

Industrial Redundancy Requirements



Christian Boiger, Deggendorf University

christian.boiger@fh-deggendorf.de

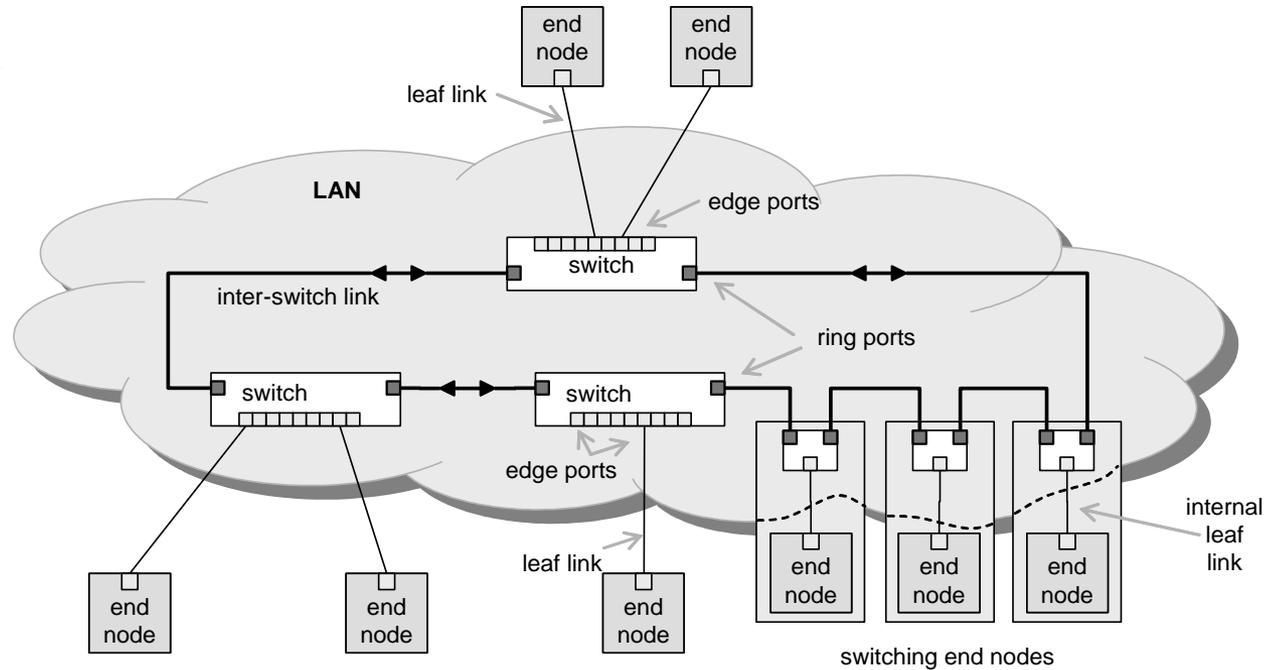
Oliver Kleineberg, Hirschmann Automation & Control

oliver.kleineberg@belden.com

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Redundant link networks:

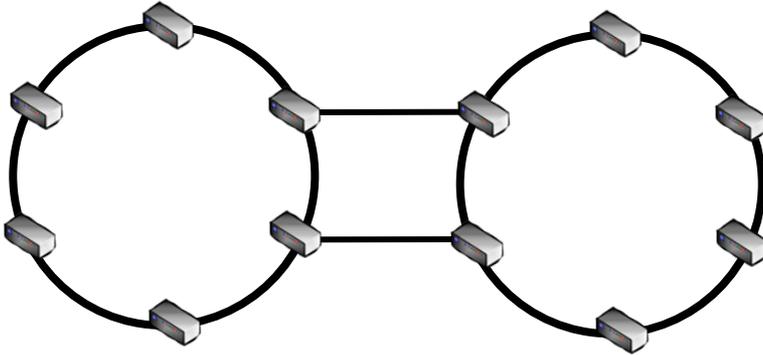
single ring



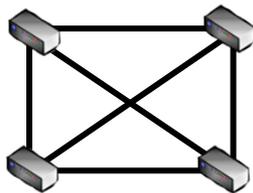
- Eliminate single points of failure by introducing multiple links
- A redundancy control protocol (like e.g. RSTP) is needed to prevent loops.
- Rings map very well to common use cases
- Ring = closed (well-known) line structure

