

Use cases for Autonegotiation

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Presentations on AutoNeg

- David Brandt: Use Cases for Autonegotiation
http://www.ieee802.org/3/cg/public/adhoc/brandt_012517_3cg_01_a_dhoc.pdf
- Brett McClellan: xBase-T1 Auto-Negotiation
http://www.ieee802.org/3/cg/public/Jan2017/McClellan_3cg_01a_0117%20xBASET1%20Autoneg.pdf
- Jens Gottron: Ideas for Objective 5 “Support for optional single-pair Autonegotiation”
http://www.ieee802.org/3/cg/public/Sept2017/Gottron_3cg_01a_0917.pdf
- Steffen Graber: 10BASE-T1L and Clause 98
http://www.ieee802.org/3/cg/public/adhoc/Graber_3cg_16a_1017.pdf

Objective of AutoNeg

“The objective of the Auto-Negotiation function is to provide the means to exchange information between two devices that share a link segment and to automatically configure both devices to take maximum advantage of their abilities. “

Clause 28 and 98

Functions of AutoNeg

- Master/Slave Resolution, Fault signaling, acknowledging, renegotiation, nonce etc.
 - → There seems to be a straightforward solution by implementing functions similar to Clause 98
The physical layer could be the one presented in Graber_3cg_16a_1017.
- Technology Ability
 - Which technologies should be able to auto-negotiate with 10BASE-T1L ?
 - How many different technologies are behind 10BASE-T1L?
- Priority Resolution
 - What is the hierarchy of the supported technologies?

Technologies

- 802.3cg
 - 10BASE-T1L w/o powering
 - 10BASE-T1L with lower power signaling (1.0 instead of 2.4V)

- Future SPE long distance PHYs
 - e.g. 100BASE-T1L w/o (intrinsically safe) powering

- Optionally SPE short reach PHYs
 - 10BASE-T1S, 100BASE-T1, 1000BASE-T1, P802.3ch

