

SINA SOLID – Secure dynamic VPN networking

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Complexity in large VPN networks

■ Configuring big VPN networks:

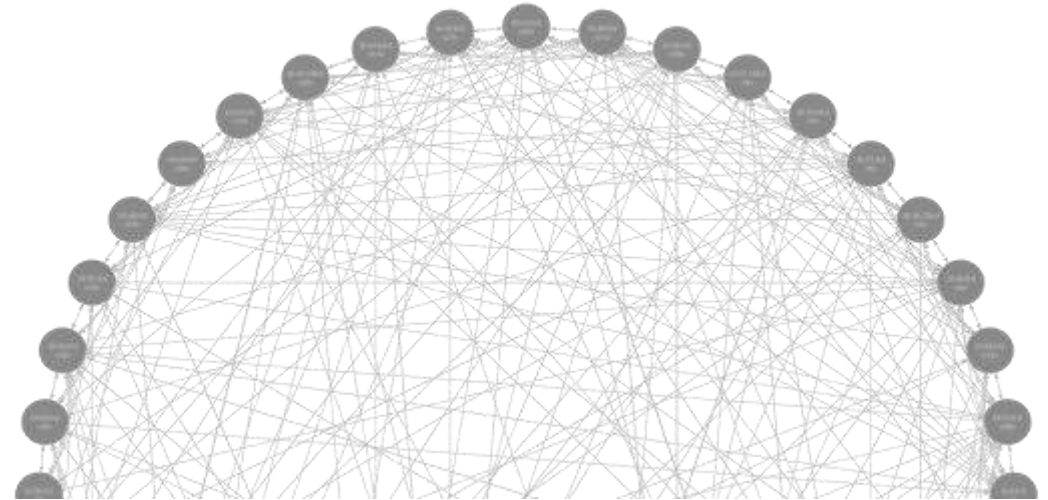
- A lot of different and complex routes and end points/locations
- Which red network can be reached via which gateway/path
- Reboot order?

■ Strong VPN meshing is the norm!

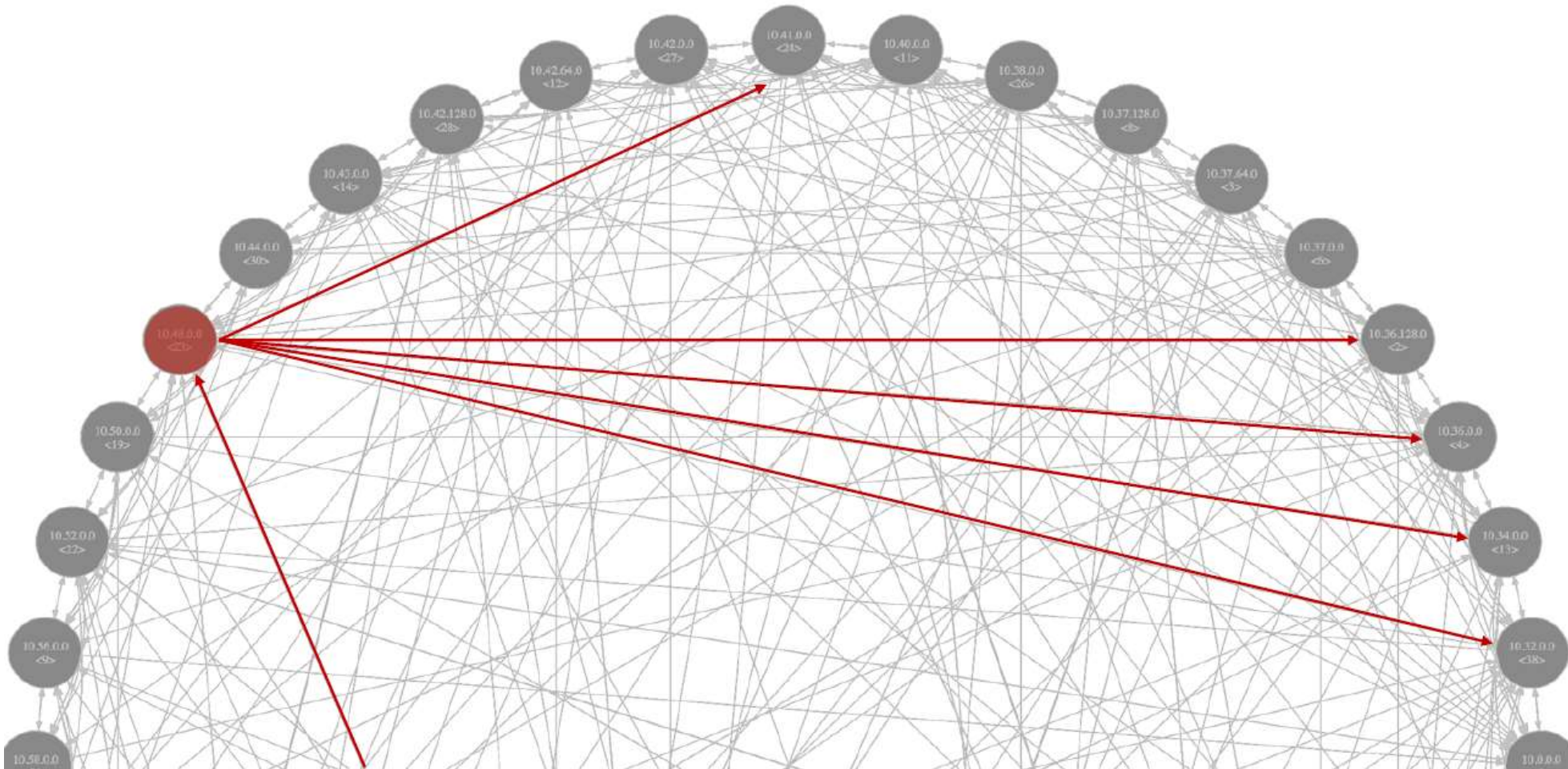
- Problems with scalability
- High administrative effort
- Labor increases (quadratic?)
- Susceptible to errors increases
- Configuration changes might have wide-reaching consequences and are error prone

■ Agility

- No direct connections between mobile users
- No direct reaction to failures/attacks



VPN failures have far-reaching consequences



The search for a flexible solution:

Objectives:

- Self-configuration
- Support for
 - Nested networks
 - Private IP address ranges
- Scalable & Agile
- Protect Confidentiality, integrity & authentication
- DoS resistance / resilience
-

SINA SOLID is a function of the SINA L3 Box S and the result of years of research cooperation

