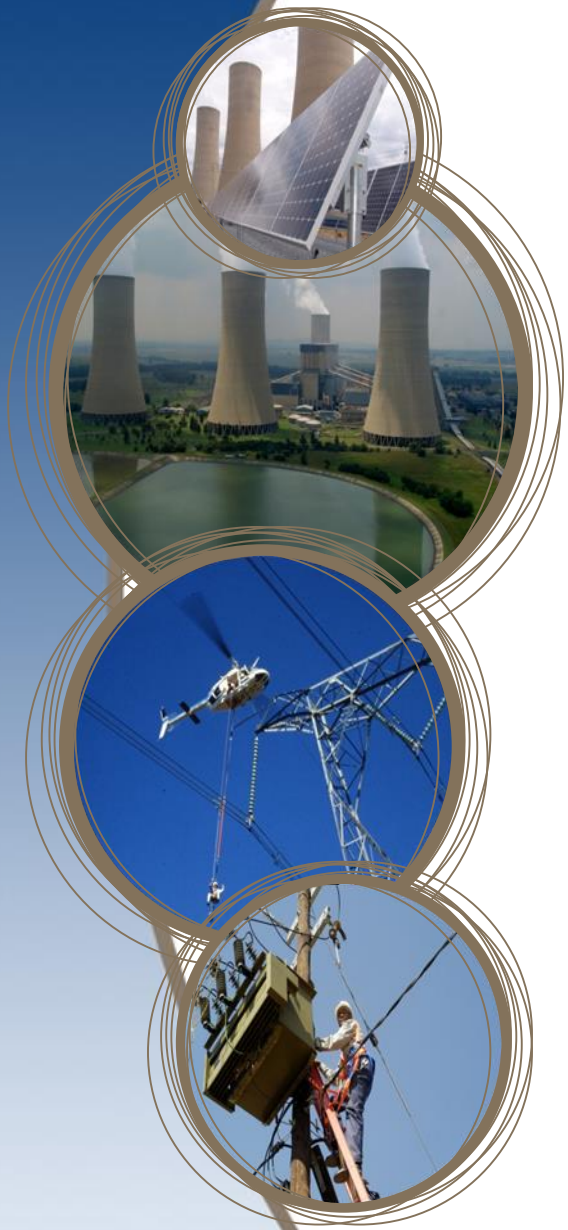


Experiences in the standardization and use of G3-PLC

Presented by: Shawn Papi

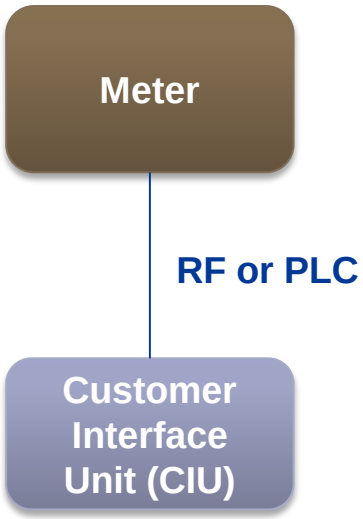
Date: 26 November 2020

Outline

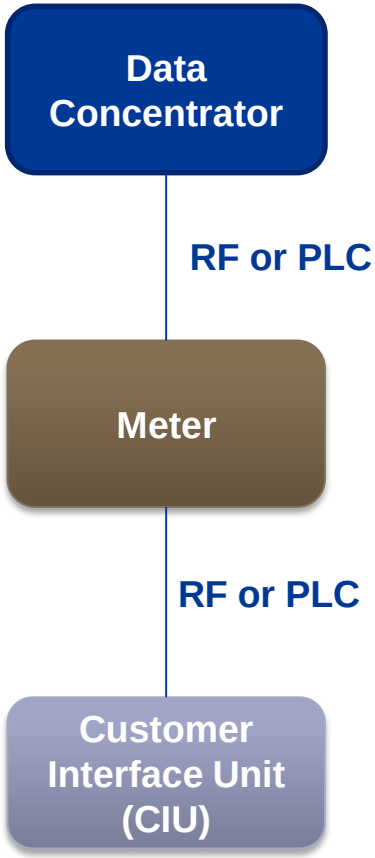
- Standardization within Eskom
- Laboratory experiments and findings
- What we have learnt in the past few years…
- Adoption in NRS 049 Companion Specification

The concept of split metering

Basic Prepayment Meter



Smart Meter (Prepaid and Post-paid Modes)