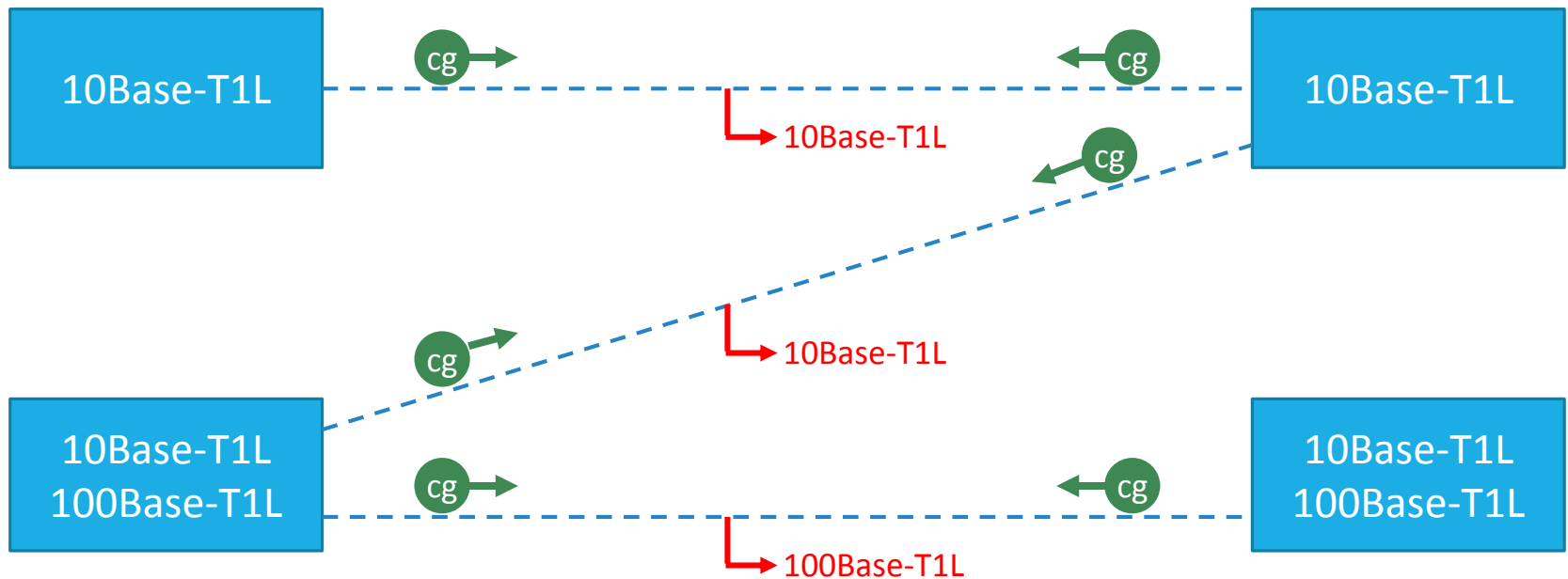
Low Power Signaling Devices


- Regarding communication voltages, not autoneg voltages
- Reduced Signaling Voltage: 1.0V vs. 2.4V
- Can have diodes for clamping the supply & signaling voltage
- A low power signaling device could be used at a standard port
- If a standard and a low power device autonegotiate, they should end up at 1.0V signaling voltage, 2.4V might be not working.
- Only 200m are working then, but that's ok, since the low power device is not expected to go further

How does this fit to AutoNeg standards?

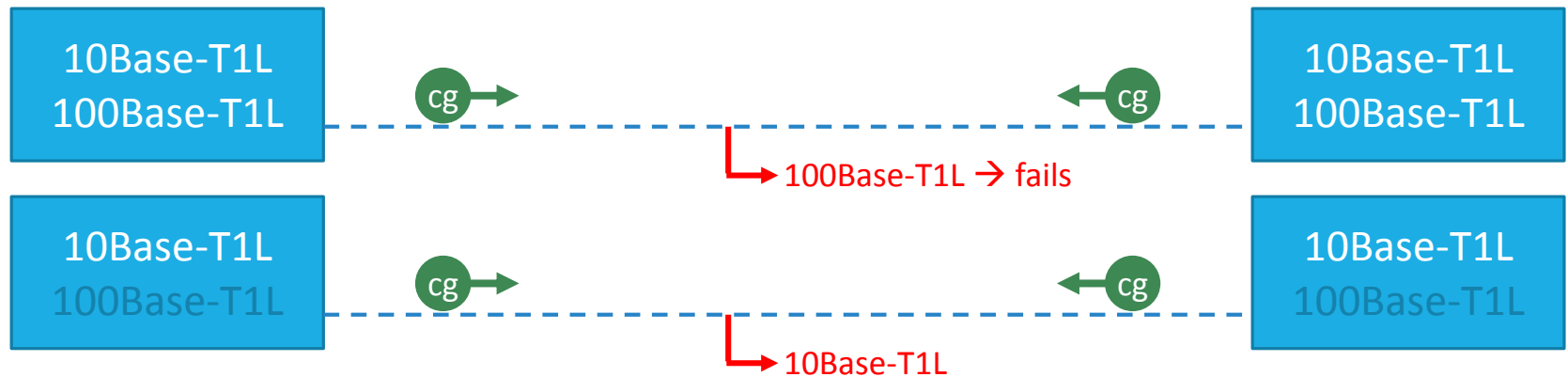
- One way could be to make the „10BASE-T1L-low-power“ a separate technology (in the AutoNeg „Technology Ability“ Field)
- The 10BASE-T1L-low-power has the lowest priority, since such a device will only support this technology (it „knows“, that is has the clamping diodes inside)
- Two devices without 10BASE-T1L-low-power will autonegotiate to the higher signaling voltage, supporting the higher link length

AutoNeg with future higher data rate SPE (“100Base-T1L” as an example)