Redundant link networks - possible combinations:

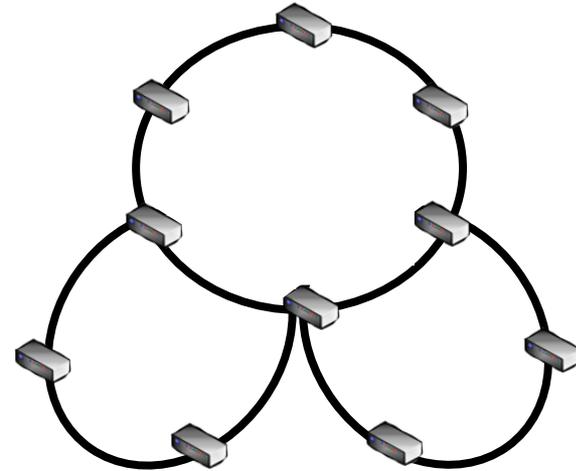
coupled single rings



full mesh

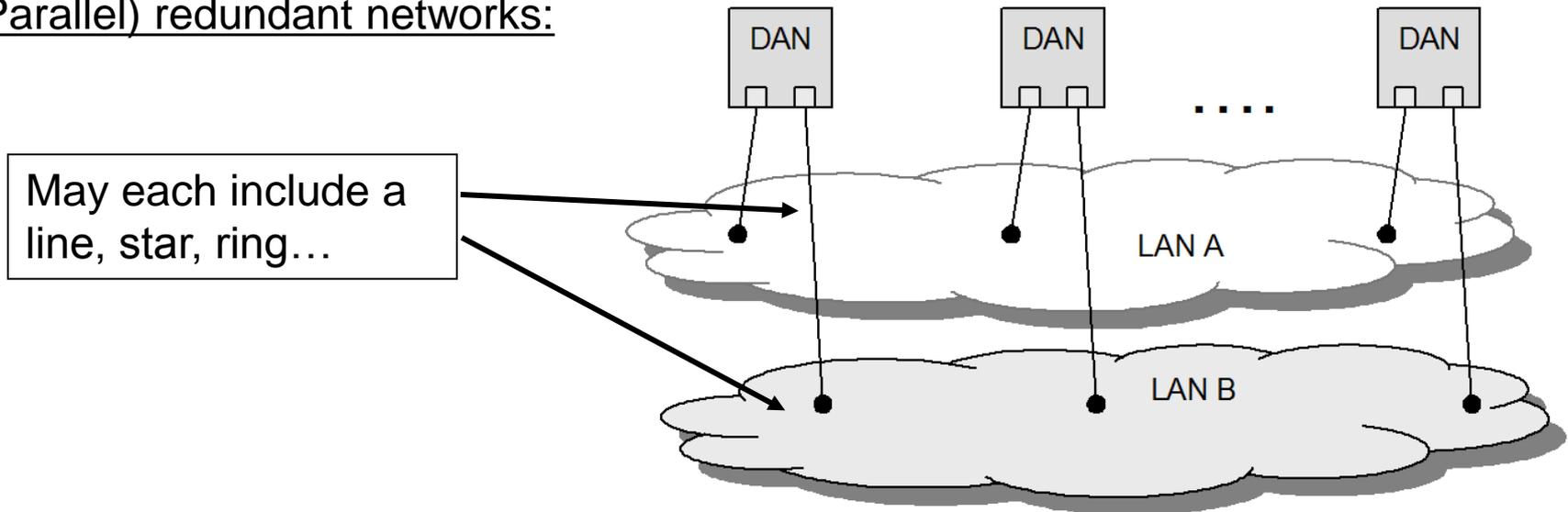


ring with subrings



- More complex networks may be derived from the single ring structure - in practical applications, network topologies are very diverse and specially suited to individual application requirements
- Full meshes are mostly avoided due to complexity (deterministic recovery after media failure is considerably harder to achieve in a mesh than in a ring)