Standardization within Eskom

2016

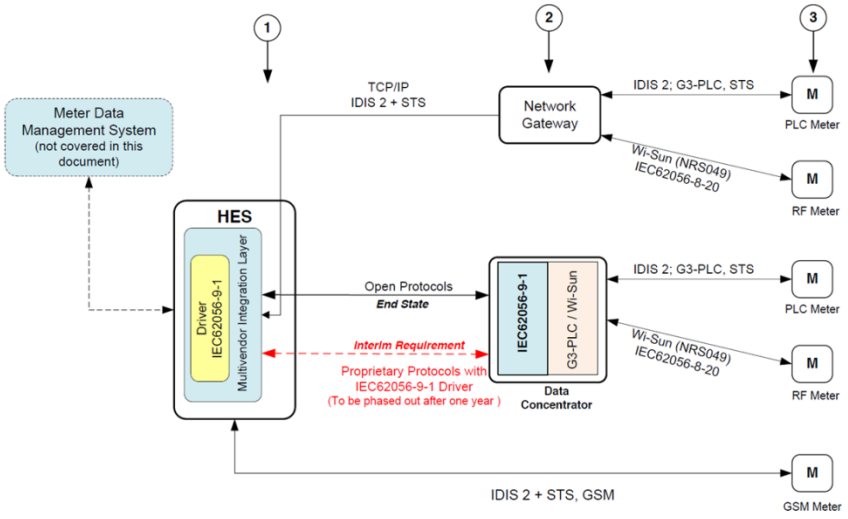
G3-PLC part of technical specifications for Eskom Smart Prepayment Project in 2016 for rolling out ~36 000 meters

2017

G3-PLC included in Eskom “Basic Prepayment Meter Standard”

2018

G3-PLC part of Eskom “Smart Metering Standard”

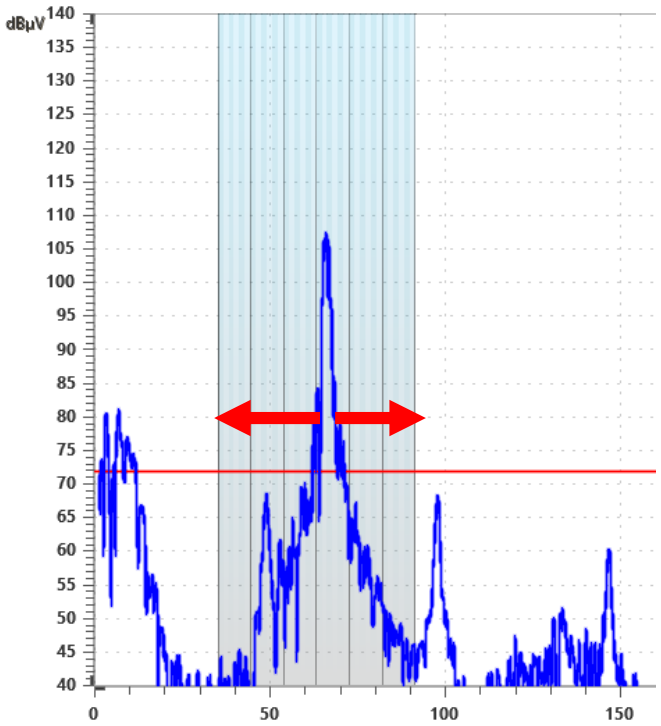


Standardization/Adoption mainly driven by:

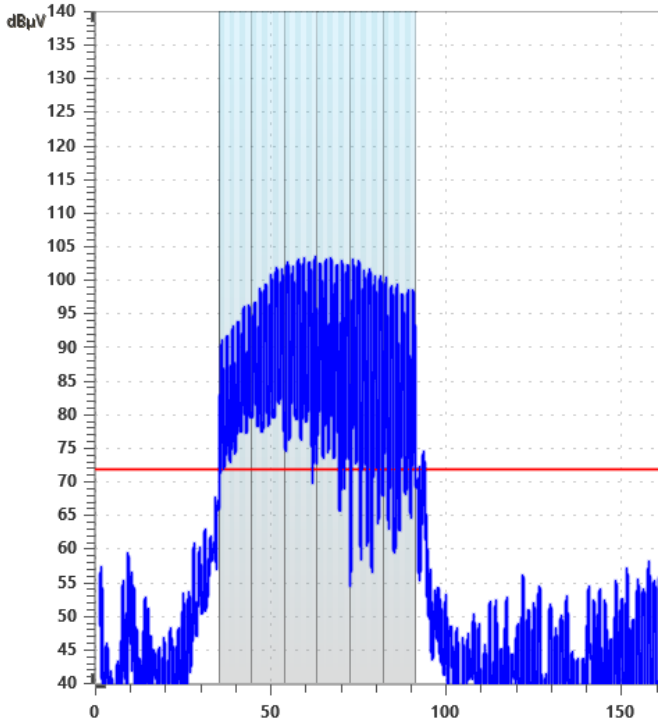
- Robustness of G3-PLC in comparison to G1-PLC (PLAN) deployed in earlier years!
- Healthy eco-system of both smart and basic prepayment metering products from manufacturers in Africa, Asia and Europe.

