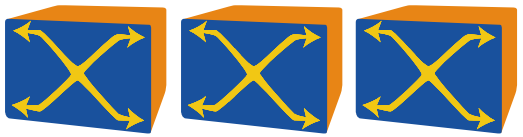
6WINDGate HA

6WIND

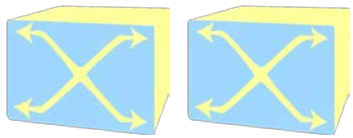
#SPEEDMATTERS For Serious Networks

HA for Networking Systems: Two Ways To Address This Question

- **Redundancy in the equipment architecture**



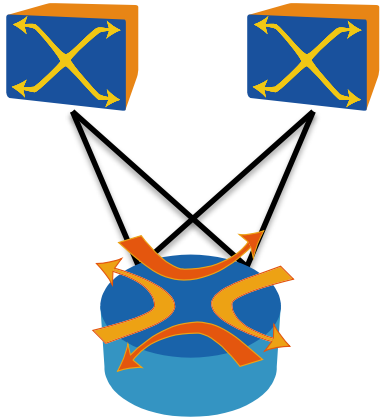
N active elements



M inactive elements

- **Once a planned or unplanned outage has been detected on an active element**
  - The whole configuration has to be restored in a inactive element
  - Complete information has to be learned by the inactive element from the system to provide the service again
  - Minimize switch-over delay to avoid service interruption

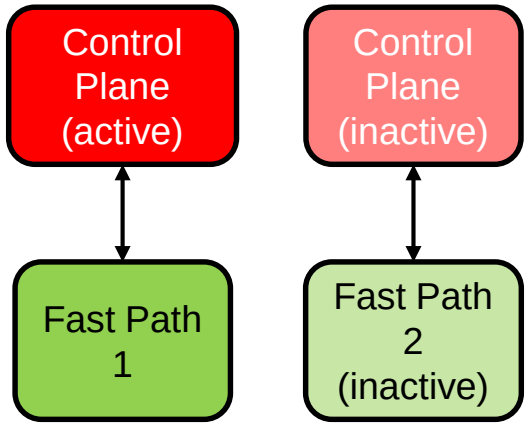
- **Use Traffic Engineering to enhance system availability**



- **Deploy standard protocols on at least 2 interfaces**
  - Routing with ECMP
  - Link Aggregation (Ethergroups)
  - VRRP

6WINDGate High Availability

- **1+1 Architecture to minimize service interruption**
- **System architecture relies on redundant hardware platforms, each running an instance of 6WINDGate**
- **Control Plane protocols must maintain a consistent view of the system for both instances in case an active Control Plane fails**



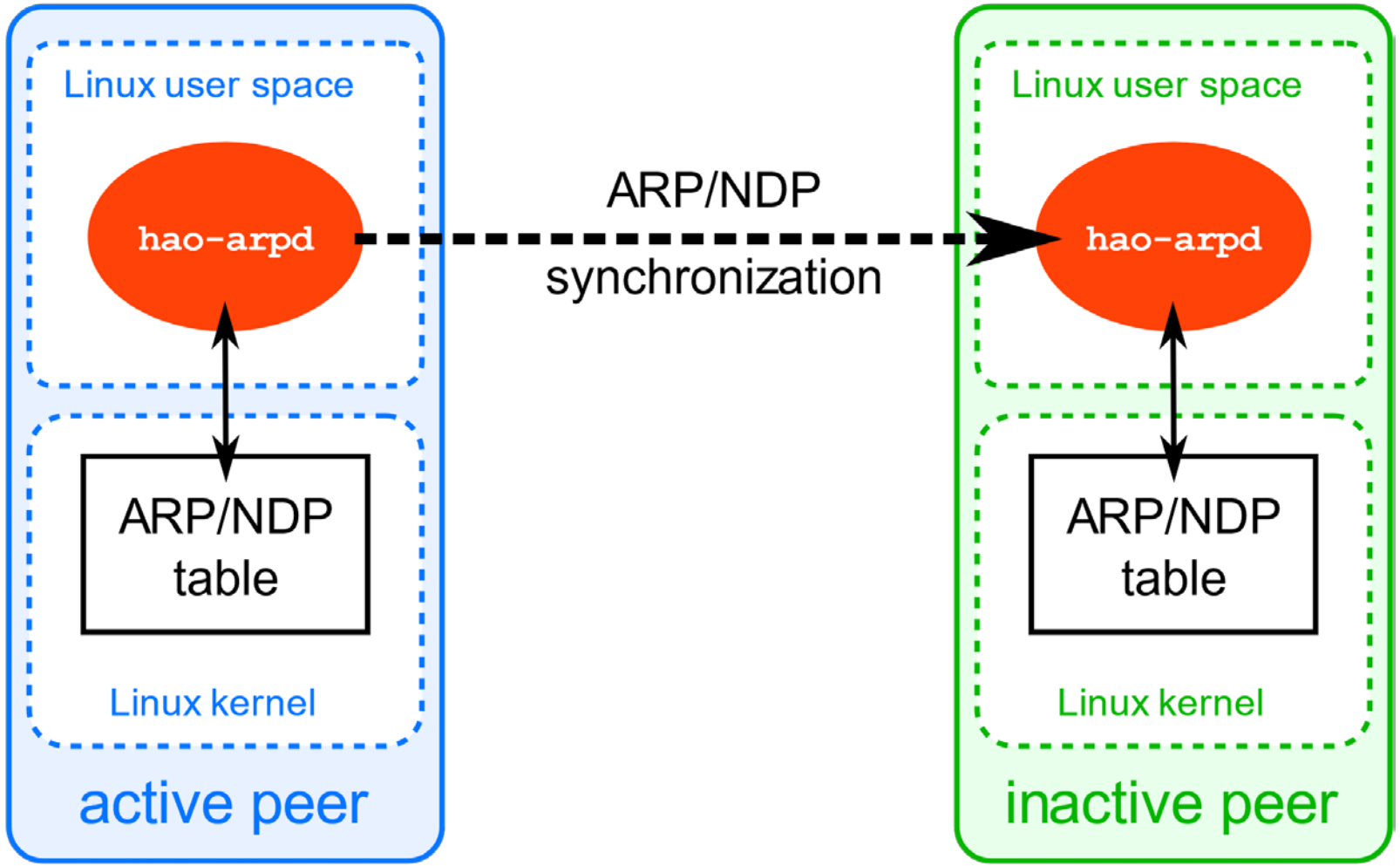
What Does 6WINDGate High Availability Provide?