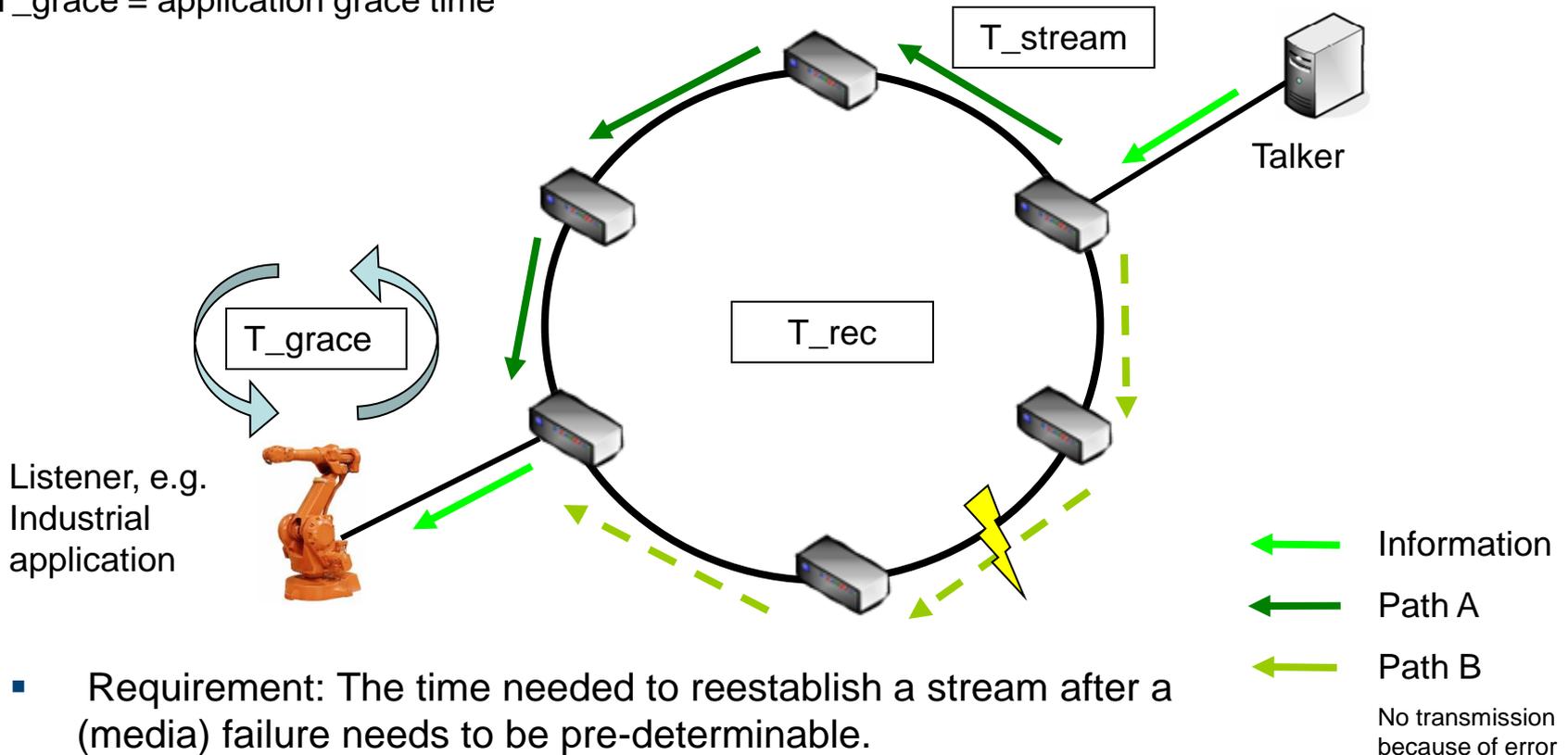
(Parallel) redundant networks:



- Eliminate single points of failure by doubling network infrastructure
- Devices can be double-attached to each network (DAN = Double Attached Node) without bridging from LAN A to LAN B
- Networks are (usually) independent layer 2 broadcast domains(LAN A/B)
- Independent networks can be of any topology and may/may not make use of redundant links themselves

$$T_{rec} + T_{stream} \ll T_{grace}$$

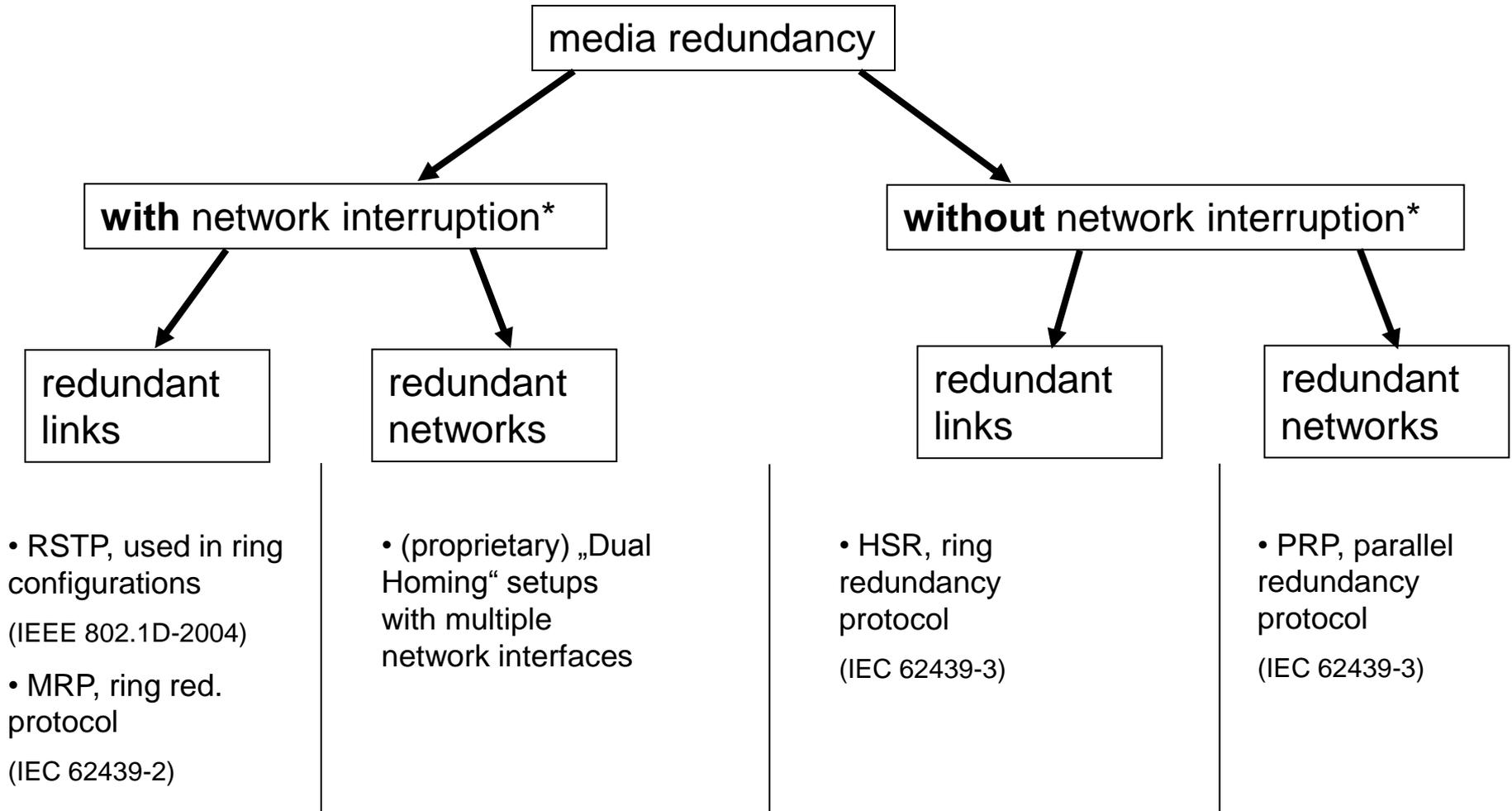
- T_{rec} = network reconfiguration time
- T_{stream} = stream reconfiguration time
- T_{grace} = application grace time



Many Diversified Solutions For Many Different Requirements

Media redundancy „taxonomy“:

* Network interruption = end-to-end communication experiences outage in case of fault



↑ Examples ↑



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Thank you for your attention!