FAKULTÄT FÜR !NFORMATIK
Faculty of Informatics

Highly available KNX networks

AUTOMATION SYSTEMS GROUP

Masterstudies
Computer Engineering

Harald Glanzer

Technische Universität Wien
Institut of Computer Aided Automation
Automation Systems Group
Advisor: Ao.-Univ. Prof. Dr. Wolfgang Kastner

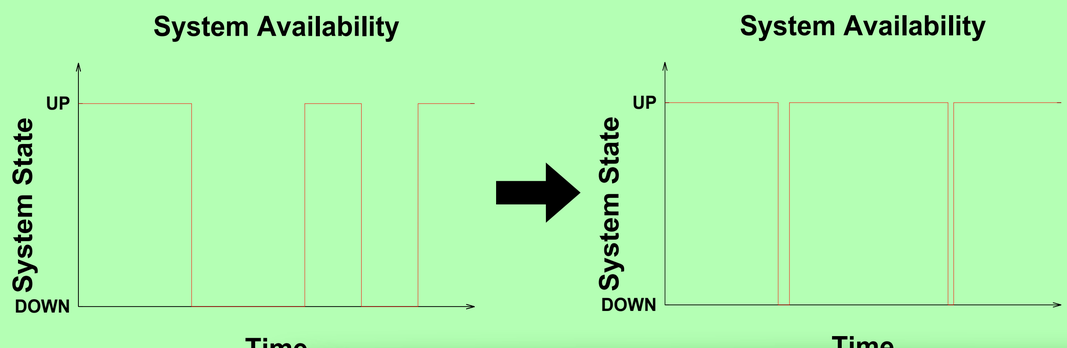
Problem and Motivation

- KNX: Home- and Building Automation System used for services considered 'uncritical' like heating, ventilation, ...
- Critical applications like elevation control, access control or burglar alarms are based on dedicated systems
- Idea: unify critical and uncritical systems into one system to reduce maintenance costs
- Problem: no unified concept for providing the full CIA triad AND high availability at disposal

