

## “Lab & Field alliance” for technology optimisation

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**G3-PLC Alliance General assembly**

# Agenda

- G3-PLC field experience and installations (Landis + Gyr)
  - Landis+Gyr portfolio
  - Overview of G3 PLC installations
  - Benefits from field experience
  - Going further: adding hybrid
  
- G3 evolution (Renesas)
  - Technology Optimization Environment
  - CSMA, Trickle & Clusterhead optimizations
  - Evolution => Hybrid solution

# 125 Years of Excellence



Global Reach & Local Presence  
Swiss HQ with Locations  
**in over 30 countries**  
worldwide



Frost & Sullivan  
**Global AMI Company  
of the Year 2019** –  
for 5th consecutive year



Worldwide largest  
**IoT Utility Network**  
1.3 billion reads per day  
with 99.99% accuracy



**Smart Infrastructure**  
Partnership with  
Google



Largest installed base  
**300+ million**  
devices globally



**Over 125 million**  
Connected intelligent  
devices deployed



More than **15 million**  
**meter points** under  
managed services



of services to  
**3,500+ customers**  
as a trusted partner

Over 8 million tons of CO<sub>2</sub> saved by Landis+Gyr devices each year



# Communication technologies generate work and cost for utilities

## CHALLENGES UTILITIES FACE



To understand, select and specify



To tender, evaluate, and select



To implement and test



To operate and maintain

Communication is a necessary constraint to manage smart infrastructures

# Communication technology serves our customers use cases and TCO expectations



# Landis+Gyr G3 PLC Smart Grid product portfolio

Landis+Gyr

G3-PLC  
Alliance



Linky



Smart meters for residential and commercial applications



Concentrators for Ethernet, Cellular and Fibre



Smart meters and customer displays for Pre Payment



Load switching for flexibility management applications

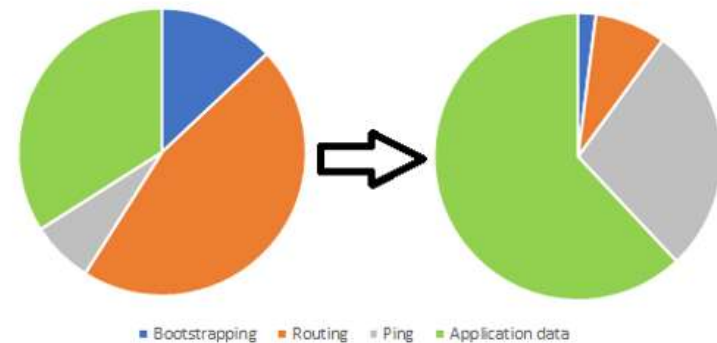
# Benefits from field experience

## Challenges of field deployment:

- Operation of networks in “extreme” conditions
  - Noisy situation
  - Networks with high number of nodes
- Customization, adaptation to customer needs

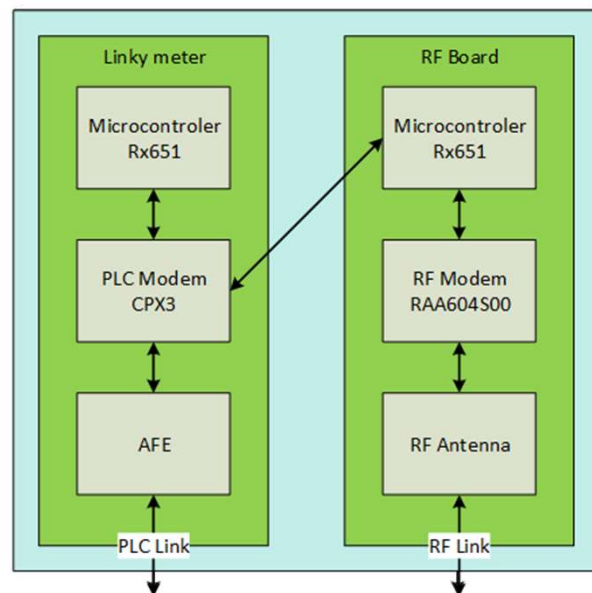
## What can be done to support customers:

- Tuning G3-PLC parameters
  - Use Parameterization of daily reading
  - of broadcast messages
- Transition from Cen-A to FCC

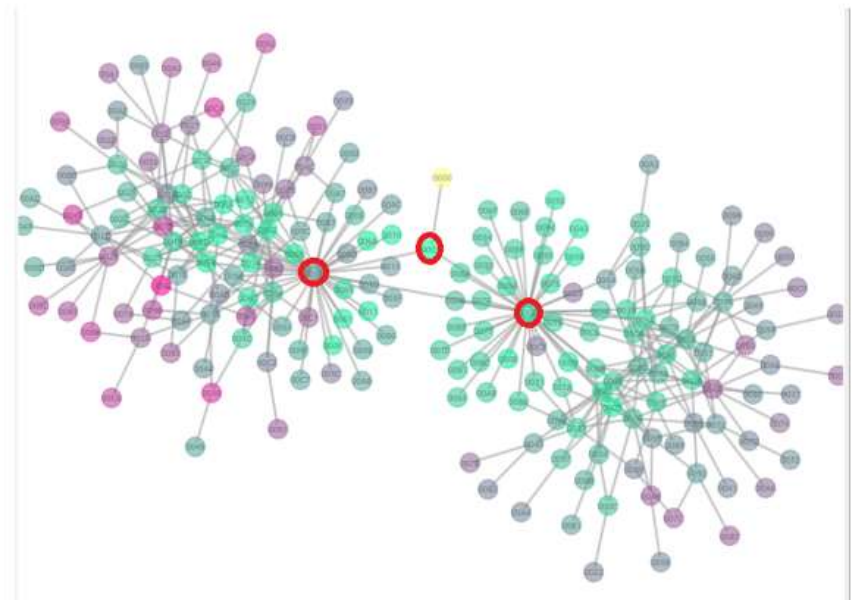


# Going further: Adding Hybrid RF

- Proof of concept for G3-PLC / Hybrid
  - Linky meter is used as a basis
  - An external board is added to handle RF part(Note: Next generations will be fully integrated)



