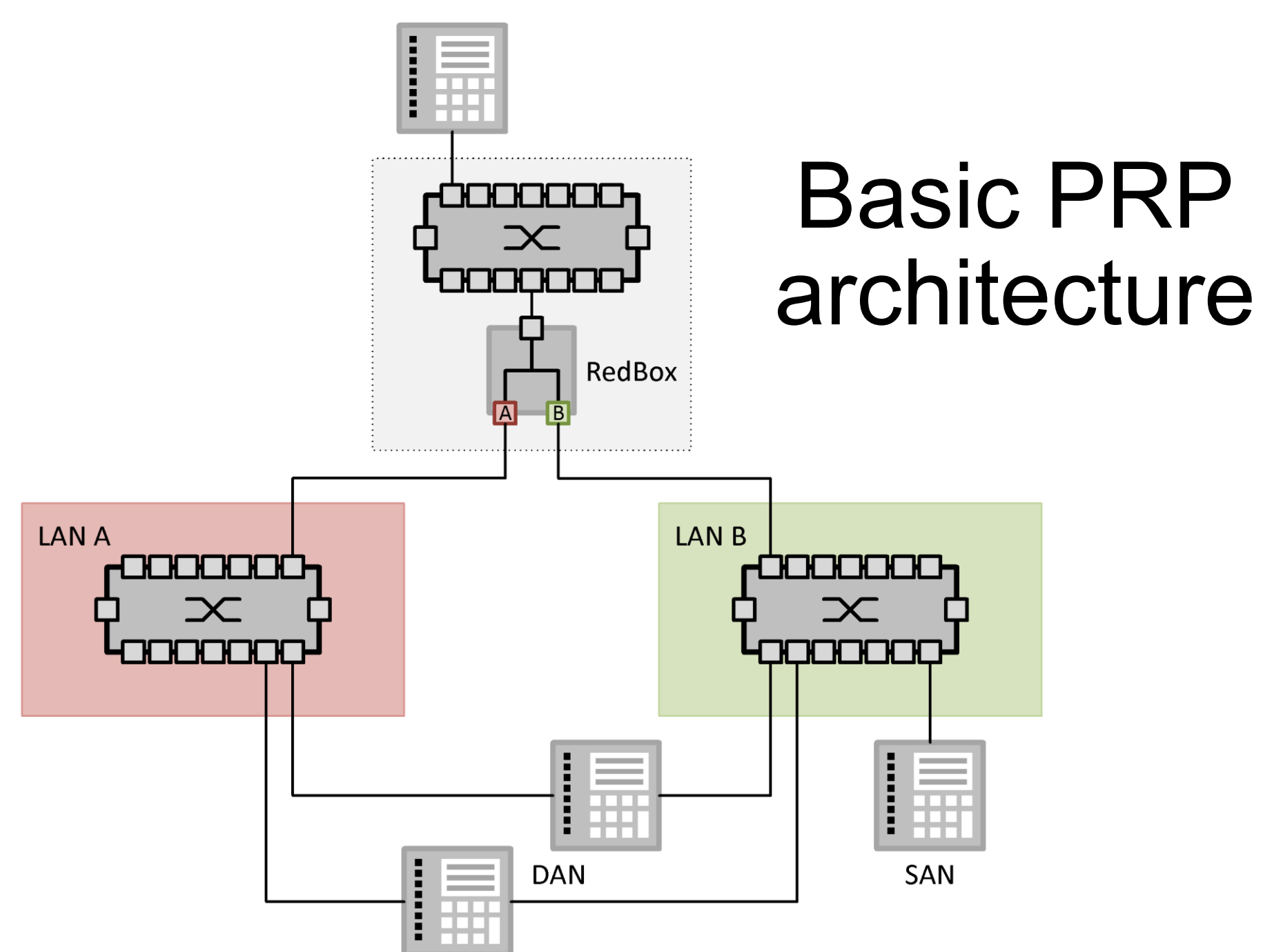


REDUNDANCY FOR POWER UTILITY COMMUNICATION NETWORKS

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Redundancy has always been a concept in power system protection. In classical applications, this was often achieved by duplication.

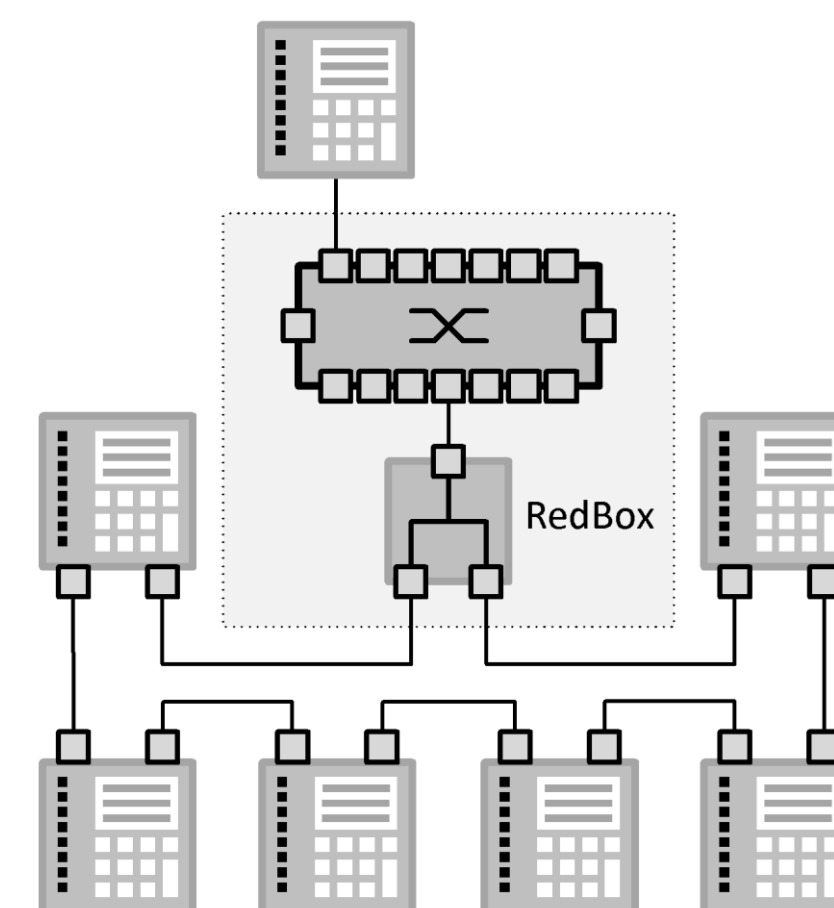
With **IEC 61850** systems, **redundancy** is needed for **network communication** as well.



