

devolo's ITU-T G.hn Solution for the German Smart Grid Rollout

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About devolo





Broadband PLC for In-Home (1/2)

- Internet in any room, at any socket.
- Short distance.
- No repeating.
- High data rate (Fast internet).



Broadband PLC for In-Home (2/2)

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• devolos experience with HPAV and G.hn:

	HPAV (dLAN)	G.hn (Magic)
PLC transmission speed	Up to 1200 Mbps	Up to 2400 Mbps
PLC range	400 m	500 m
Life cycle	Until 2017	From 2018





- G.hn has: Significant speed boost—currently by 100 percent.
- Greater stability.
- Increased range.

Why Broadband PLC for Access in Germany? (1/4)

- Broadband PLC (BPL) for access (Smart Grid applications).
- Issues: Long distance.
- Repeating needed.



Why BPL for Access in Germany? (2/4)

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- The federal office for information security in Germany (BSI) addresses essentially the requirements for information security in context of smart metering.
- The upcoming smart metering infrastructure in Germany revolves around a specific component: the smart meter gateway (SMGW).



Why BPL for Access in Germany? (3/4)

- Data Rate Requirements in Germany.
- Example: Data Transfer for Billing.



Why BPL for Access in Germany? (4/4)

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• Data Rate Requirements in Germany.

Some Basis Applications for WAN	Bandwidth Requirement
Data Transfer for Billing	COSEM elements with ca. 2.145 kBytes with max. 15 min. periodicity
Emergency Firmware Update to the SMGW	The amount of data: around 10 MB per 24h
Alerting and	Alive message: once per day with 1.7 Kbytes
notification between SMGW and SMGW administrator	Event Signalling with each message of 1.7 kBytes.
Data transfer for regulating the controllable local systems (CLS)	1.7 kBytes with every 2 hours (Latency< 2 min.)

High data rate is required!

Why ITU-T G.hn for Access?



• High bandwidth and low latencies in the access area.

	Earlier BPL	G.hn
Maturity	Legacy technology	devolo tests and field trials during the full last year proofed maturity
Successor chips	Not expected	Announced
Industry forum	Non existent	Home Grid Forum is presently very active. http://www.homegridforum.org/
Standardization	No present activity	ITU-T Study Group 15
Industry key drivers	None at present	Iberdrola, e.on, etc. are driving the standardization.
devolo's strategy for the consumer market	Only support of existing customers	New product line "Magic" launched for mass market.

Smart Metering Scenario (1/2)

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• Typical application of the access PLC for the Smart Grid scenarios:



Smart Metering Scenario (2/2)

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Communication units



Challenges (1/2)

- **Repeaters Positioning**
- Where to place the repeaters?
- Maximum availability? Highest data rate? Minimum cost? ...
- \rightarrow PLC Network Planning Tool.





Challenges (2/2)

• **Coexistence:** between In-Home and access.

• Security: Encrypted PLC channel only on the lower layer.





Field Trial (1/2)

- Field trial phase has been started with small and large number of end points.
- Field test environment considers complex scenarios with high noise and attenuation.
- Small test scenario with 6 EP, 1 Repeater, and 1 HE.



Field Trial (2/2)

- Interim results:
- Stable network where mostly all end points are reached.
- In areas with short distances between the distribution boxes, fewer repeaters are required, which substantially reduces the installation effort and costs.
- Acceptable data rate for the German Smart Grid solution.
- Ongoing:
- Stability enhancement with higher data rate.

Lessons learned

- Field tests are still going on with continuous improvements.
- Every station could be connected to the headend.
- The topology is very stable.
- ITU-T G.hn is a suitable technology for access BPL solution.



Thank you! devolo Smart Grid. Green technology for tomorrow.