Argand Solutions
Energy Analytics & Smart Grid Solutions

Enabling the Smart Grid with Smart Communications

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7th Smart Grids & Cleanpower 2016
Cambridge 27-28 June
www.cir-strategy.com/events

Agenda

1. About Argand
2. Focus of Talk
3. Requirements for a Smart Grid
4. Communications Layer Innovation
5. Opportunities
6. Q&A

About Argand Solutions

Distributed Processing, M2M & the Cloud

Enabling the Smart Grid Transition

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Our Focus

Energy Data Analytics

- Differentiating through asset risk analytics

Smart Grid Solutions

- Focus on enabling renewables in relation to real-time constraints
- Developing M2M solutions to enable aggregated control responses

The focus of this talk

How latest developments in **open source computing** & **messaging protocols** can be used to solve the existing real-time communications problems in aggregated monitoring & control

Giving "Smart Grid" actors the communication tools to better manage the wider network

What we think you need for a Smart Grid

- Smart Grid implies that we need 2-way communication with multiple locations with lots of data
- F e. no / lc
- M se e

Communications Structure is Key

Communications infrastructure is one of the biggest challenges facing network operators & their Smart Grid ambitions currently.

A lot of blame is assigned to the hardware used e.g. mobile GPRS etc.

We don't think this is completely fair.

- Take the finance market as an analagous market to smart grid requirements
- Billions of transactions per day
- Need no “message” loss due to financial importance
- Need a system that is highly scalable

Solving the Communication Issue

Distributed Processing, M2M & the Cloud

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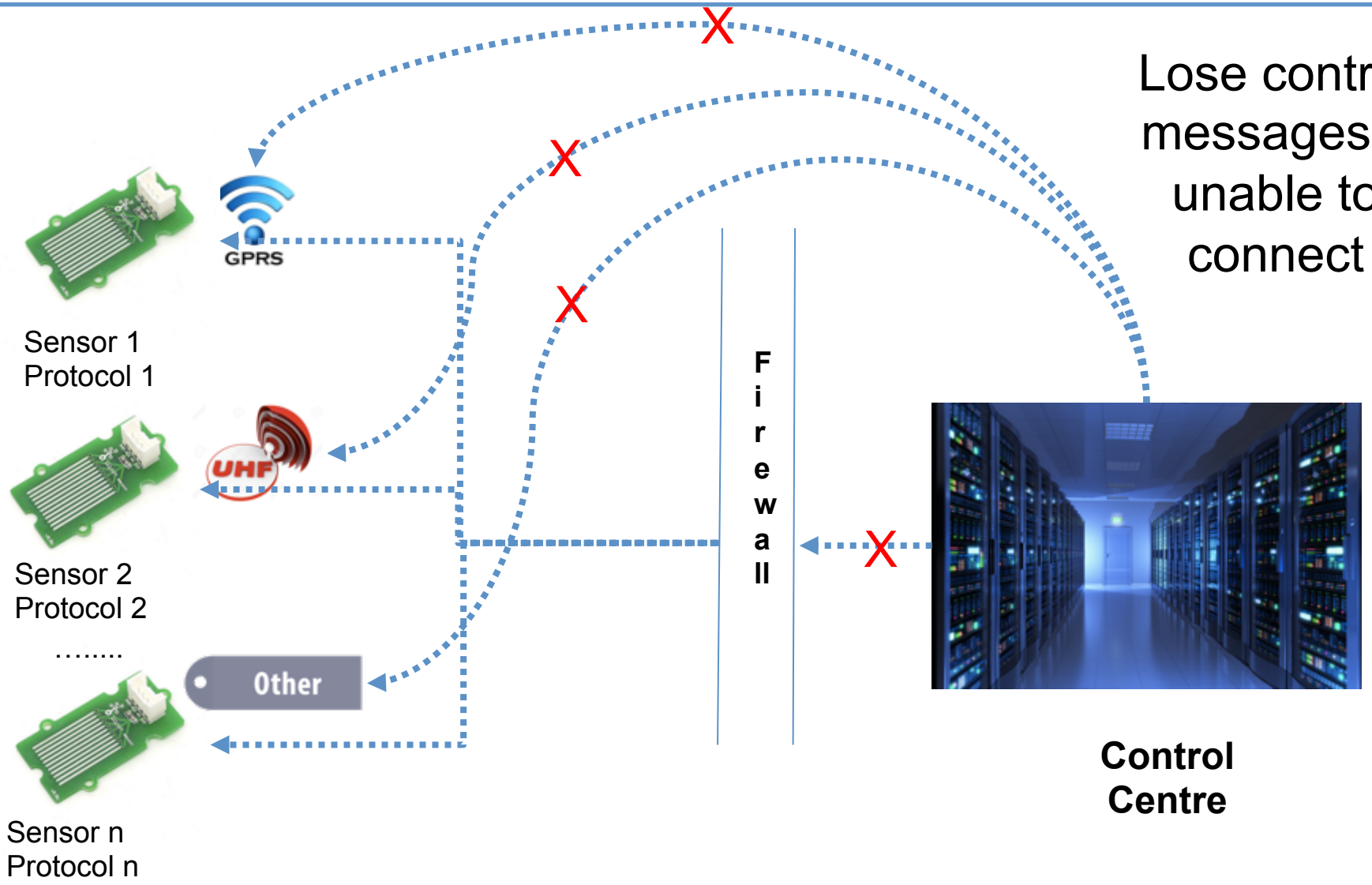