Laboratory experiments and findings

Comparison to PLAN (G1-PLC)…



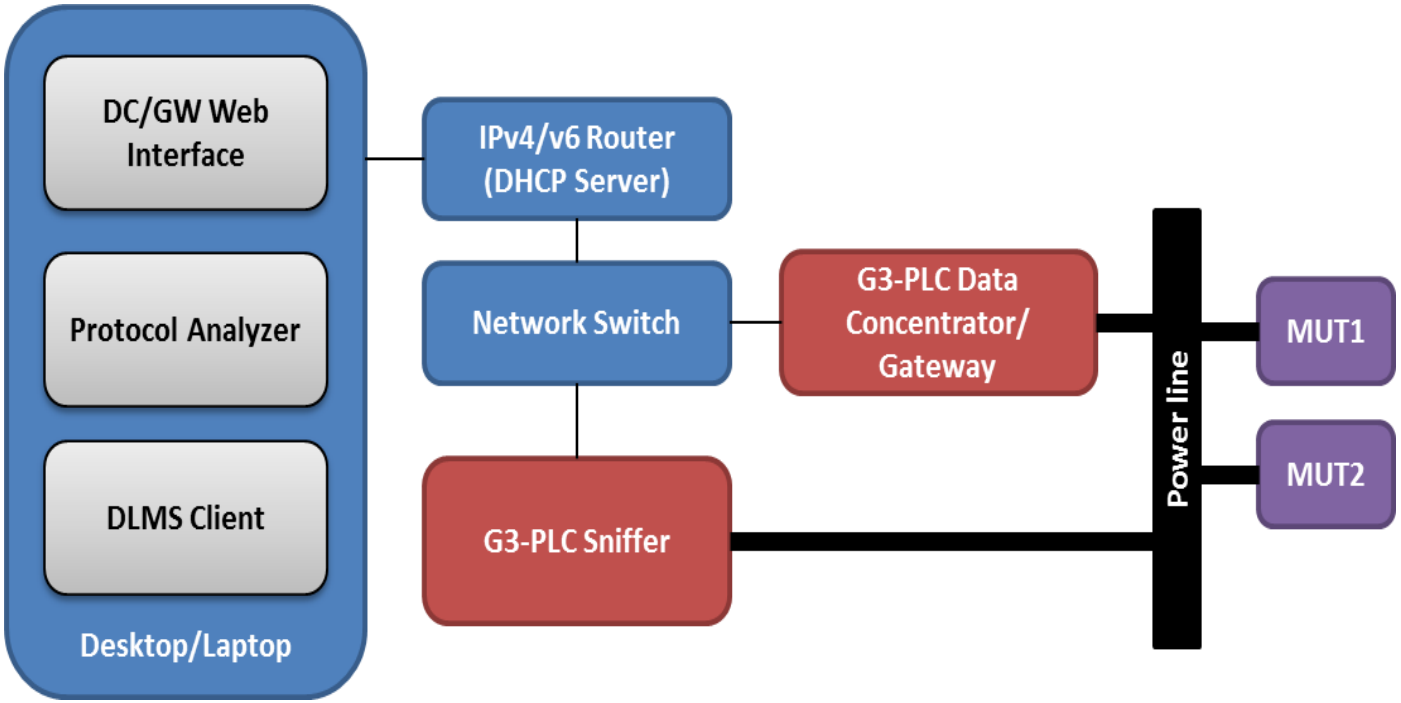
PLAN (G1-PLC)



G1-PLC
(Cenelec A)

Laboratory experiments and findings

Evaluation of ease of G3-PLC level integration of devices from different manufacturers…