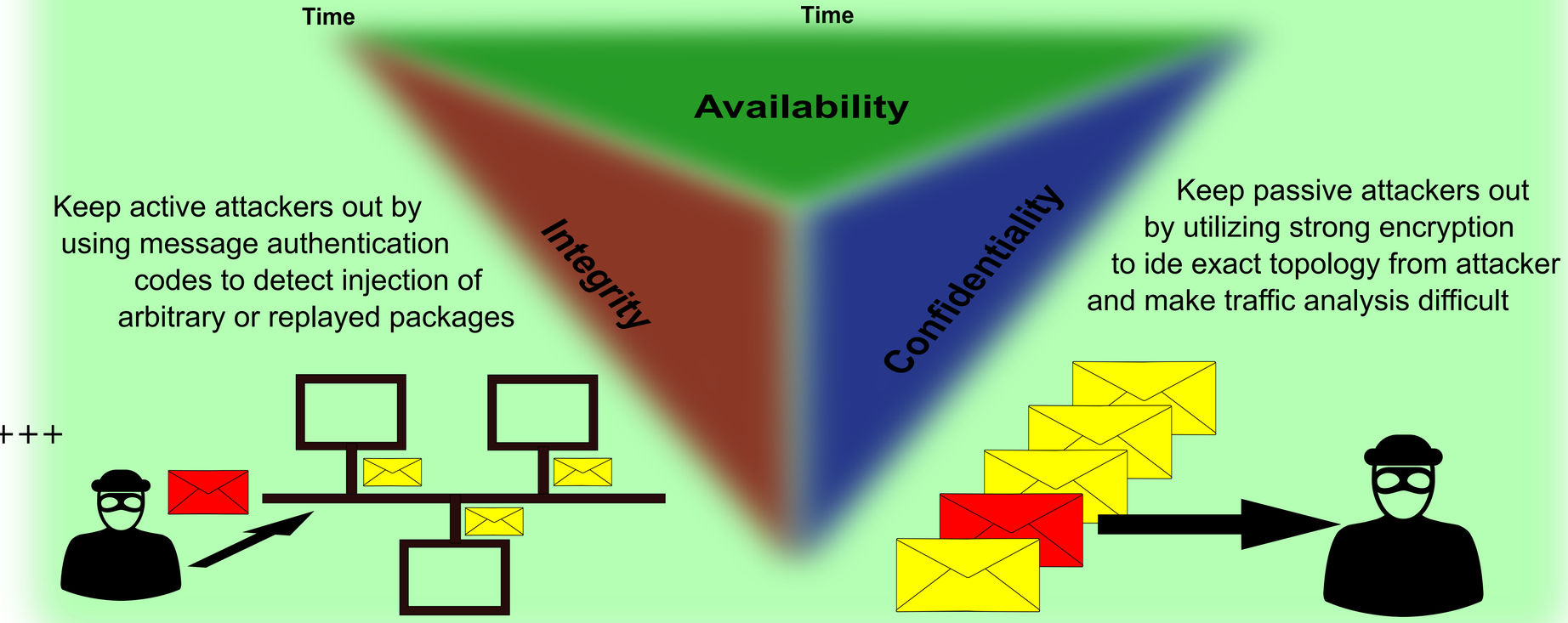
Design Goals

- Provide high-availability by utilizing independent communication lines and independent bus interfaces
- Also provide confidentiality and integrity by implementing strong cryptographic mechanisms
- Keep interoperatbility in mind by using 'plug-and-play' functionality
- Keep protocol overhead as small as possible
- Provide a prototype as proof-of-concept

Computational Security - the 'CIA Triad'



To increase availability:
- Achieve high reliability
- Keep 'mean-time-to-repair' low
- Protect network from DOS attacks
- Guard against transient hardware faults



Protocol Overview

Syncronization Service for distributing global counter to assure data freshness

Sync Request

Sync Response

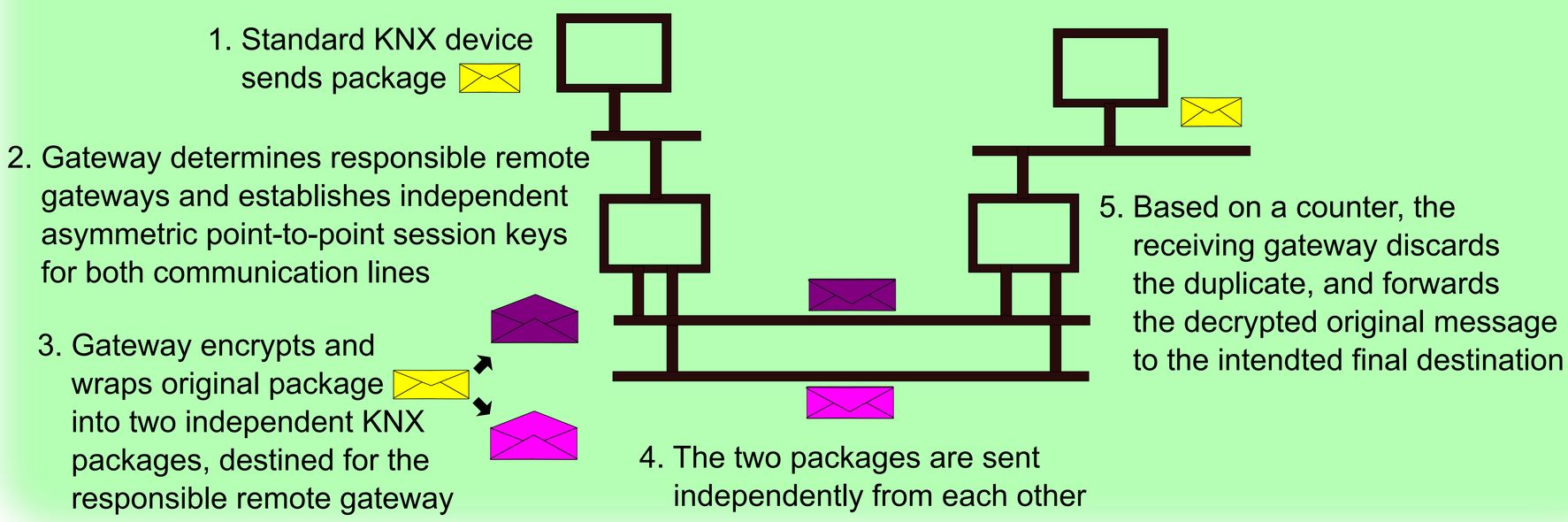
Discovery Service to achieve end-to-end encryption with perfect forward secrecy

Discovery Request

Discovery Response

Data Service for secure communication

Operational Overview



Contact: hglanzer@powpow.at