- **Non-stop forwarding thanks to continuous synchronization of inactive system**
  - Inactive system can take over packet processing at any time to manage planned and unplanned outages
  - ARP, NAT/firewall, IPsec/IKE tables are continuously updated and ready-to-use
  - Minimal interruption of traffic during switch over
- **6WINDGate components monitoring**
  - Inner health check and Graceful Restart (GR) of 6WINDGate components
- **Traffic engineering through VRRP**
  - Including activity switch upon state change thanks to notification scripts
- **6WINDGate is NOT a HA Framework**
  - It provides the features to implement HA
  - The HA strategy (when to trigger switch over) depends on the use case and is left to the customer

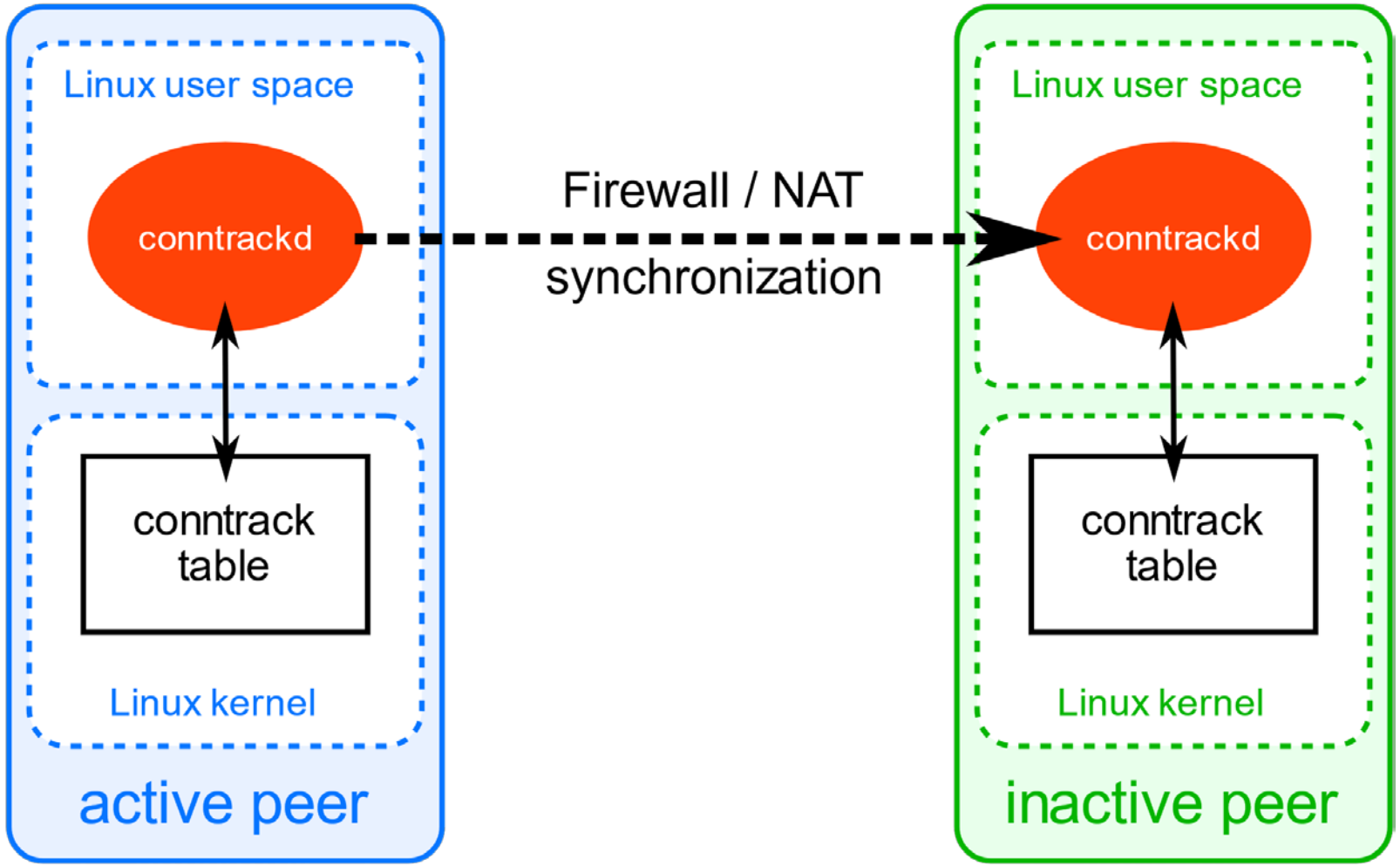
Control Plane Synchronization

- **Maintain coherent protocol information in several instances of 6WINDGate**
  - ARP/NDP tables, SA/SP tables for IPSec, Connection states of NAT and Firewall
- **Two types of states**
  - Object information: table element (SA, …)
    - Updates are “rare”
  - Flow information: dynamic information related to an object (sequence number for a SA…)
    - Updates for every packet
- **Golden rule of 6WINDGate: only synchronization of Control Planes’ states is required; the CM/FPM will take care of the Fast Paths**