**BSI German Federal Office
for Information Security**

RESTRICTED

RESTREINT UE*

NATO RESTRICTED*

*for national use



**Ilmenau University
of Technology**



May 2009

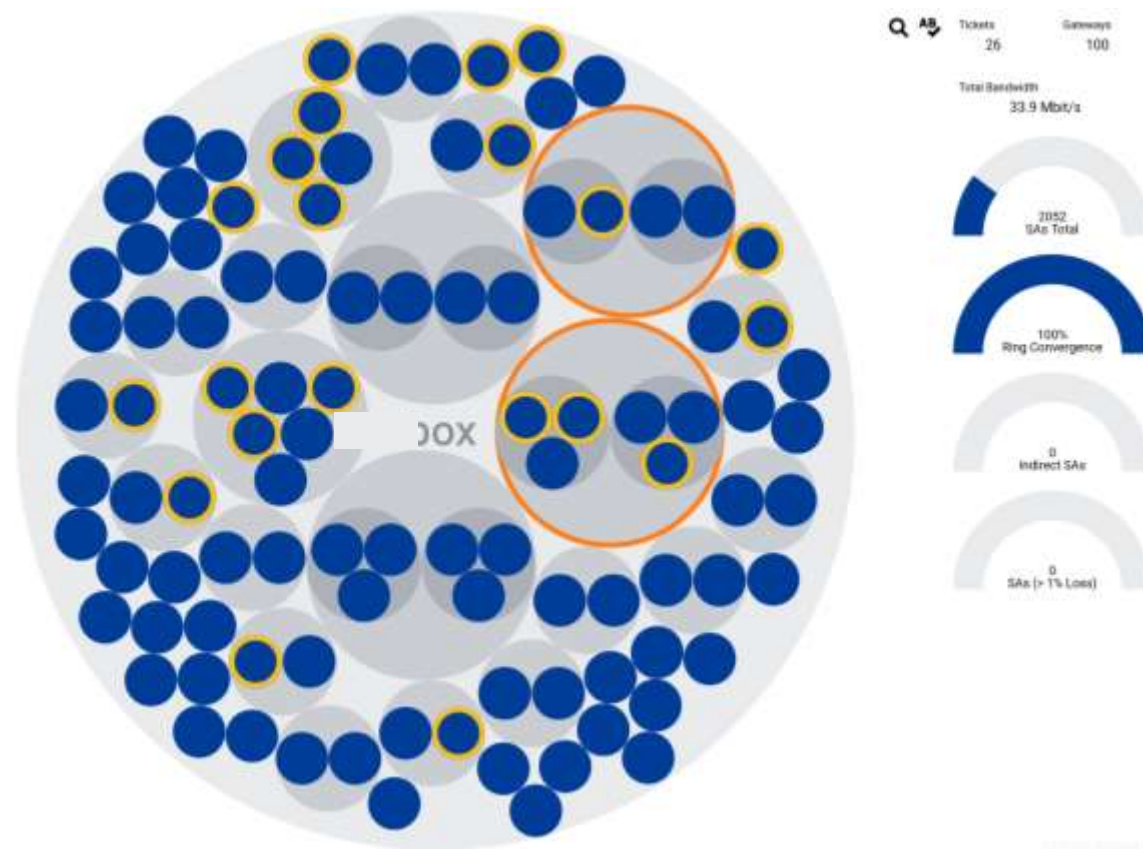
Roßberg; Steudel; Schäfer; Martius

SOLID

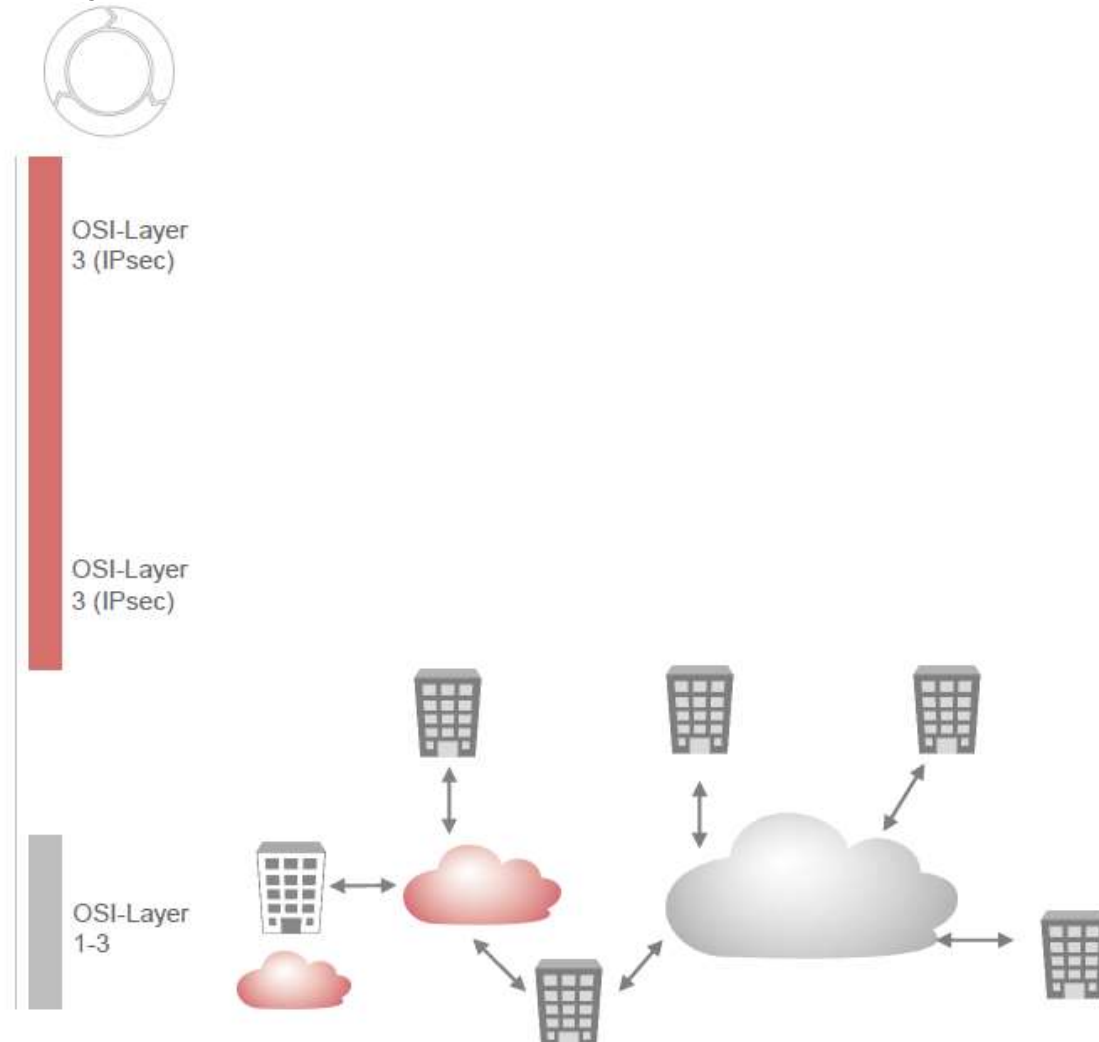
- SOLID (Secure OverLay for IPsec Discovery) dynamically auto-configures IPsec-based security associations in the VPN overlay network
- » In short: "**Automatic routing for IPsec VPN connections**" - In principle, SOLID replicates for IPsec what OSPF and BGP do for TCP/IP

Benefits of SOLID

- Reduction of operating expenses
- No load balancers necessary
- Automatically takes over ongoing connections in the event of a failure < 10 seconds..
- Real-time monitoring of the SOLID devices – *DETECT & RESPOND done automatically*



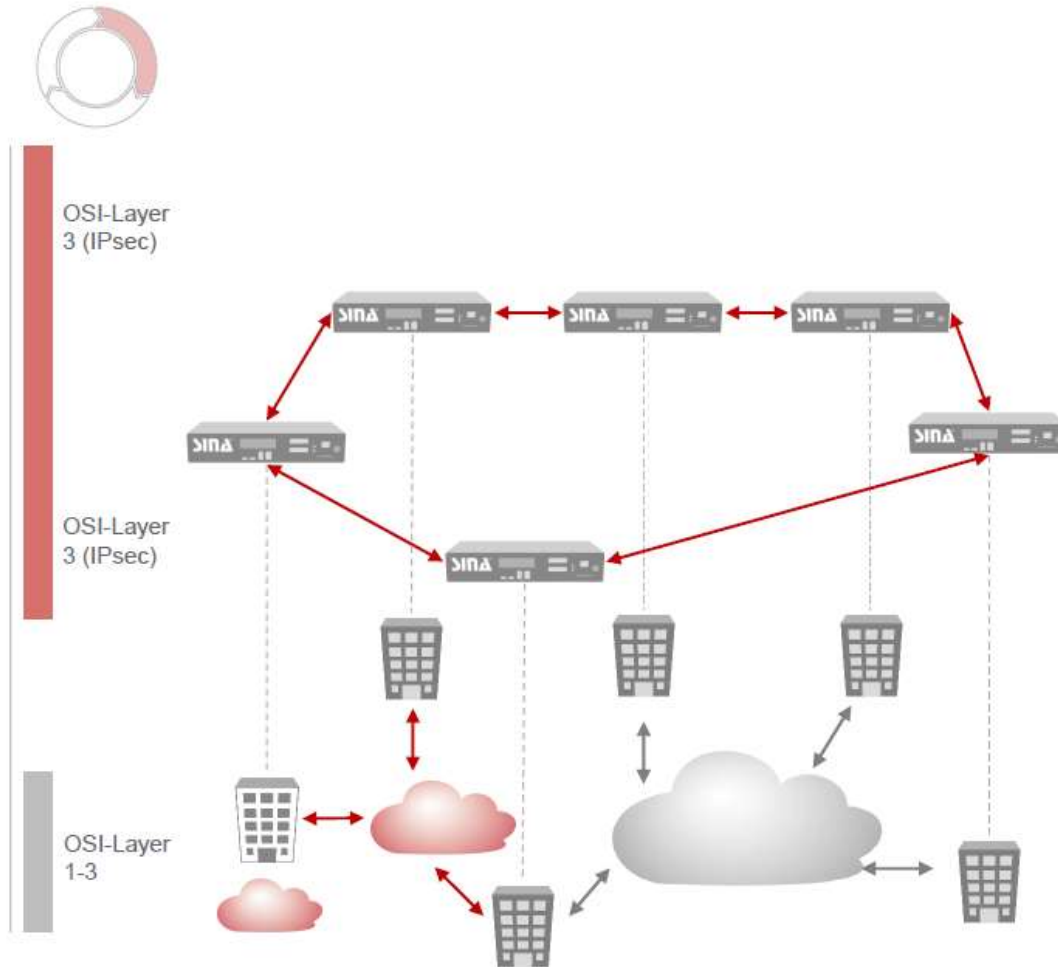
SINA SOLID: New way for secure private networks



