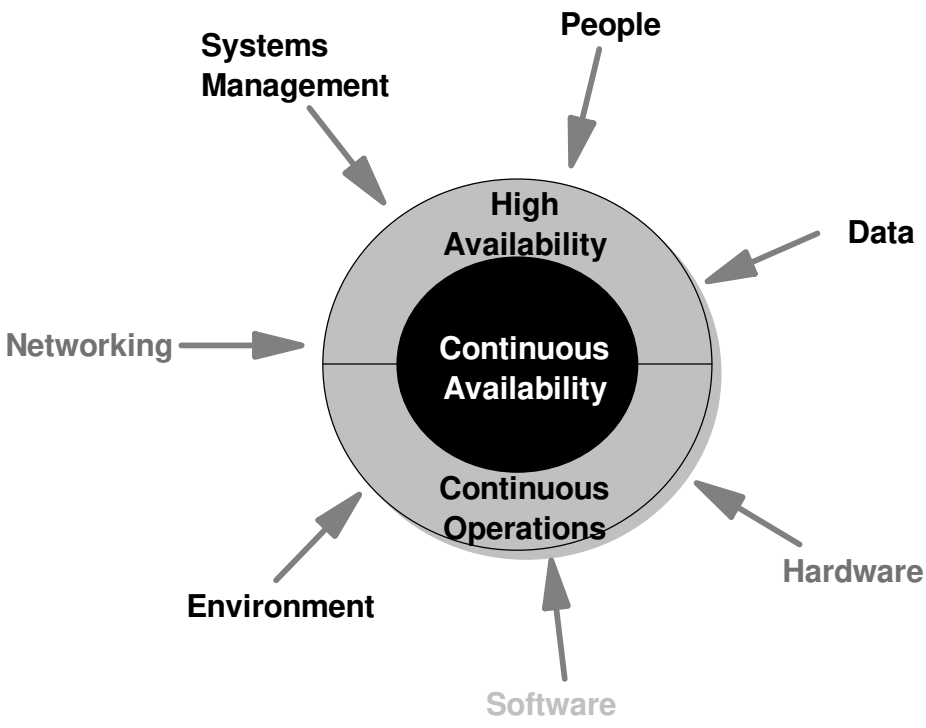
Linux High Availability Project

Agenda

Components of Availability
What Makes Linux Special?
Identifying Single Points of Failure
High Availability vs. Fault Tolerance
Linux-HA Terminology & Software Components
Two Popular Configurations
What Is Missing From Linux?
How To Support Linux-HA Development

Components of Availability



What Makes Linux Special?

Linux is a very low-cost, high-performance Unix-like operating system

Linux enables people to use standard, low-cost PCs, mostly Intel-based

Typical cheap mainstream PCs are not designed for fault resilience

Many companies start using Linux for their business

- Sixt uses Linux-based IP routers in all offices
- Linux Commercial HOWTO

Identifying Single Points of Failure

An outage of a "Single Point of Failure" (SPOF) causes an outage of the entire system

- single power supply
- single network or network adapter
- single SCSI adapter or cabling
- unmirrored disk
- single computer room or building!

Key to highly available systems

- identify all Single Points of Failure
- add redundant parts where needed
- care for automatic replacement of failed parts

High Availability vs. Fault Tolerance

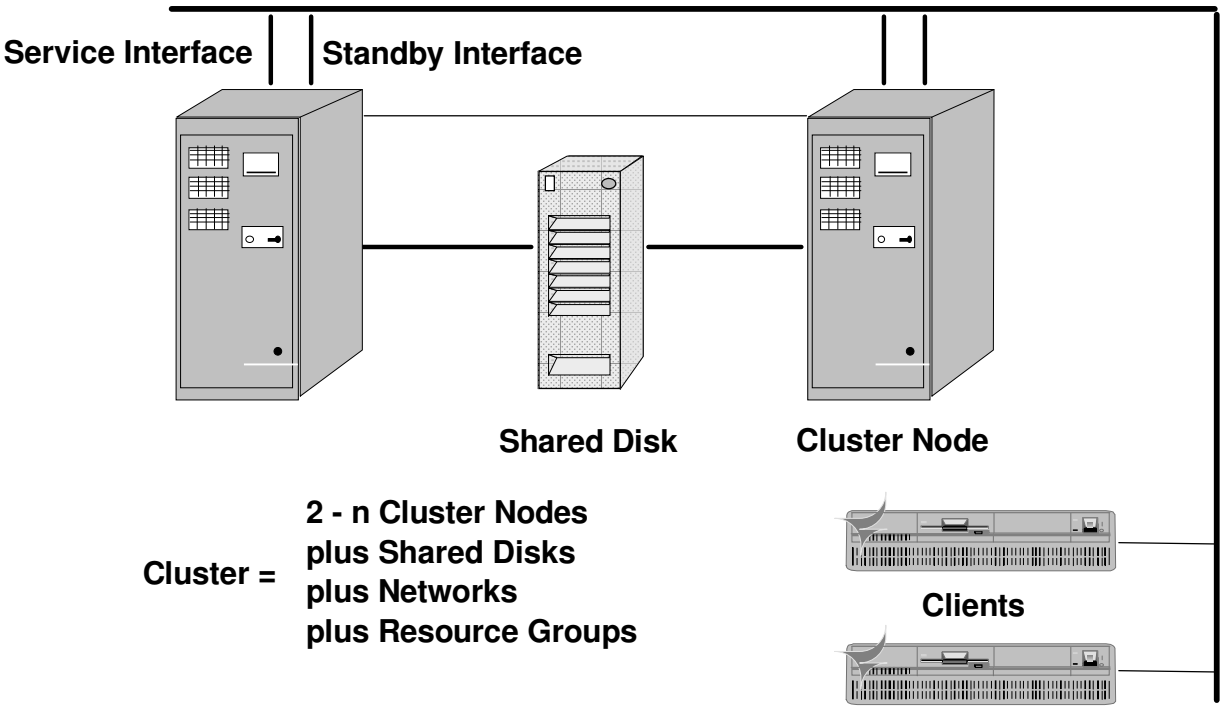
Highly Available Systems may fail but are designed to recover quickly