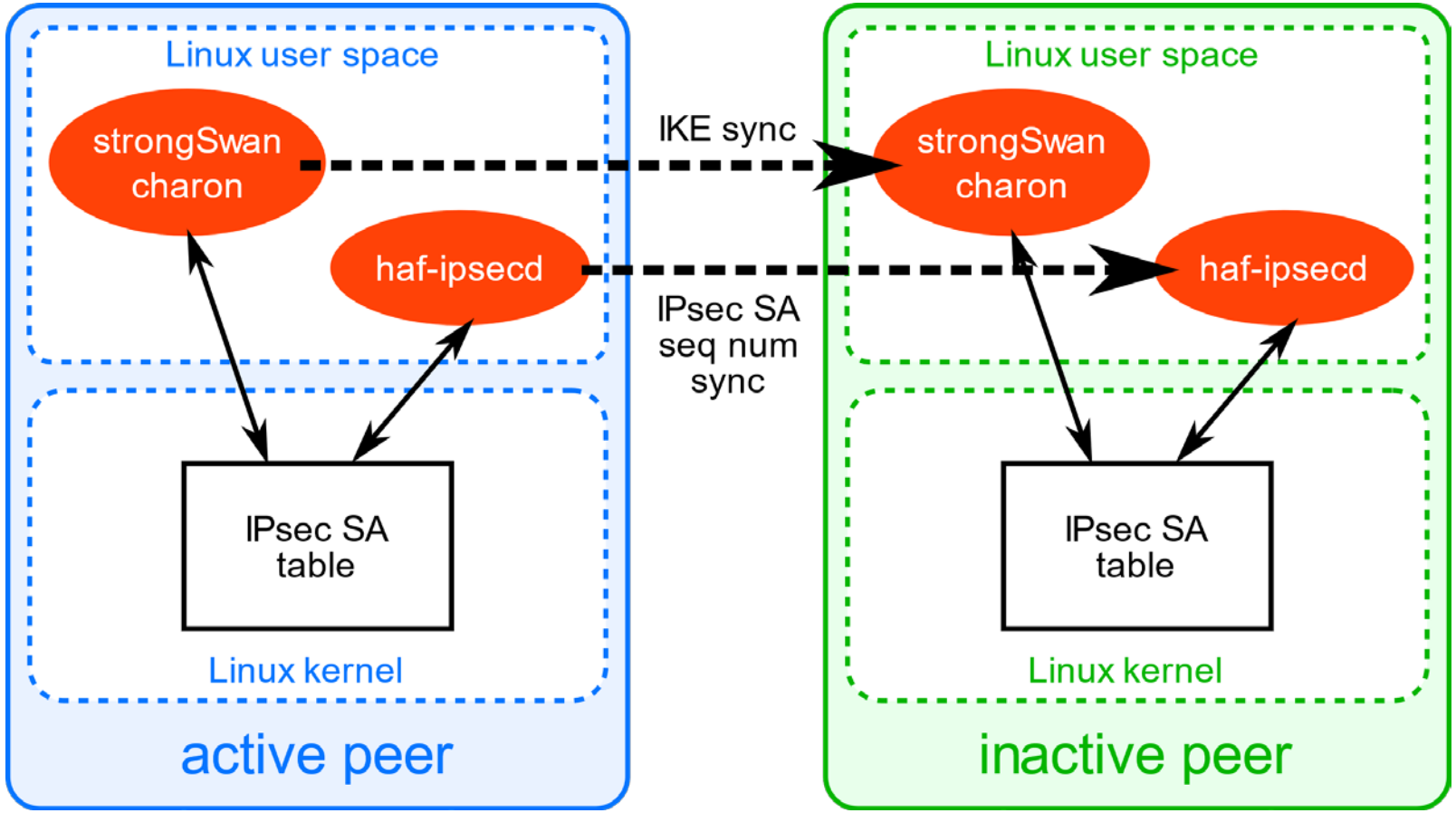
HA ARP / NDP Synchronization



HA Firewall / NAT Synchronization



HA IPsec / IKE Synchronization

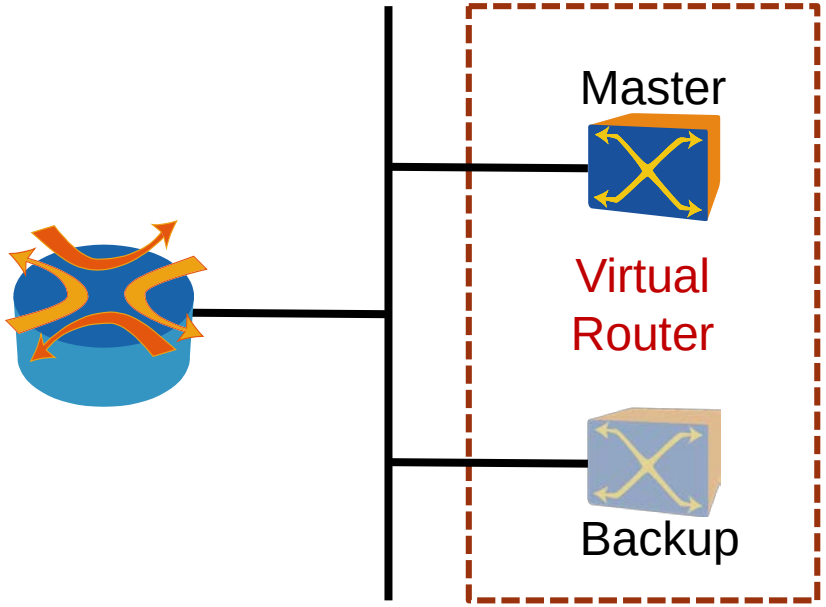


6WINDGate Components Monitoring

- **Daemon Monitoring System (DMS) provides proactive health check of 6WINDGate components and crash recovery**
- **Monitored daemons**
  - Cache Manager (cmgrd)
  - Fast Path (fp-rte)
  - Fast Path Manager (fpmd)
  - Fast Path Statistics (fpsd)
  - Hitflags (hitflagsd)
- **Daemons are monitored by sending health check requests and automatically restarted if they don't respond or if the corresponding process crashes**
- **DMS can be configured to monitor custom daemons**
  - pid file or process name
  - Health check command, interval, timeout and retries
  - Valid exit codes/signals
  - Restart command with timeout

VRRP

- VRRP provides a way, for a set of routers, to control a virtual IPv4 address and MAC address, and to provide automatic failover.
- Master and Backup routers belong to the same VRRP group to form a Virtual Router.
- Master holds the Virtual IP and MAC addresses.
- Master regularly sends advertisements to Backup and in case of failure, Backup will become Master.
- Scripts can be called in case of role change, for example to trigger HA activity switch.



6WINDGate High Availability Modules

- **HA Baseline**
  - Provides libraries and scripts common to other HA synchronization modules
- **HA ARP/NDP Synchronization**
- **HA Firewall / NAT Synchronization**
- **HA IPsec/IKE Synchronization**
- **Daemon Monitoring System**
- **VRRP**

Thank You

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