Network consisting of

- Public network
- Private network

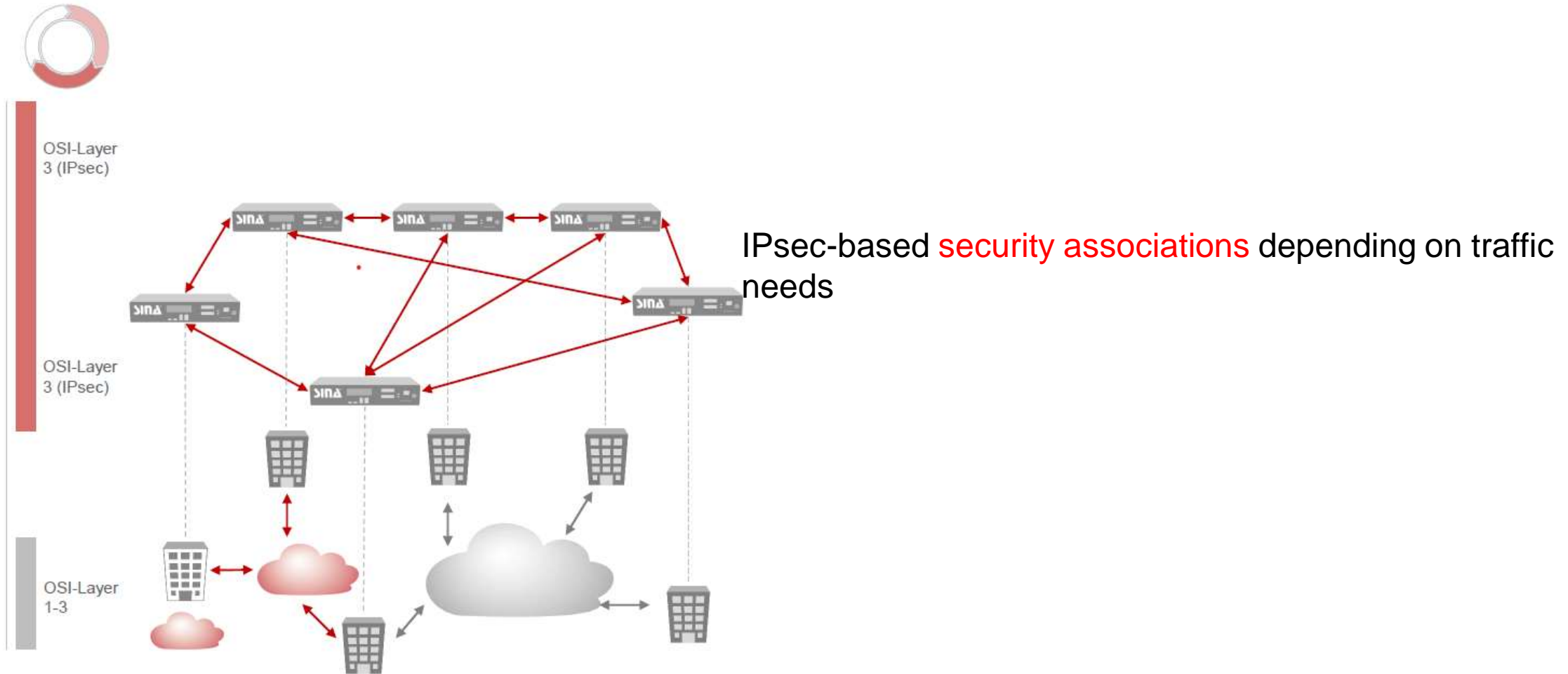
SOLID: VPN overlay



Dynamic IPsec-based **security associations** in the overlay network through auto-configuration

SOLID:

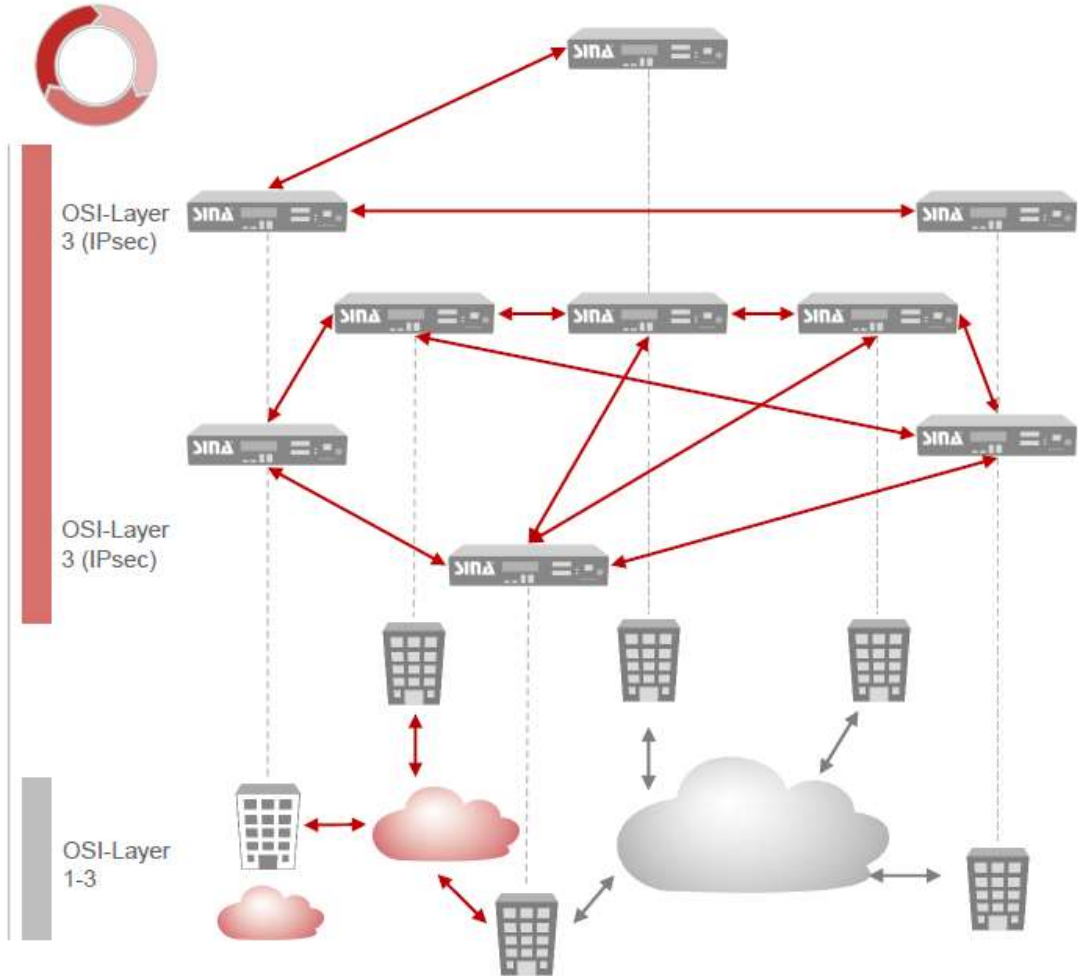
"Dynamic" structure of the SOLID ring



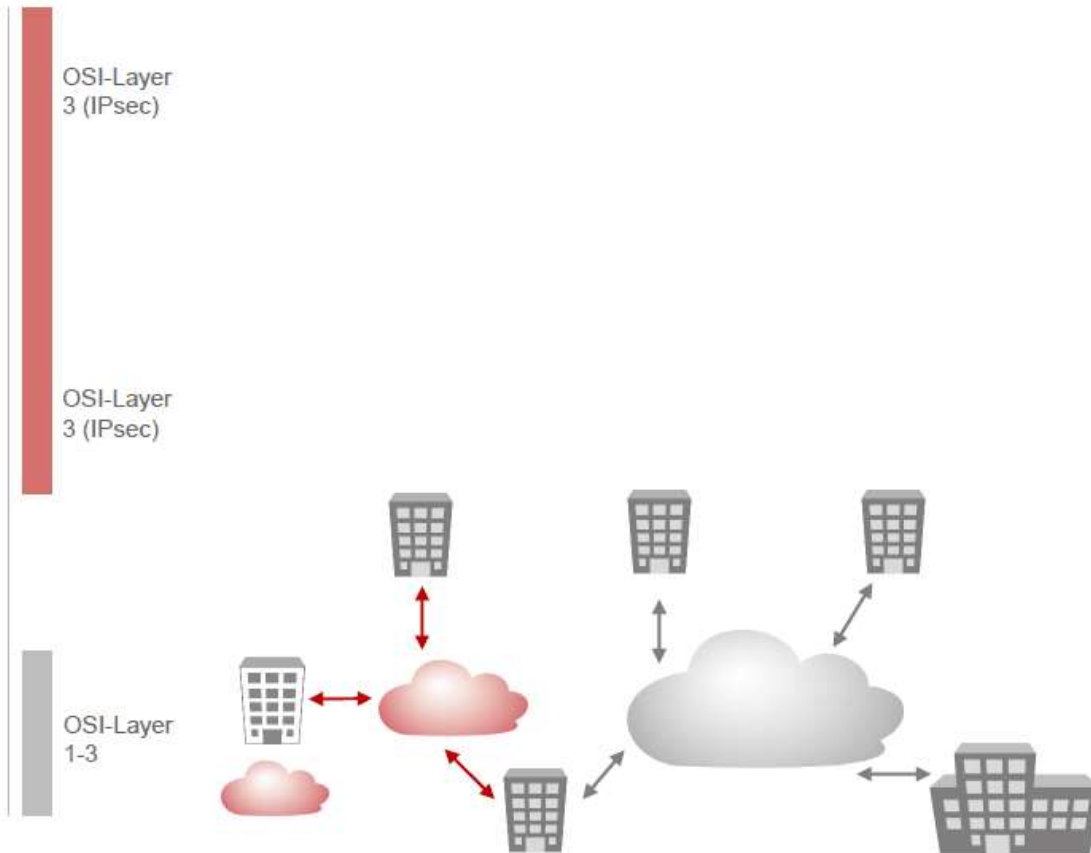
SOLID:

"Dynamic" structure of the SOLID ring

IPsec-based **security associations** depending on traffic needs and topology changes

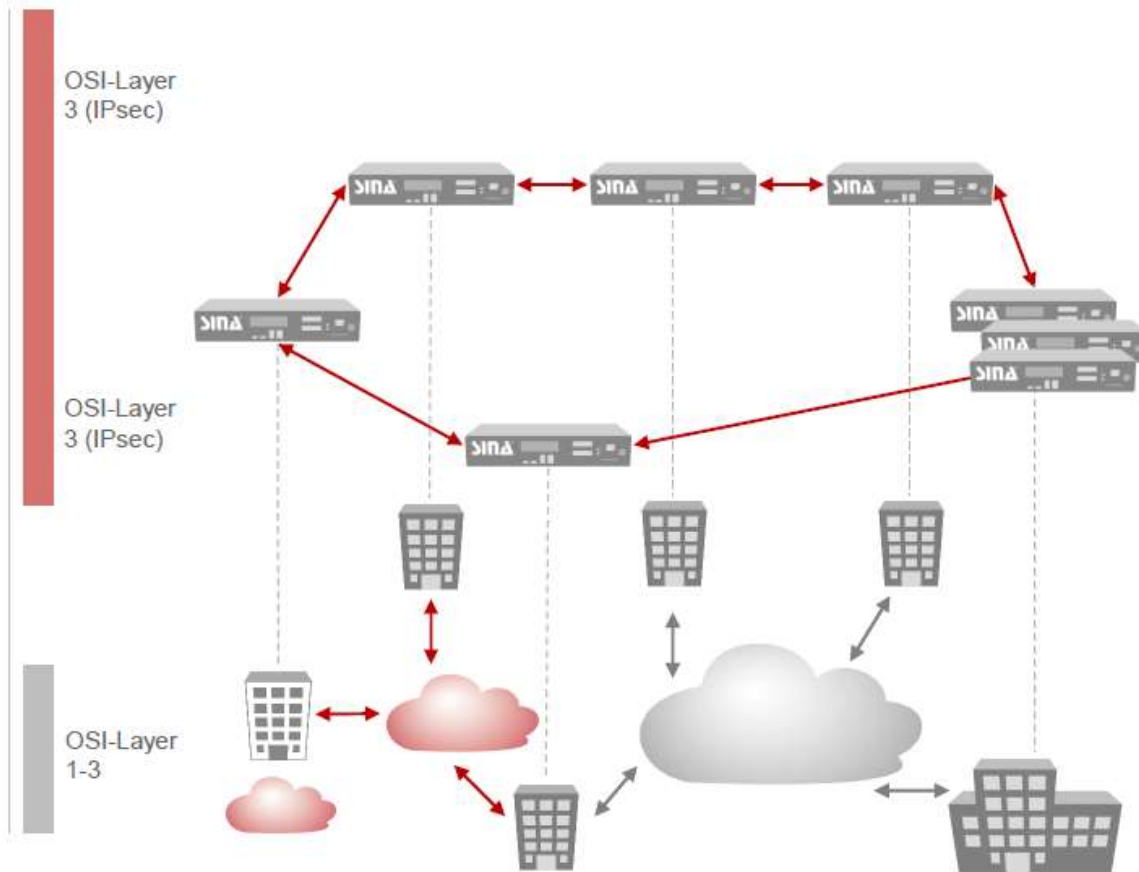


SOLID: Stability and resilience



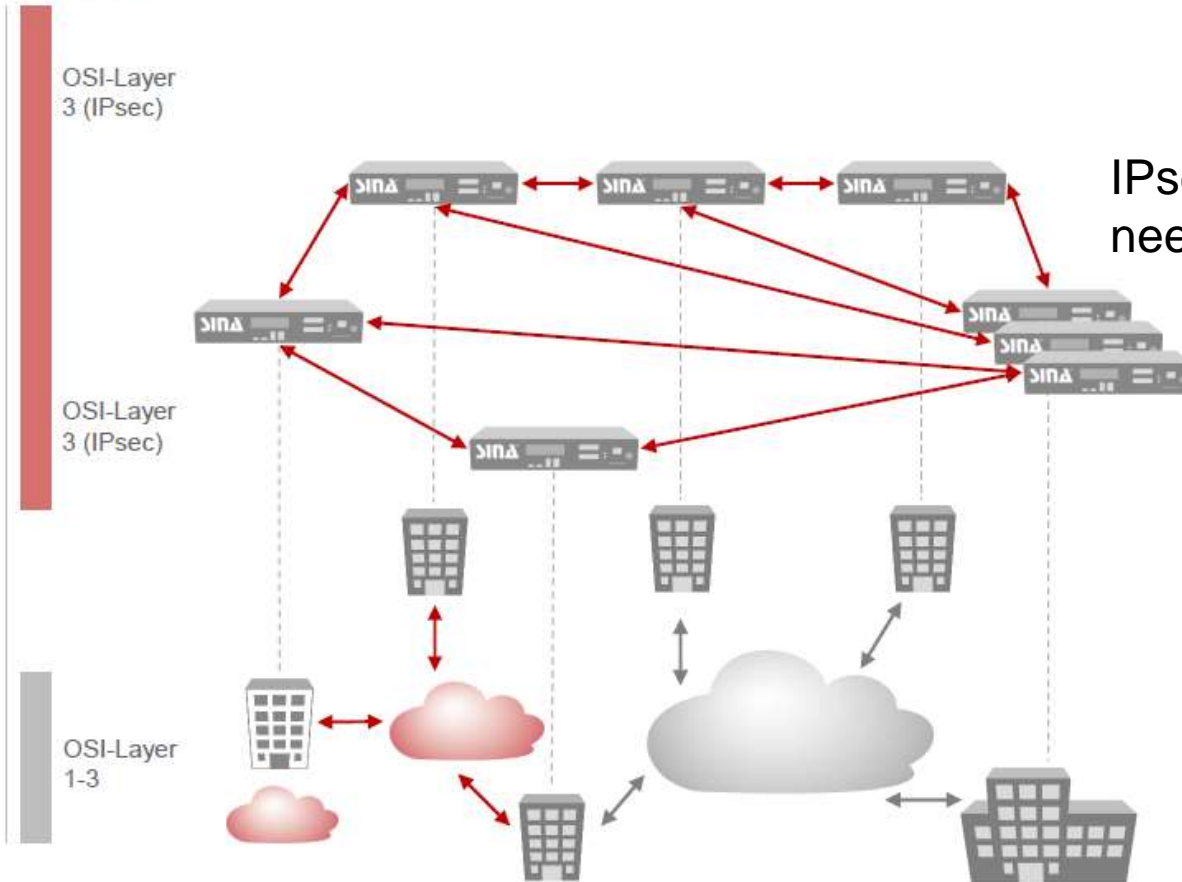
High availability requirement in data center