Smart Grid & Message Management

Distributed Processing, M2M & the Cloud

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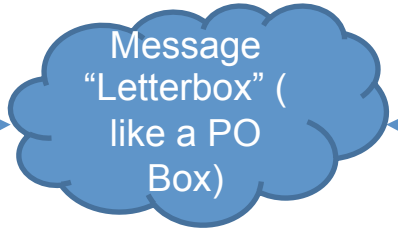
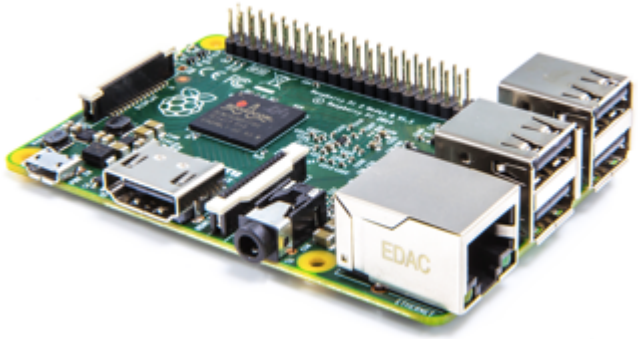
Communication interface **looks externally for messages** within its own letter box. Can look via any "external facing" comms hardware e.g. GPRS, ethernet etc.



Posts control message to "letterbox" that is specifically for the remote asset



Communications Interface

Firewall

Control Centre

Smart Grid & Message Management

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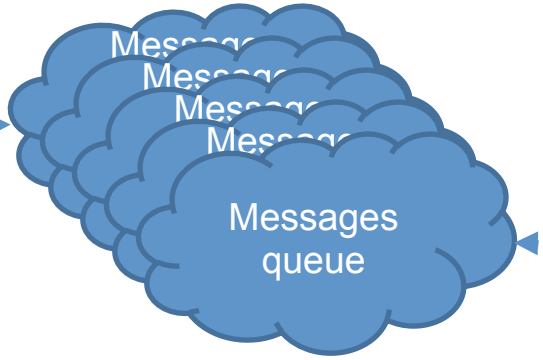
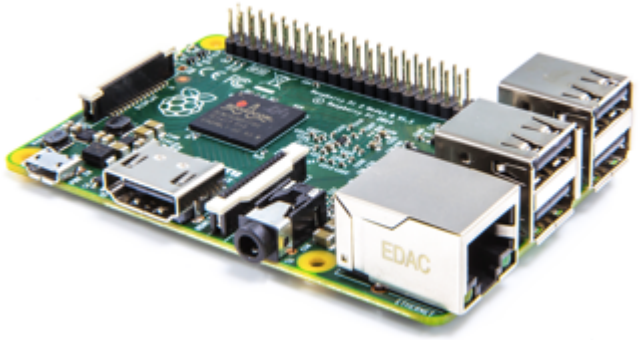
Messages will queue if unable to be read & processed by remote control / comms interface which enables integrity of data



Split messages down into bite-size chunks that enable higher integrity data comms



Communications Interface

Firewall

Smart Grid & Message Management (2)

Distributed Processing, M2M & the Cloud

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Read or control assets dependent on message in "letterbox"

Processor can undertake distributed processing across multiple communication protocols