- Typical failover time will be below 5 minutes
- No data corruption should occur
- Transaction oriented software won't lose any data

Fault tolerant systems are not supposed to fail at all but are very expensive!

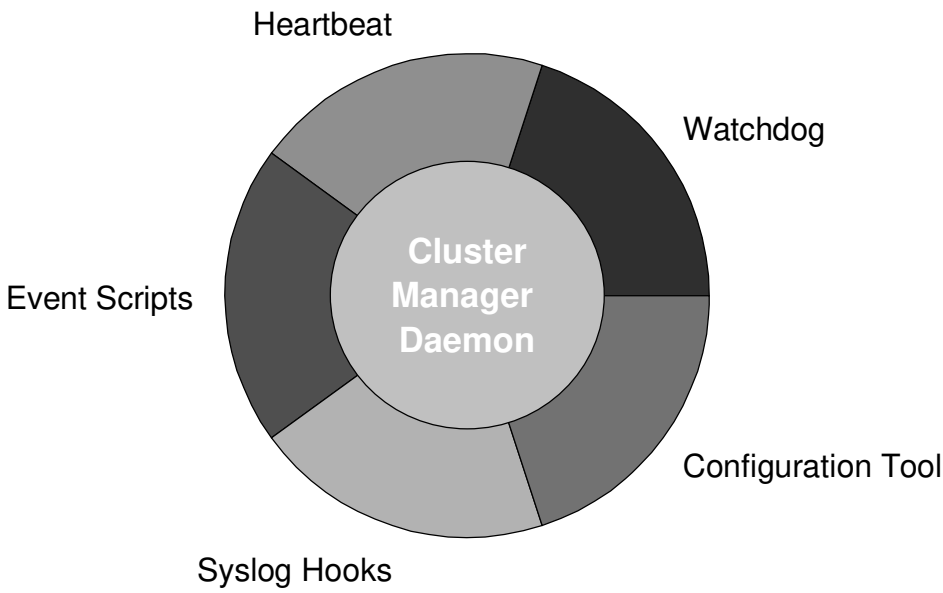
- Specialized hardware is needed
- Everything must be laid out in a redundant manner
- Specialized operational software is needed
- Computer room or building are still SPOFs!