SOLID: Stability and resilience



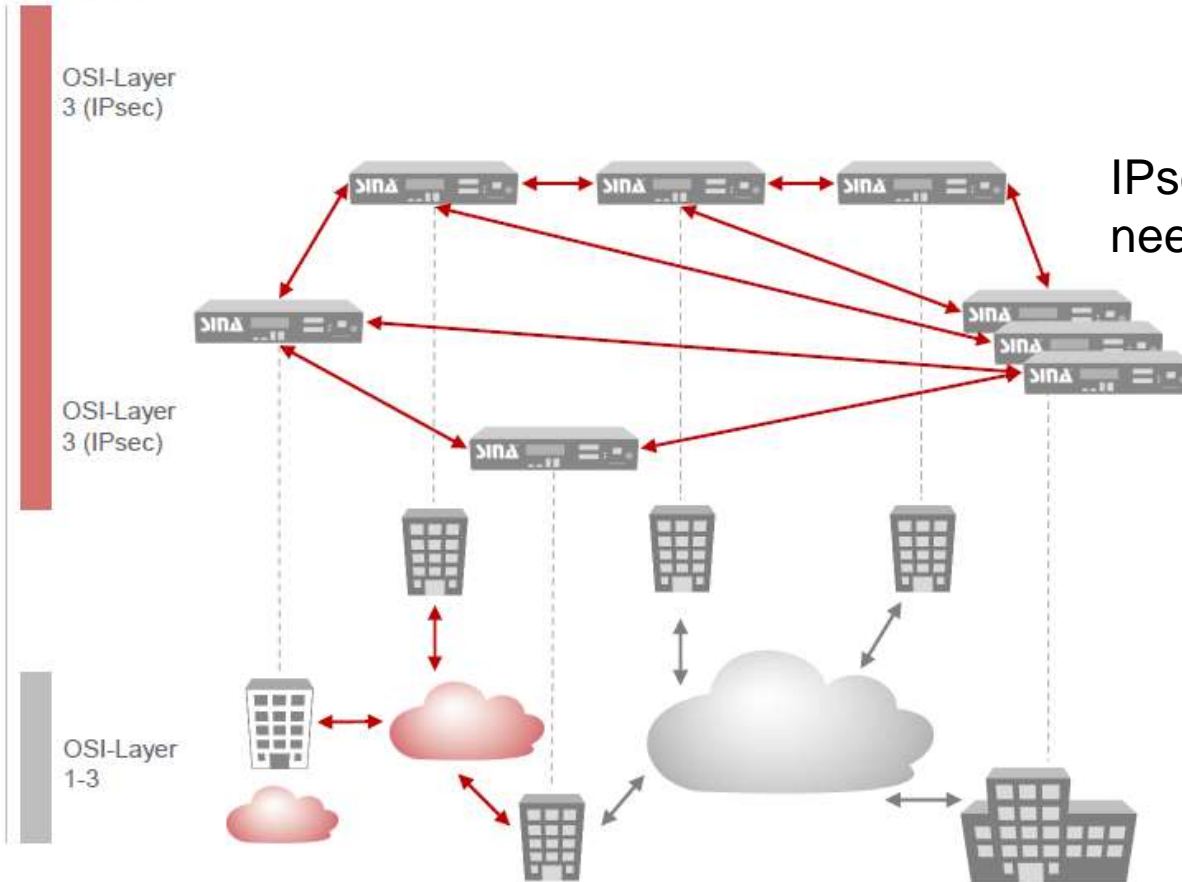
Cluster mode in SOLID

SOLID: Stability and resilience



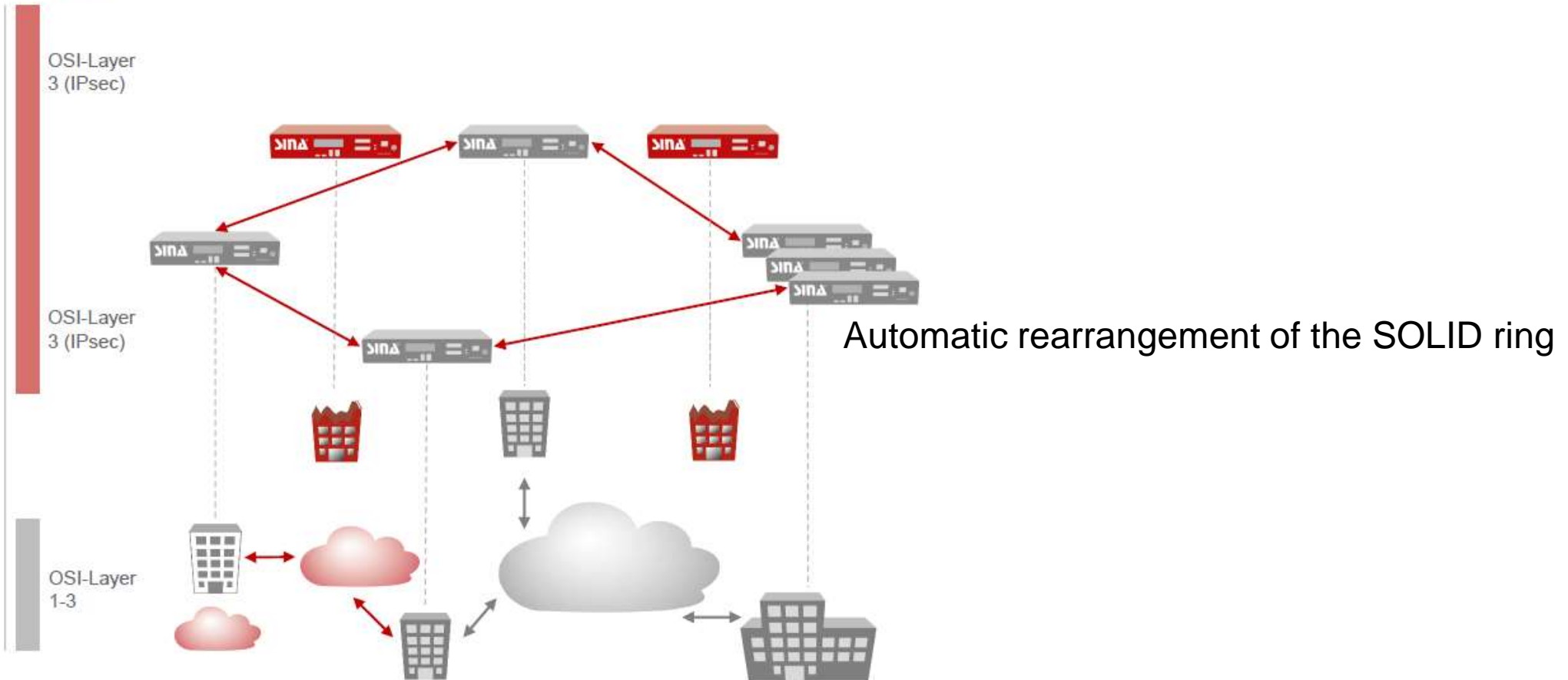
IPsec-based **security associations** depending on traffic needs and topology changes

