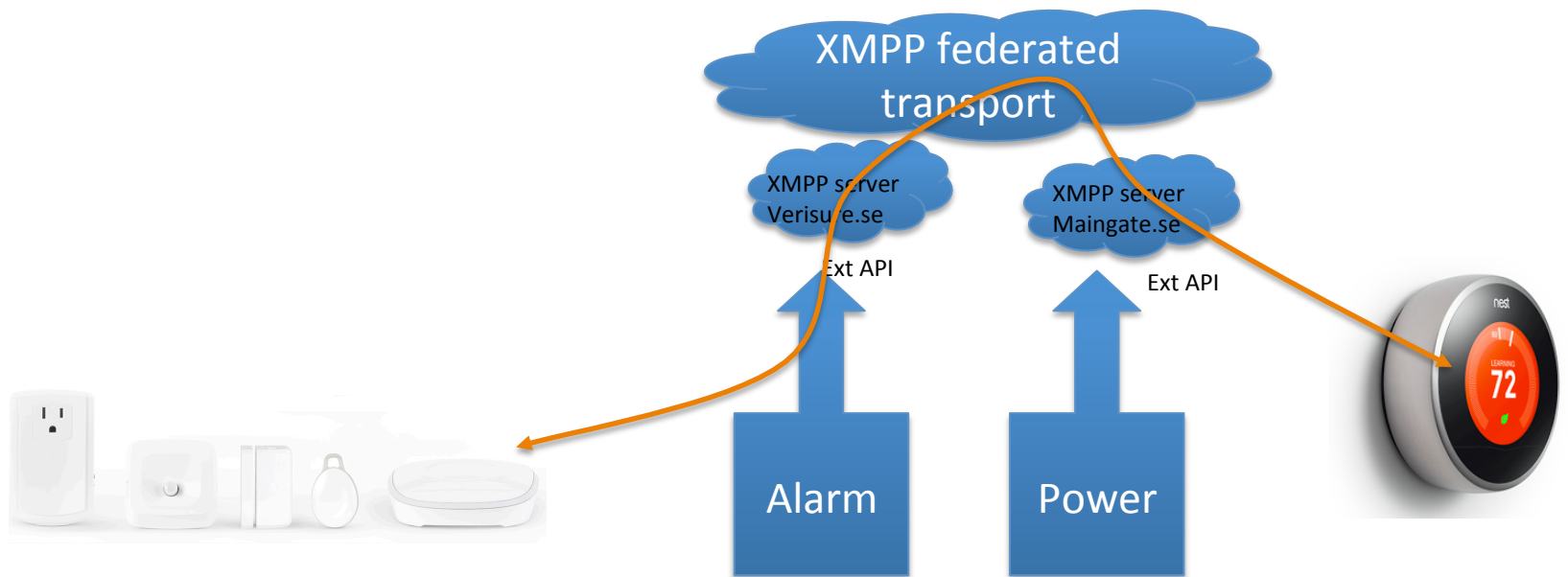
```
<iq type='result'
  from='device@clayster.com'
  to='master@clayster.com/amr'
  id='1'>
  <accepted xmlns='urn:xmpp:sn' seqnr='1'/>
</iq>
```

```
<message from='device@clayster.com'
  to='master@clayster.com/amr'>
  <fields xmlns='urn:xmpp:sn' seqnr='1' done='true'>
    <node nodeId='Device01'>
      <timestamp value='2013-03-07T16:24:30'>
        <numeric name='Temperature' momentary='true' automaticReadout='true' value='23.4' unit='°C'/>
      </timestamp>
    </node>
  </fields>
</message>
```



# XEP 325 IoT control

- Configuration
- Updating parameters
- Controlling commands



# Example XEP 325

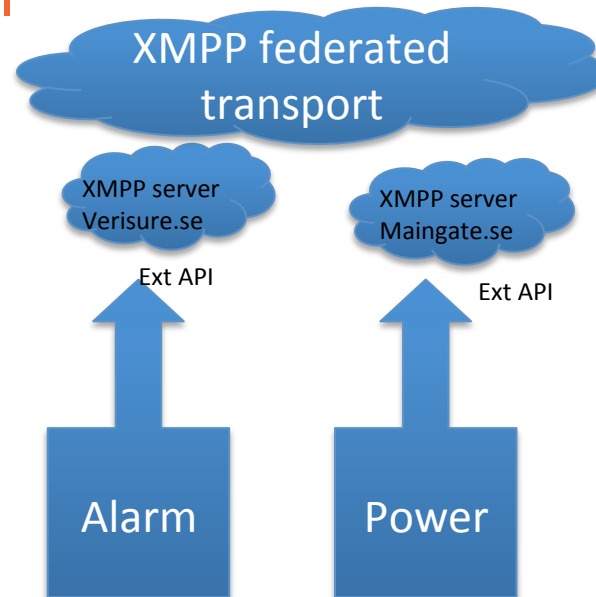
```
<iq type='set'  
  from='master@clayster.com/amr'  
  to='digital.output@clayster.com'  
  id='1'>  
  <set xmlns='urn:xmpp:sn:control' xml:lang='en'>  
    <boolean name='Output' value='true'/>  
  </set>
```

```
<iq type='result'  
  from='digital.output@clayster.com'  
  to='master@clayster.com/amr'  
  id='1'>  
  <setResponse xmlns='urn:xmpp:sn:control' responseCode='OK'/>  
</iq>
```