With **Sampled Values** on a **process bus**, "**bumpless redundancy**" is especially important.

This ensures **uninterrupted delivery of information** even in the case of a failing communication network component.

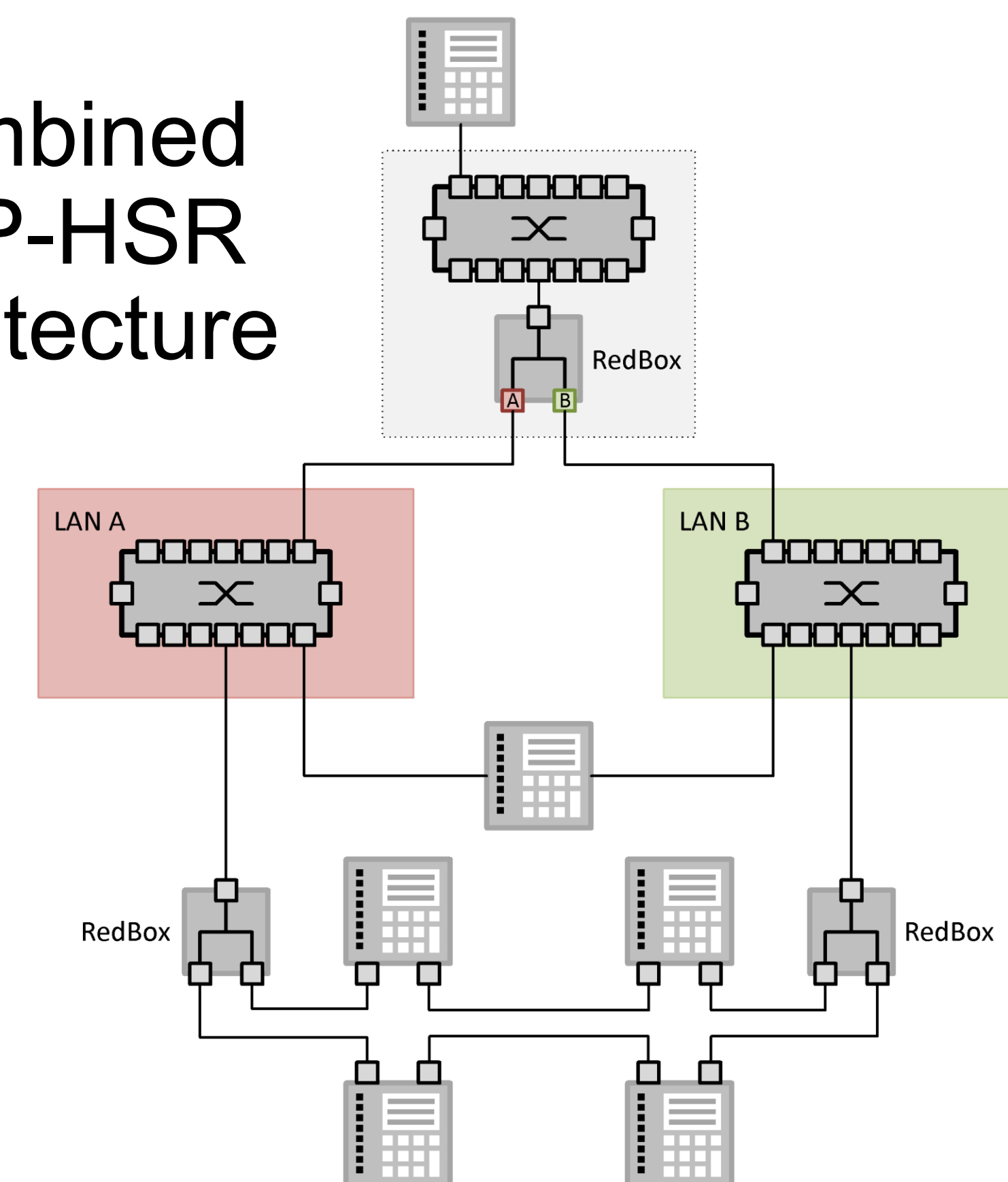
Basic HSR architecture



IEC 61850 adopted **PRP** (Parallel Redundancy Protocol) and **HSR** (High Availability Seamless Redundancy)

Design knowledge (e.g., for **redundant time synchronization** via IEEE 1588) has been acquired.

Combined PRP-HSR architecture



Redundancy options are available for **reliable power utility communication**