SOLID: Stability and resilience

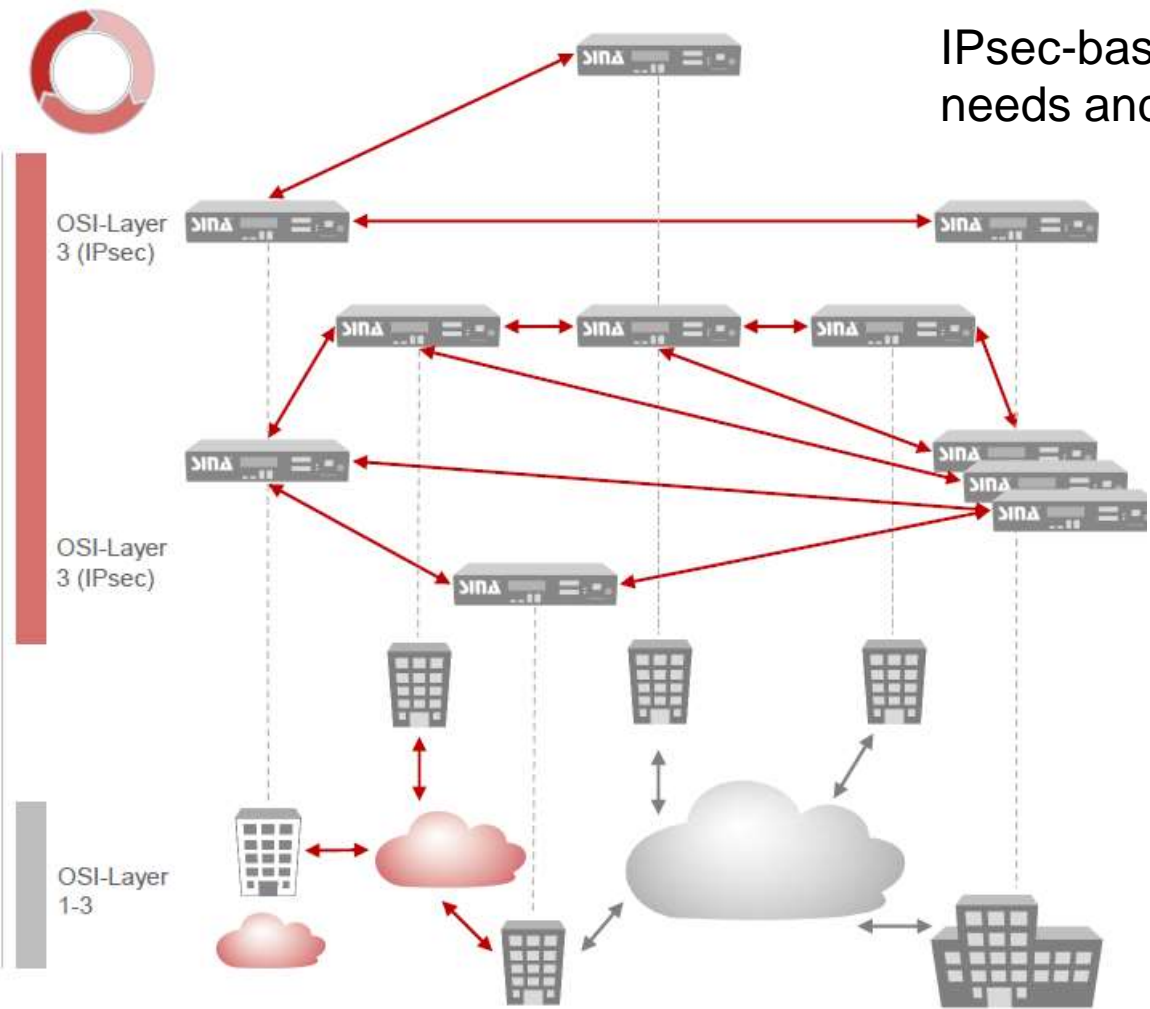


IPsec-based **security associations** depending on traffic needs and topology changes

SOLID: Dynamic response to failures



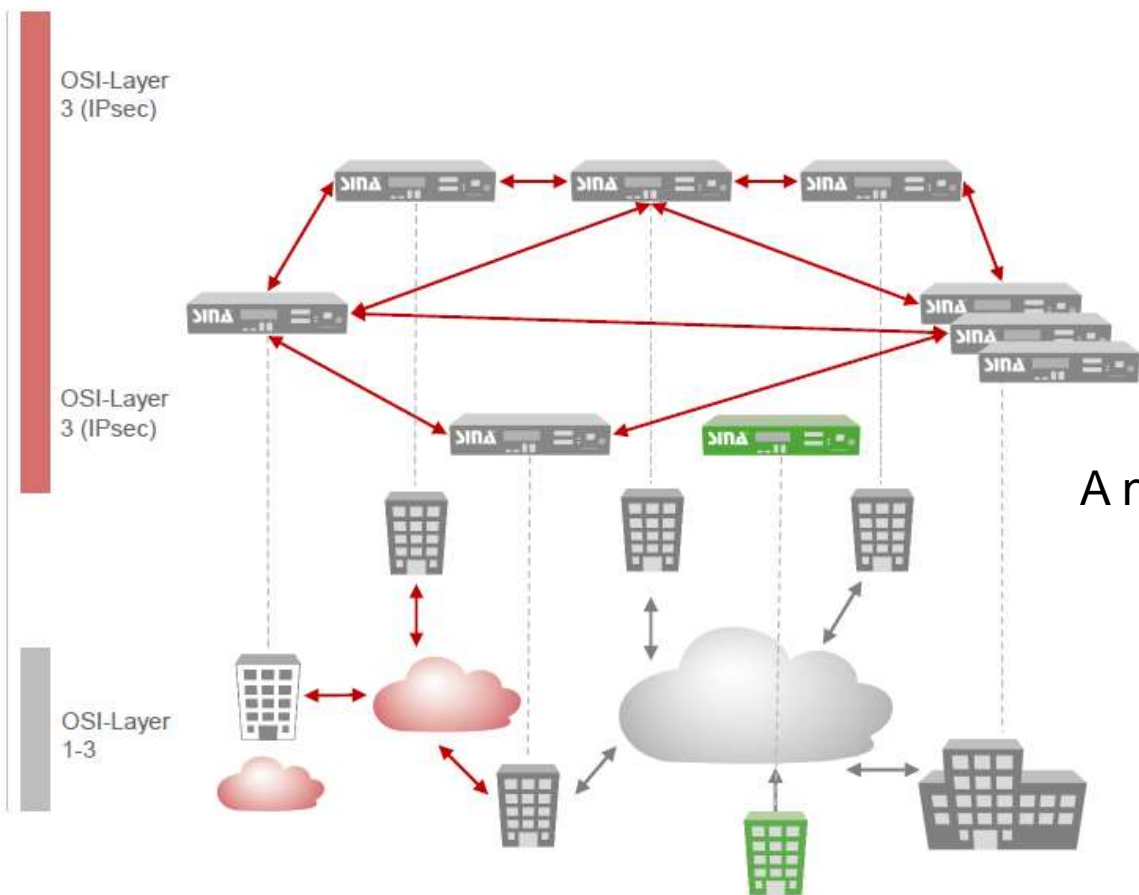
SOLID: Dynamic response to failures



IPsec-based **security associations** depending on traffic needs and topology changes

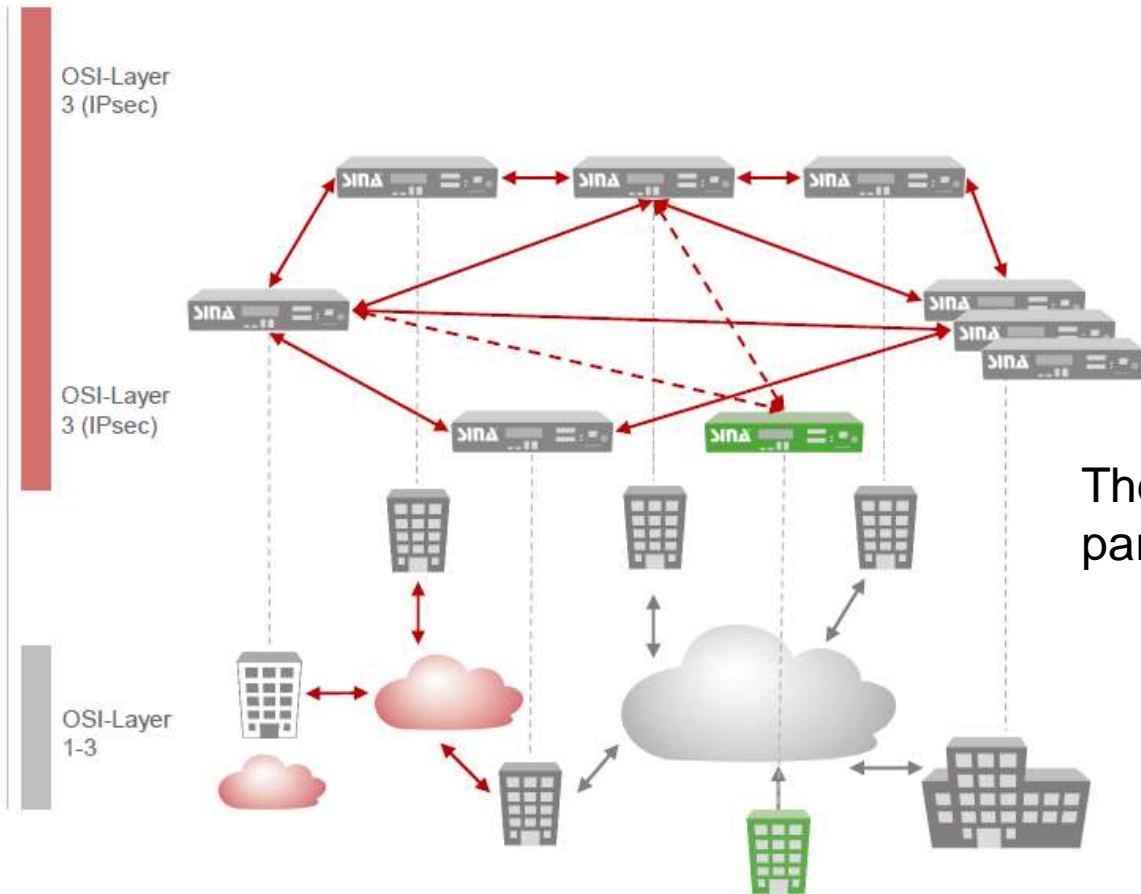
SOLID:

Dynamic response to topology changes



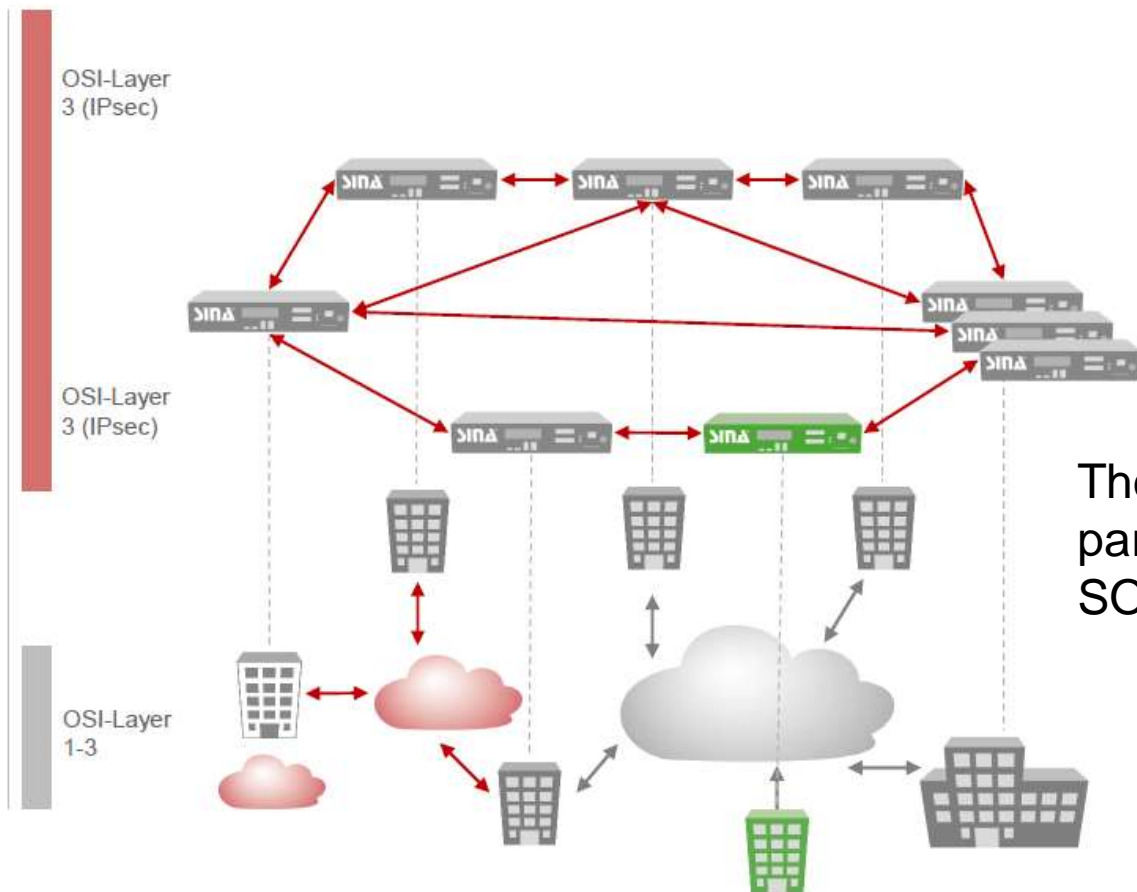
A new SINA Box will be added in the network

SOLID: Dynamic response to topology changes



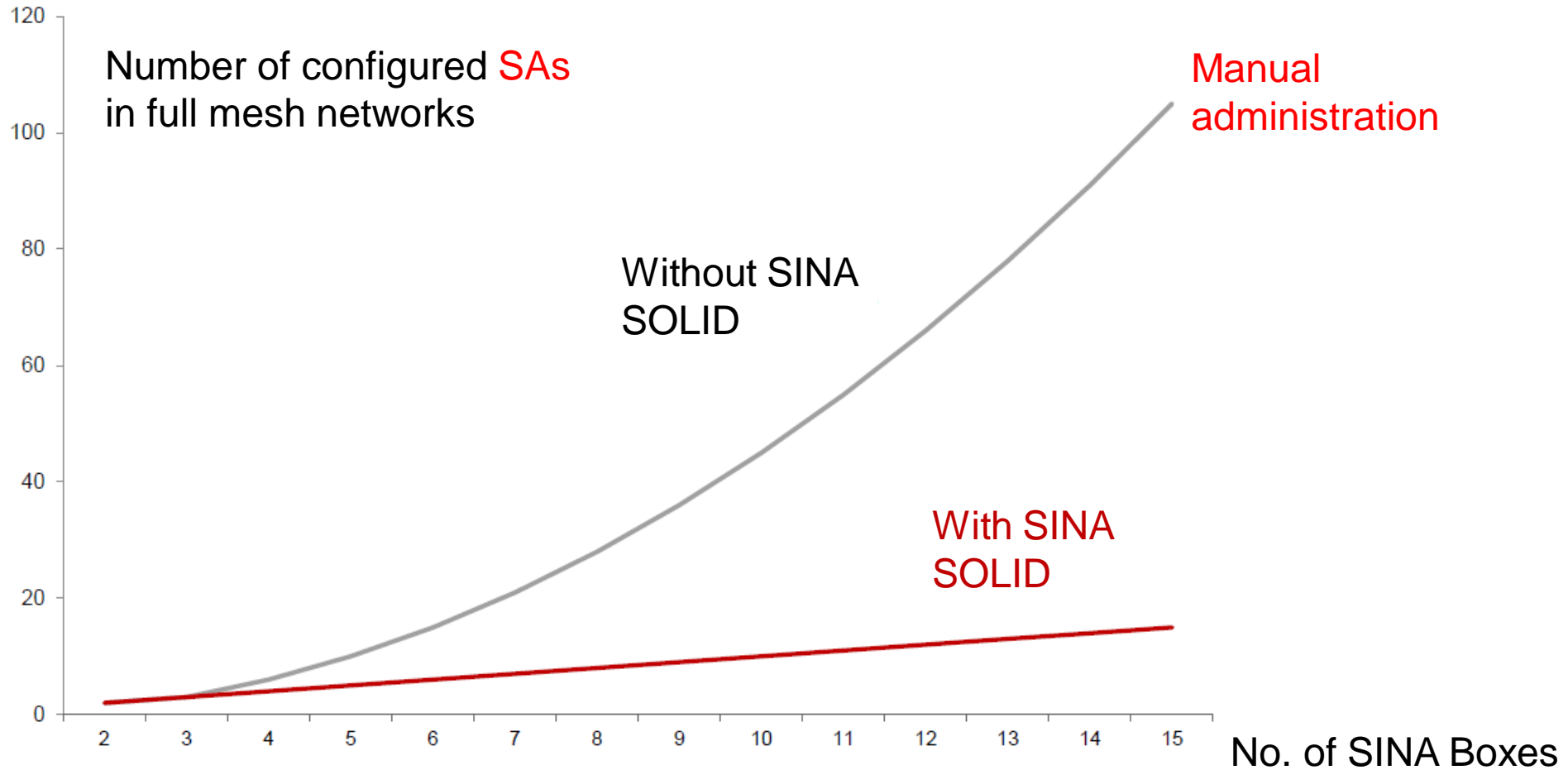
The SINA Box contacts the existing SOLID ring participants