# XEP 324 IoT Provisioning

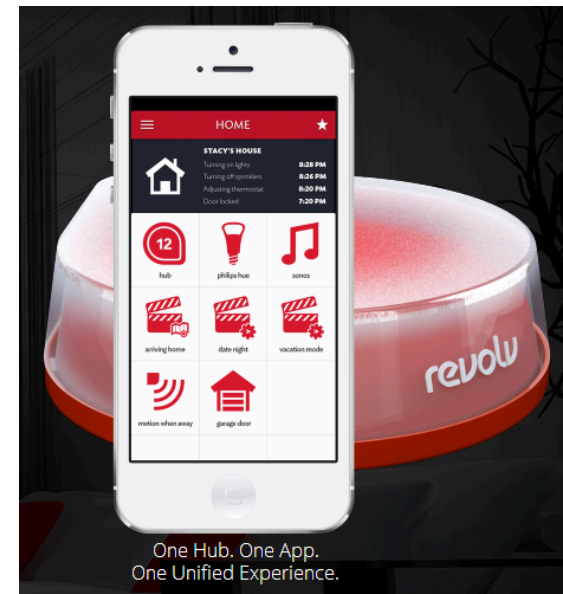
- My Bestfriend
- Unfriending
- Recommend friend
- Detail field control

Leaf control instead of central control



# The gateways to heaven

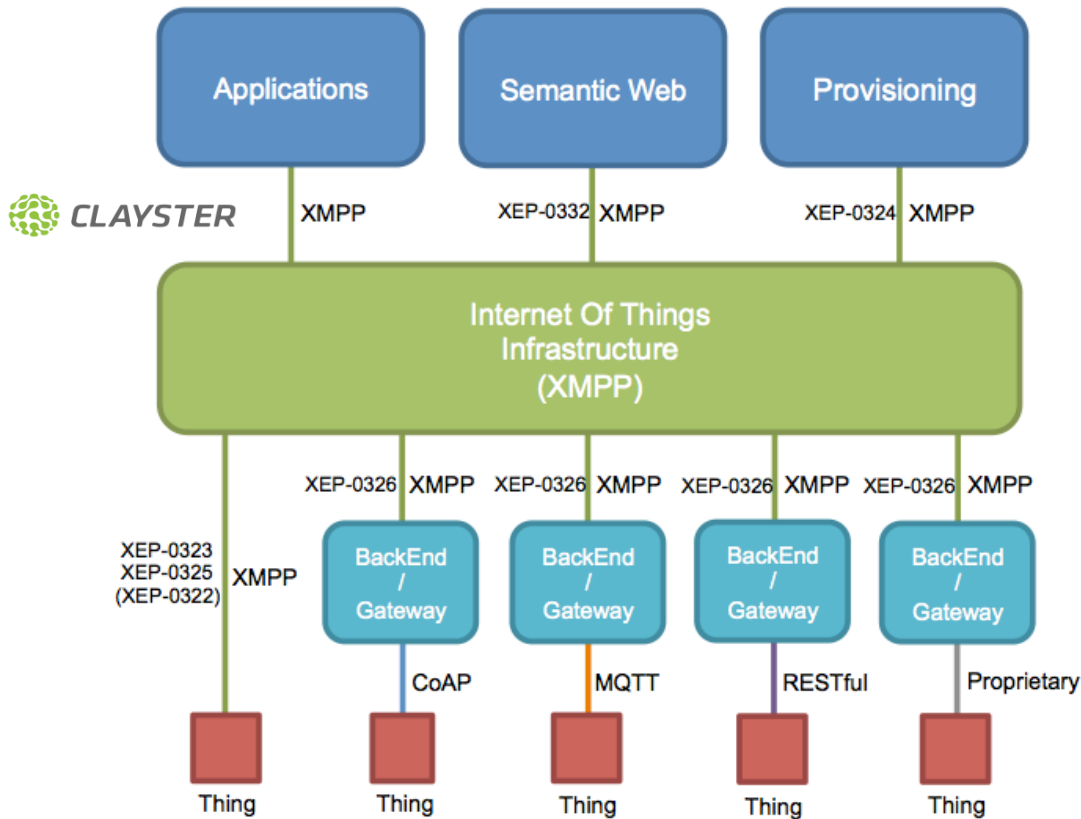
- Some google search home work to do
- IP gateway knx
- IP gateway modbus
- IP gateway metasys
- IP gateway i2c
- IP gateway profibus
- IP gateway mbus
- IP gateway can bus
- IP gateway Lonworks
- IP gateway ZigBee
- IP gateway z-wave
- IP gateway WirelessHART
- IP gateway RS485
- IP gateway RS232





# XEP 326 IoT concentrator

Hide any system  
Easy integration



# XEP 326 IoT concentrator example

```
<iq type='get'  
  from='client@clayster.com/client'  
  to='concentrator@clayster.com'  
  id='4'>  
  <getAllDataSources xmlns='urn:xmpp:sn:concentrators' xml:lang='en'/>  
</iq>
```

```
<iq type='result'  
  from='concentrator@clayster.com'  
  to='client@clayster.com/client'  
  id='4'>  
  <getAllDataSourcesResponse xmlns='urn:xmpp:sn:concentrators'  
  result='OK'>  
    <dataSource id='Applications' name='Applications' hasChildren='false'  
  lastChanged='2013-03-19T17:58:01'/>  
    <dataSource id='Certificates' name='Certificates' hasChildren='false'  
  lastChanged='2013-02-20T12:31:54'/>  
    <dataSource id='Clayster.EventSink.Programmable' name='Programmable  
  Event Log' hasChildren='false' lastChanged='2012-10-25T09:31:12'/>  
    ...  
  </getAllDataSourcesResponse>  
</iq>
```

# Bridging domain silos