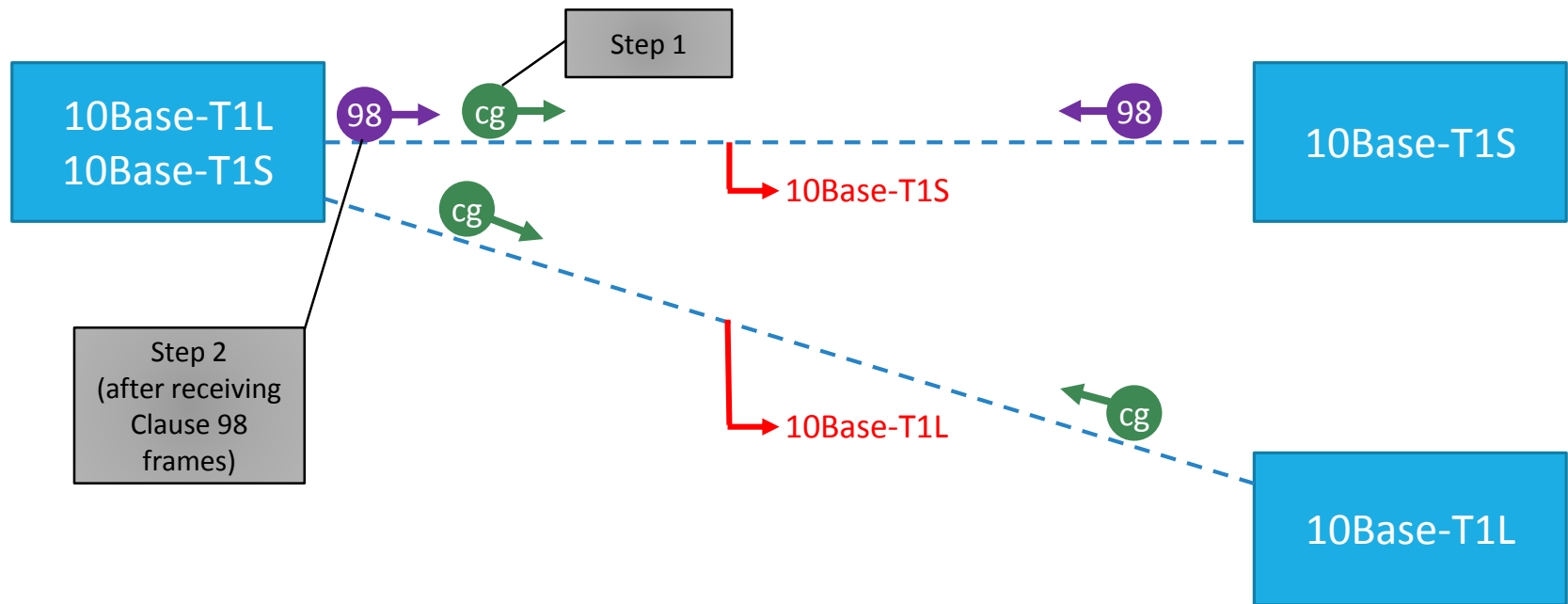
 = new low-rate signaling


What, if the future SPE doesn't support the length?



- It should be the responsibility of the 100Base-T1L, to indicate link failure. Negotiation is restarted with only 10Base-T1L advertised
- This is similar to Clause 28.1.4., which says:
“... The highest common mode is resolved using the priority resolution hierarchy specified in Annex 28B. It may subsequently be the responsibility of a technology-dependent link integrity test function to verify operation of the link prior to enabling the data service.”

Universal 10SPE PHYs (Long & Short Reach)



 = new low-rate signaling

 = existing AutoNeg Clause 98

Universal 10SPE PHYs (Long & Short Reach)

- Universal 10SPE PHYs could have a function similar to parallel detection, where they can receive Clause 98 Autoneg frames and then switch to this Autoneg scheme
- This can also be used to connect to 100Base-T1, 1000Base-T1, NGAUTO...
- When two universal SPE PHYs are connected:
 - The first priority is the higher speed
 - The second priority is the higher length supported
 - → Thus the cg-Autoneg needs to know about Clause 98 Technologies

Proposal for the “Technology Ability Field bit assignments”

- Defined in Clause 98B.3:

Table 98B–1—Technology Ability Field bit assignments

bit	Selector description
A0	100BASE-T1 ability
A1	RESERVED
A2	1000BASE-T1 ability
A3 through A26	RESERVED

- Proposal for cg:

bit	Selector description
A0	100BASE-T1 ability
A1	RESERVED
A2	1000BASE-T1 ability
A3	RESERVED
A4	NGAUTO ability?
A5	RESERVED
A6	NGAUTO ability?
A7	RESERVED
A8	10BASE-T1S ability?
A9	10BASE-T1L-low-power ability
A10	10BASE-T1L ability
A11 through A26	RESERVED

Proposal for the “Priority Resolution”

Defined in Clause 98B.3:

- 1000BASE-T1
- 100BASE-T1

Proposal for cg:

- (NGAUTO)
- 1000BASE-T1
- 100BASE-T1S
- 10BASE-T1L
- 10BASE-T1L-low-power
- 10BASE-T1S

THANK YOU