Sensor 1

Communication protocol 1 e.g. ModBus

Firewall

Sensor n

Communication protocol n e.g. BACNet

Distributed processing enables on-site M2M across multiple languages

Distributed Processing, M2M & the Cloud

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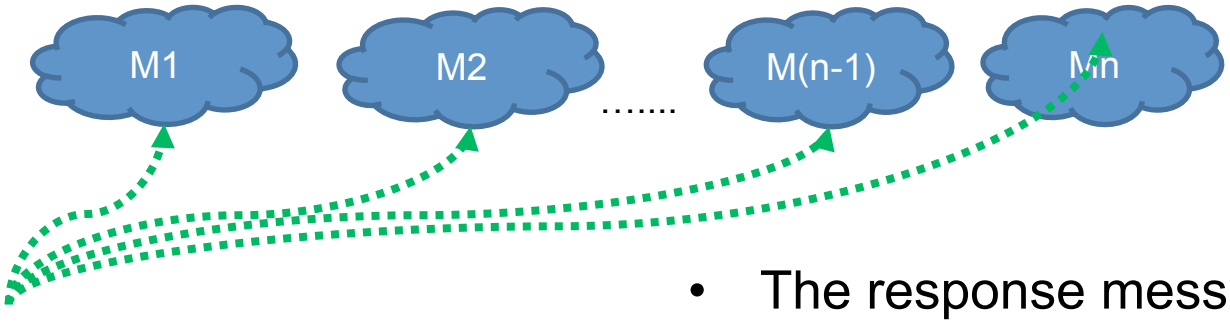
Control / read messages from actions split into packages by sensor OR specific data points per sensor to distribute data for higher communication integrity



Communications Interface

Local Network

- The response messages to local actions i.e. read / control, are broken down into small packets and then distributed back to multiple “letter boxes”
- Dramatically enhances integrity of data flow
- Small but profound change

Changing the Smart Grid Communication Landscape

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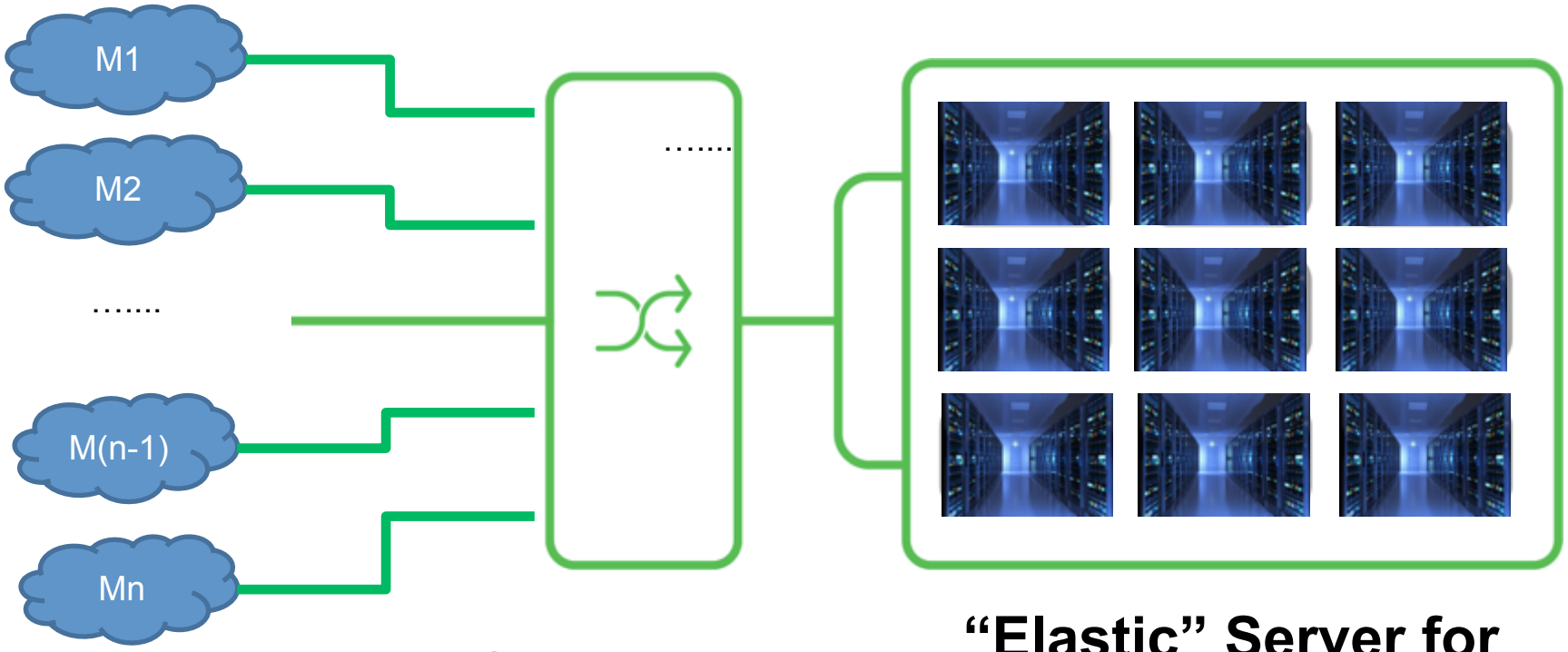
Messages can have specific processes associated with them to enable faster / better processing of data