SOLID: Dynamic response to topology changes

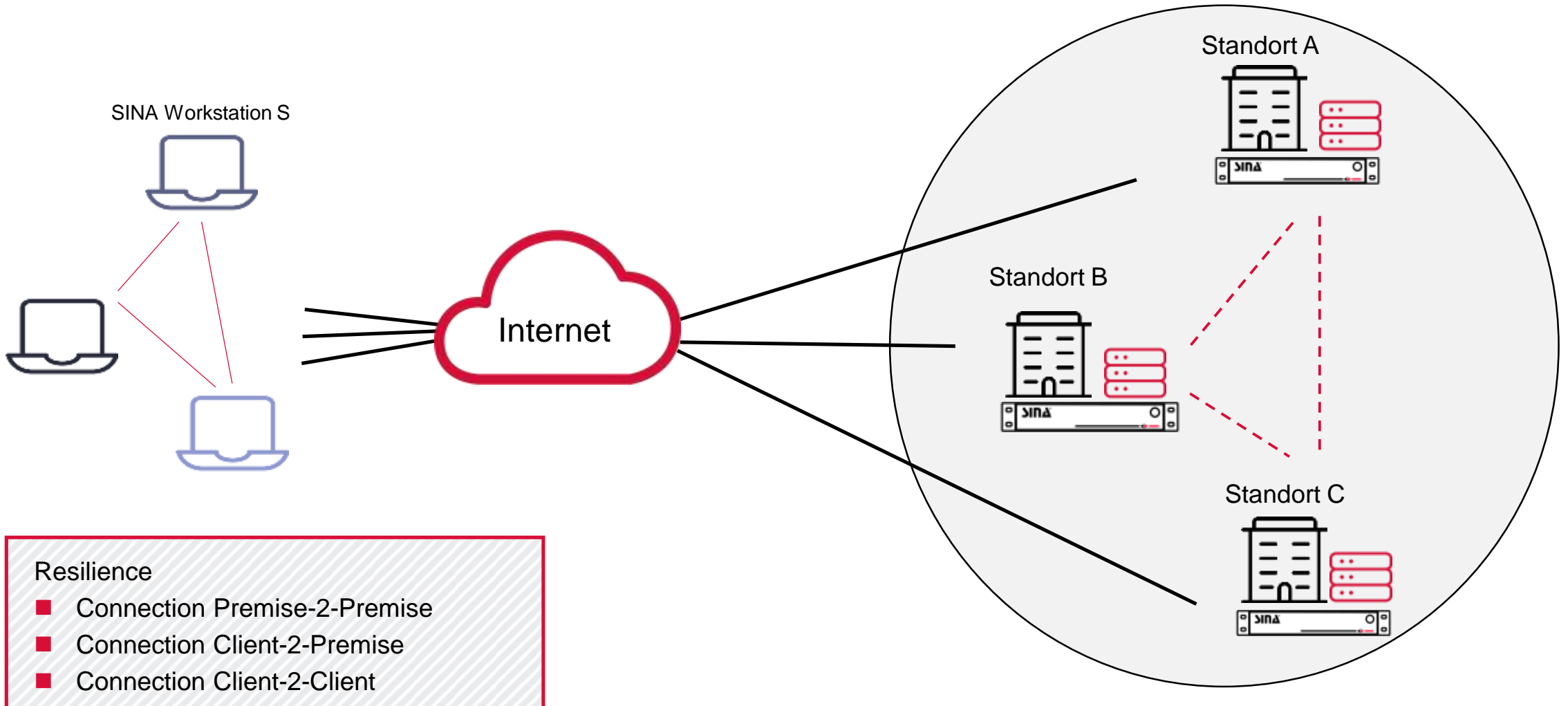


The SINA Box contacts the existing SOLID ring participants and fits according to the feedback in the SOLID ring

SOLID: Reduction quadratic to linear



Resilience with decentralized connections



SOLID connects better

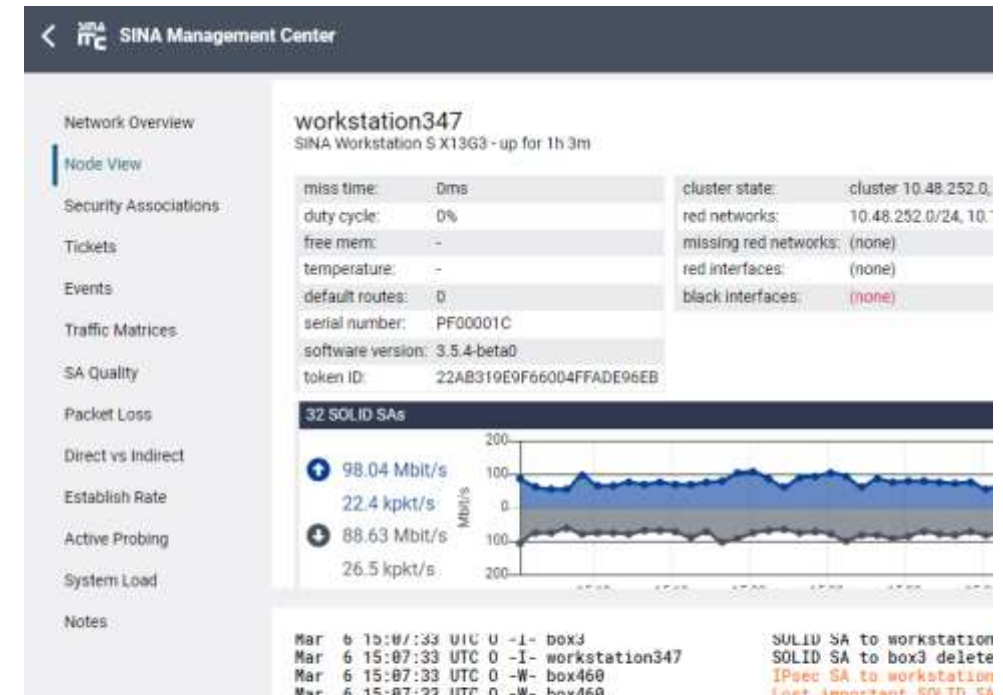
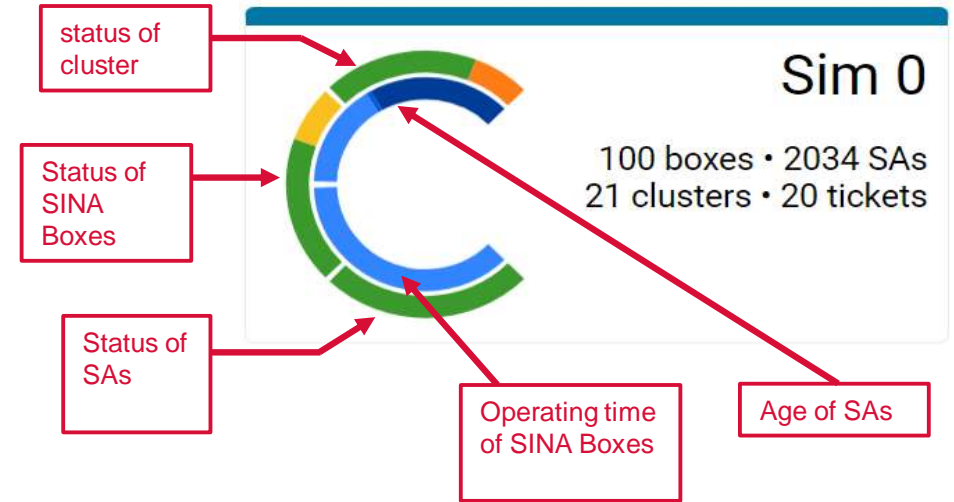
■ SOLID for SINA L3 Box S

- Replacement of the static WAN and client access scenarios
- Significant increase in performance with SOLID

■ SOLID for SINA Workstation S

- easy setup of (geo-redundant) access clusters
- optimal scaling without additional load balancers
- Service-specific access vs. central access
- Client-to-Client communication

■ SINA Monitoring for SOLID



Summary

SINA SOLID explores new ways to achieve a high level of IT security – even in complex networks

- result of years of research cooperation with the Ilmenau University of Technology
- Automatic optimization of IPsec-based security association according to traffic requirements and topology changes
- Dynamic IPsec-based security associations in the overlay network through auto-configuration in large infrastructures
- Ensure all security features of SINA and IPsec