- Operation of hybrid meter tested in the lab
  - Several test walls with no physical connection
  - One unique hybrid meter installed on different test walls
  - Data traffic goes through RF: all meters can be reached



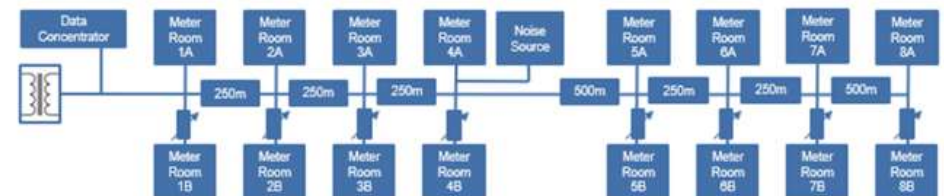


# G3-PLC EVOLUTION



# OPTIMISATIONS: FIELD EXPERIENCE

- Using a purpose build PLC test environment of 450 nodes
- Parameter optimisations (e.g. LQI values, many others)
- CSMA optimisations
  - Leading to change in the 2021 specification
- Working on future (ETT) enhancements
  - Trickle analysis
  - Clusterhead analysis
  - Both will form part of 2021 specification.

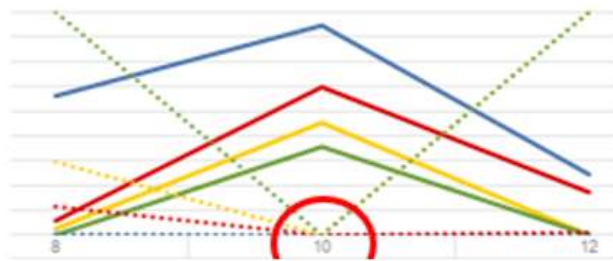


# PARAMETER OPTIMISATIONS AND ENHANCEMENTS

## CSMA

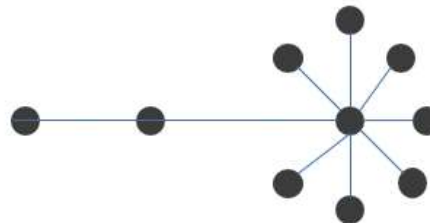
- Dense networks “fail” with default parameters
- Flooding in alarm conditions
- By altering the channel access fairness both problems are resolved.

Unicast Full Routing Table



## Clusterhead

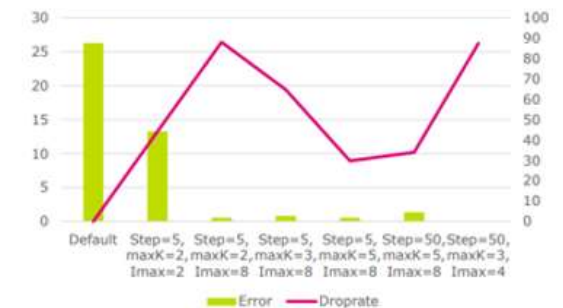
- In Dense not all nodes need to be routers
- One node serves as repeater for his neighbourhood
- Automatic rules for each node to become or stay a clusterhead apply..



## Trickle

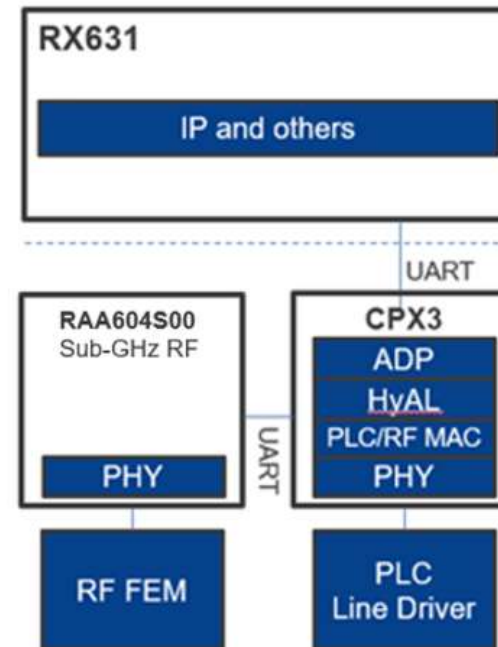
- Broadcast → all nodes retransmit → flooding → collisions
- With trickle nodes repeat messages only a specified count of times within a given timeframe

Test results from a ~330 node test network:



# RENESAS HYBRID SOLUTION – PLC + RF

- A single design for all PLC standards, all PLC frequency bands, and all RF frequency bands
- Architecture supports multiple hybrid specification.
- All building blocks available and in MP
- G3-PLC Hybrid software is implemented and **CERTIFIED**
- Evaluation and development tool (**Y-G-HYBRID-PLC –RF**)
  - Features multiple mode support
  - PLC only
  - Wi-SUN only (RX651 + Tsurugi)
  - Hybrid
- Integrated into existing test environment for hybrid optimization





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