Linux-HA Terminology

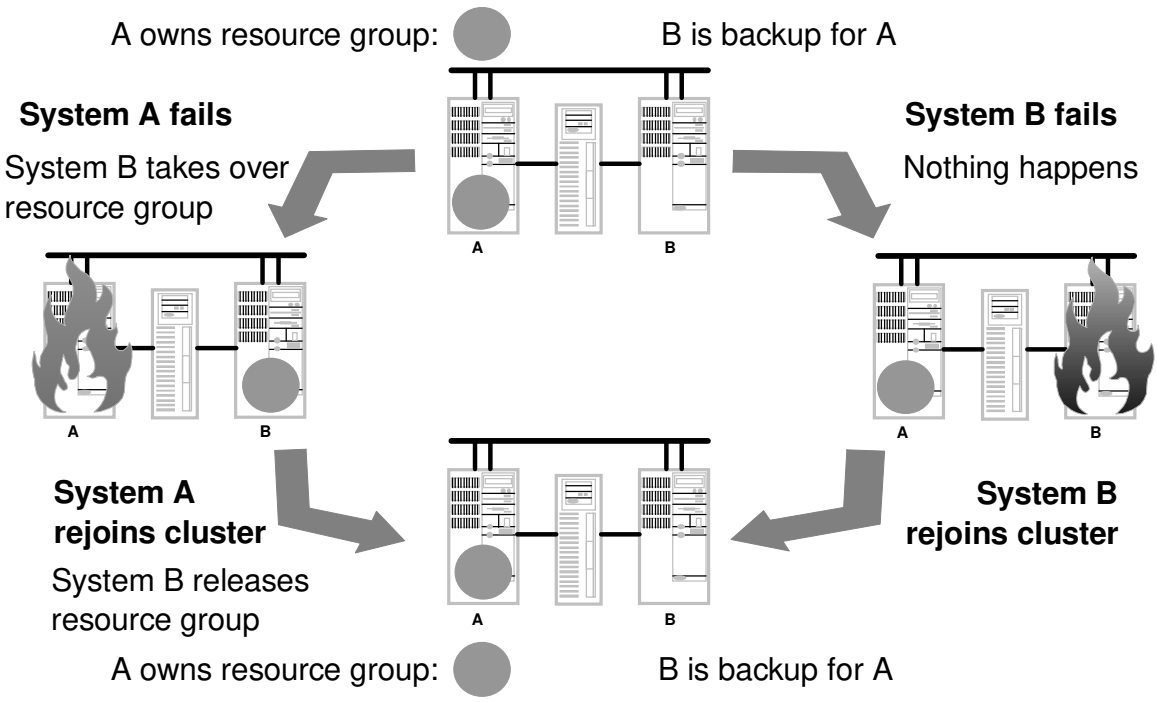


Cluster =
2 - n Cluster Nodes
plus Shared Disks
plus Networks
plus Resource Groups

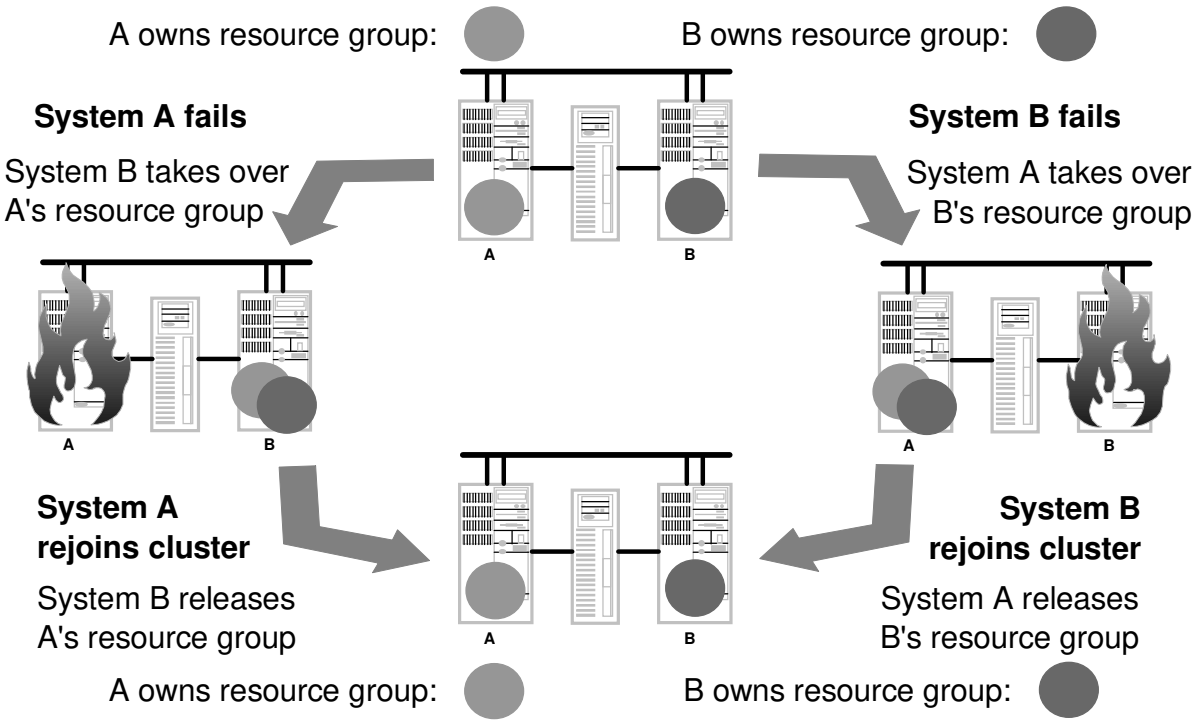
Linux-HA Software Components



Two Popular Configurations (I)
Idle Standby



Two Popular Configurations (II)
Mutual Takeover



What Is Missing From Linux?

- Transaction-oriented (journaled) Filesystem
  - prevent time-consuming filesystem checks during takeover
- Standardized Ethernet and SCSI adapter error messages
  - allow for detecting adapter failures more easily
- Review SCSI mid layer & disk device driver
  - extend device numbering scheme to allow for more than 16 disks in large setups (SSA)
  - implement SCSI speedups (SSA)
  - implement "raw" disk devices

How To Support Linux-HA Development

Basic ideas and concepts are described in the Linux High Availability HOWTO

- http://www.muc.de/~hm/linux/HA/High-Availability-HOWTO.html
- To-Do list is a separate chapter

Join linux-ha mailing list (linux-ha@muc.de)

Donate machines or money to support developers

Advertise Linux-HA

- some kernel development folks need to be convinced
- this foilset is available online