Server Mngt

“Elastic” Server for Processing & Storage

“Elastic” scalable server management enables large scale Smart Grid data management & processing

Simple change, yet profound implications:

- Message "letterboxes" combined with distributed processing overcomes multiple communications topology issues of Smart Grid / IoT
- Hardware agnostic
- Open source & non-proprietary
- Dovetails with existing IT systems without compromising network security or management
- Retains ability for significant data flow with no data loss

Opportunities

Distributed Processing, M2M & the Cloud

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ModBus Thermostat

Aggregated thermostatic reduction

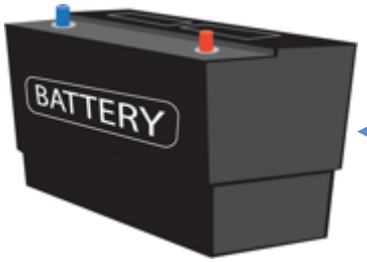
Read / Control Message(s)

Via local LAN or wi-fi

Read Electricity Meter

Read Generation Meter

Read Gas / Water Meter



Solar / Battery Inverter

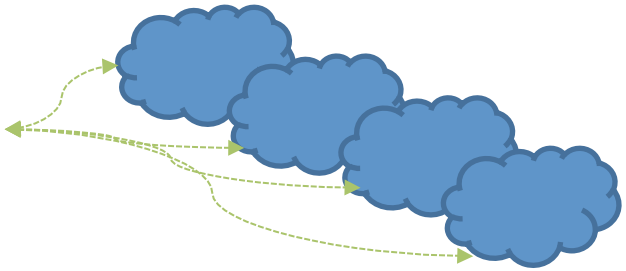
Aggregated constraint response

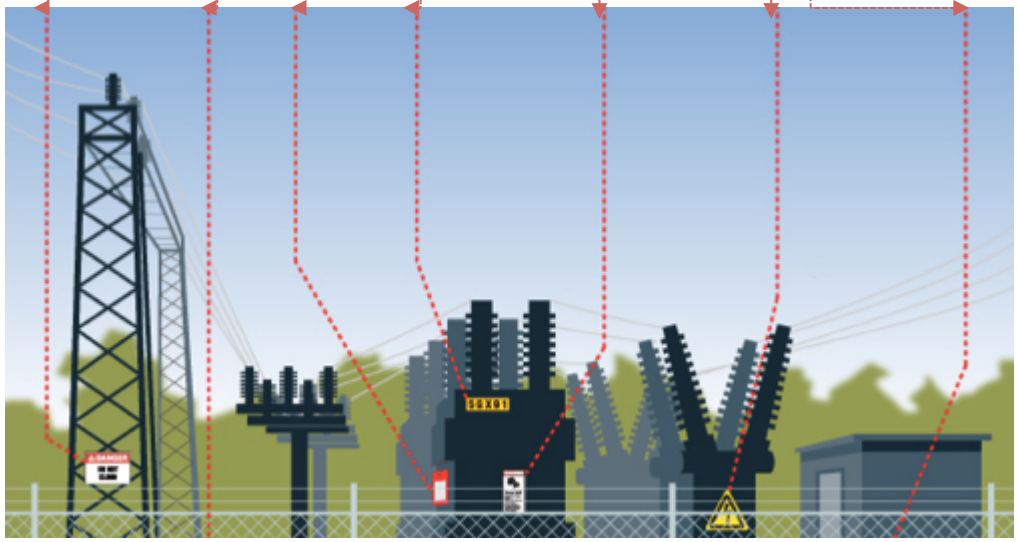
Distributed Processing & Communications Interface

Non-GPRS real-time meter reads

Works at any scale – example for a home

Communicates using local communication protocols e.g. ModBus or OPC





Dis-aggregation of sub-station data can enable robust data from remote locations

Works at any scale – example for a sub-station

Conclusions

- Distributed messaging protocols enables scalable communication with remote assets
- Distributed computing enables on-site communication across multiple protocols using embedded M2M protocols
- Distributed computing also enables "small package" messages with no loss / high integrity
- Therefore, communication architecture enables highly scalable, real-time interaction with multiple actors i.e. Smart Grid / IoT

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Thank You

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