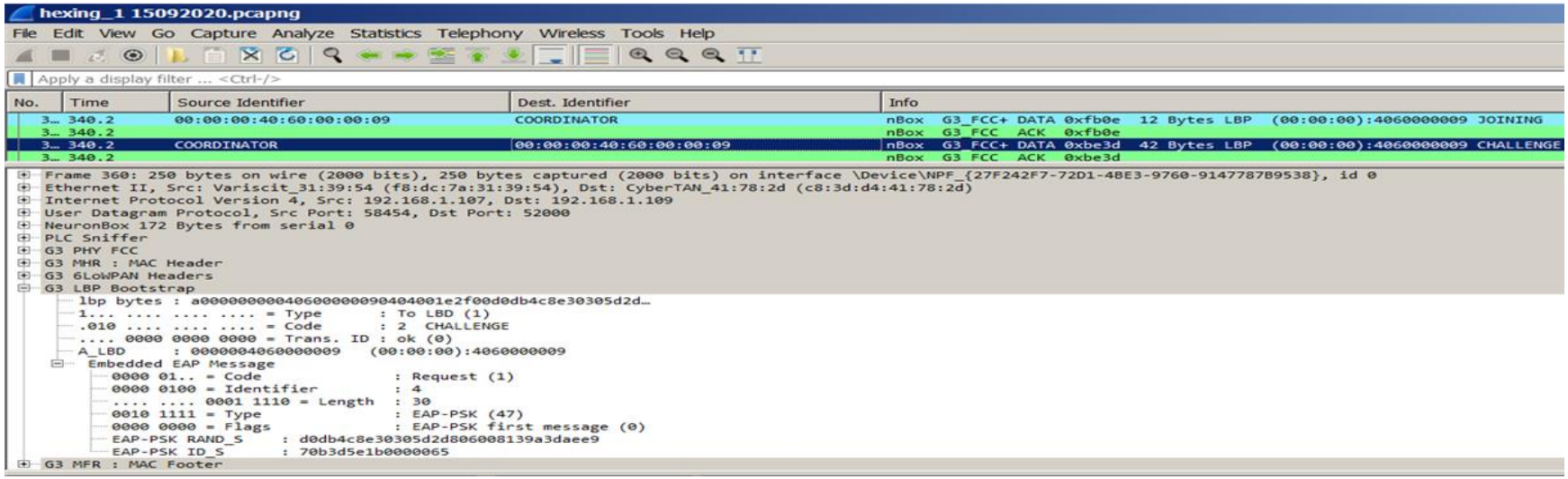


Laboratory experiments and findings

Evaluation of ease of G3-PLC level integration of devices from different manufacturers…

Some learnings…

- One device found to be transmitting un-encrypted G3-PLC messages and thus these were ignored by the G3-PLC Gateway
- Some devices, meant for the Japanese market, use an *EAP ID_P* field different from the EUI-64 format
- Due to split metering format deployed in SA – meter may need to be both PAN coordinator and PAN device, thus PAN bootstrap procedure needs to be clearly defined



What we have learnt in the past few years…

- G3-PLC has a broad ecosystem of metering products manufactured in Africa, Asia and Europe covering both basic prepayment meters and smart meters
- A solid certification program reduces the burden of product assurance on utilities or end-users
- ITU-T G.9903 is freely available – provides an excellent base for knowledge development in the utility space
- Openness of G3-PLC enables the availability of test tools – Eskom has leveraged this aspect for experiments and knowledge development!
- G3-PLC is a telecommunications network and traditional metering technicians need to be provided with telecommunication tools to enable efficient troubleshooting and maintenance
- G3-PLC is an international standard and naturally, contains a number of optional elements and these should be carefully considered when G3-PLC is adopted in utility specifications

Adoption in NRS 049 Companion Specification

- NRS 049 is a collaborative effort between Eskom and SA municipalities to develop smart technical specifications
- NRS 049 protocol aspects based open international standards and in particular IEC 62056-1-0
- Based on learnings from the past few years, G3-PLC has recommended for adoption in NRS 046
    - ❑ NRS 049 to reference **IEC 62056-8-5 (DLMS over G3-PLC profile)** and include G3-PLC interface classes in its object model
- A number of questions still to be addressed:
    - ❑ G3-PLC FCC or Cenelec A or both? (In anticipation of wide deployment of solar inverters)
    - ❑ What is the standard bootstrap procedure for CIU and meters is one PAN?

Thank you!