



A Secure Infrastructure for Remote Console and Restart

as a part of the GRID fabric infrastructure

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Area of operation

- Commodity computing (cheap standard PC + Linux)
- Large number of nodes
- Maximum CPU power / \$\$\$





Current technology





Requirements

- Keep **costs low**
- Least possible **hardware restriction** on managed nodes
- **Secure remote access**
(strict authorisation, safe communication and data storage)
- Automatisation - **scriptability**
- **Modularity and good integration**
(with local policies, management tools and fabric infrastructure)



Available technology – Console

● KVM switches

- Digital versions: expensive
- Analogue versions: not scriptable, no remote access

● IPMI (Intelligent Platform Management Interface)

- All-in-one solution (console, BIOS access, restarting and more)
- Tests not satisfactory – technology too new?

● Serial console

- Widespread, common technology
- CC boxes: either cheap OR secure but not both – **PC + multiport cards**
- BIOS access problematic

● VGA emulator PCI cards ('Weasel board')

- All-in-one solution (console, BIOS access, restarting)
- Very expensive



Remote Restart

- Mainboard reset pins + programmable relays
 - need connector on chassis
- Controlled power distributors
 - cutting power may reduce lifetime



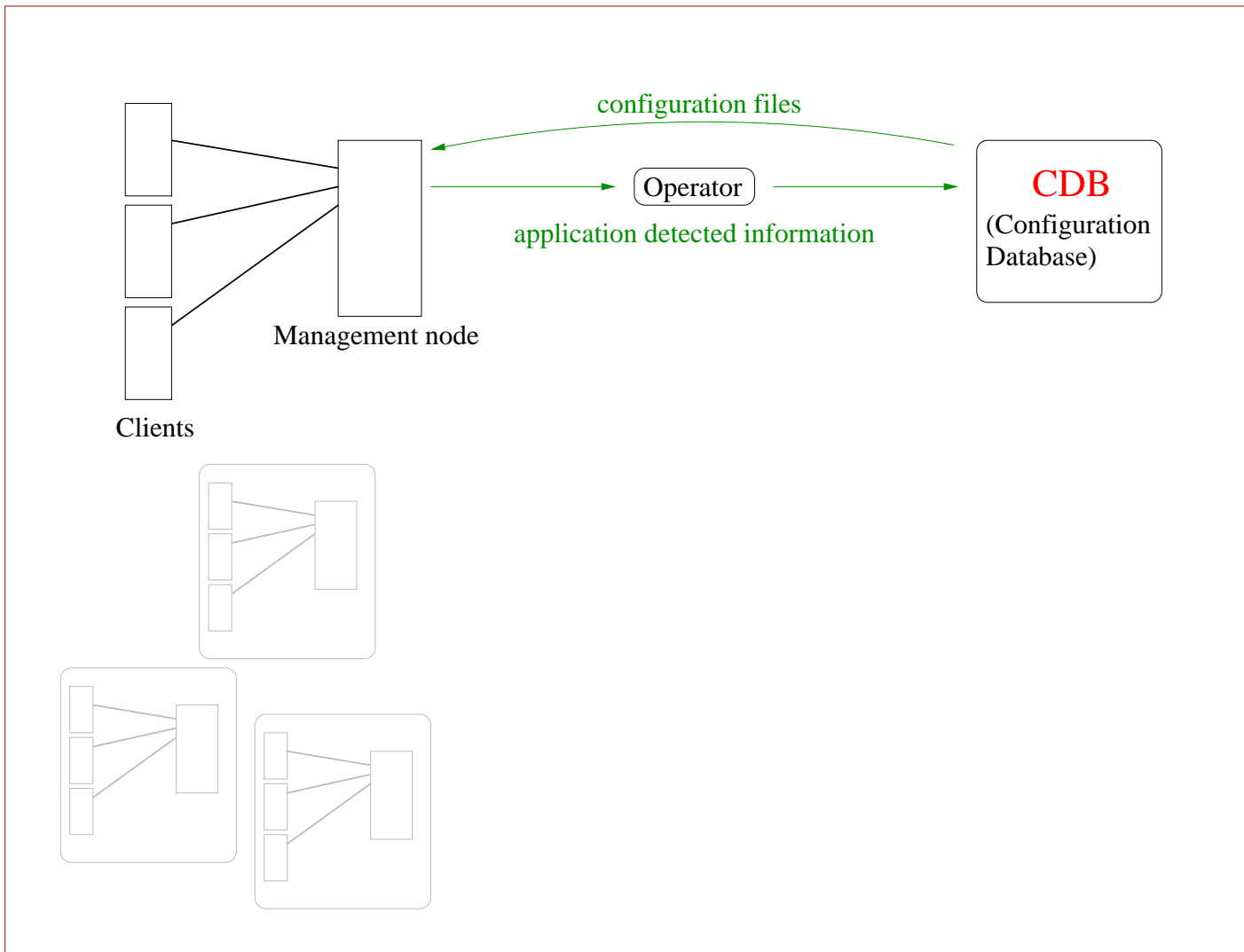


Our solution and status

- Proof-of-concept: 50 machines equipped with
 - **Serial console** (connected to another PC)
 - Remote restart using **reset connectors and relays**
 - **Control software**
- **Large scale deployment** to start in near future
- *Remote restart method still under research*

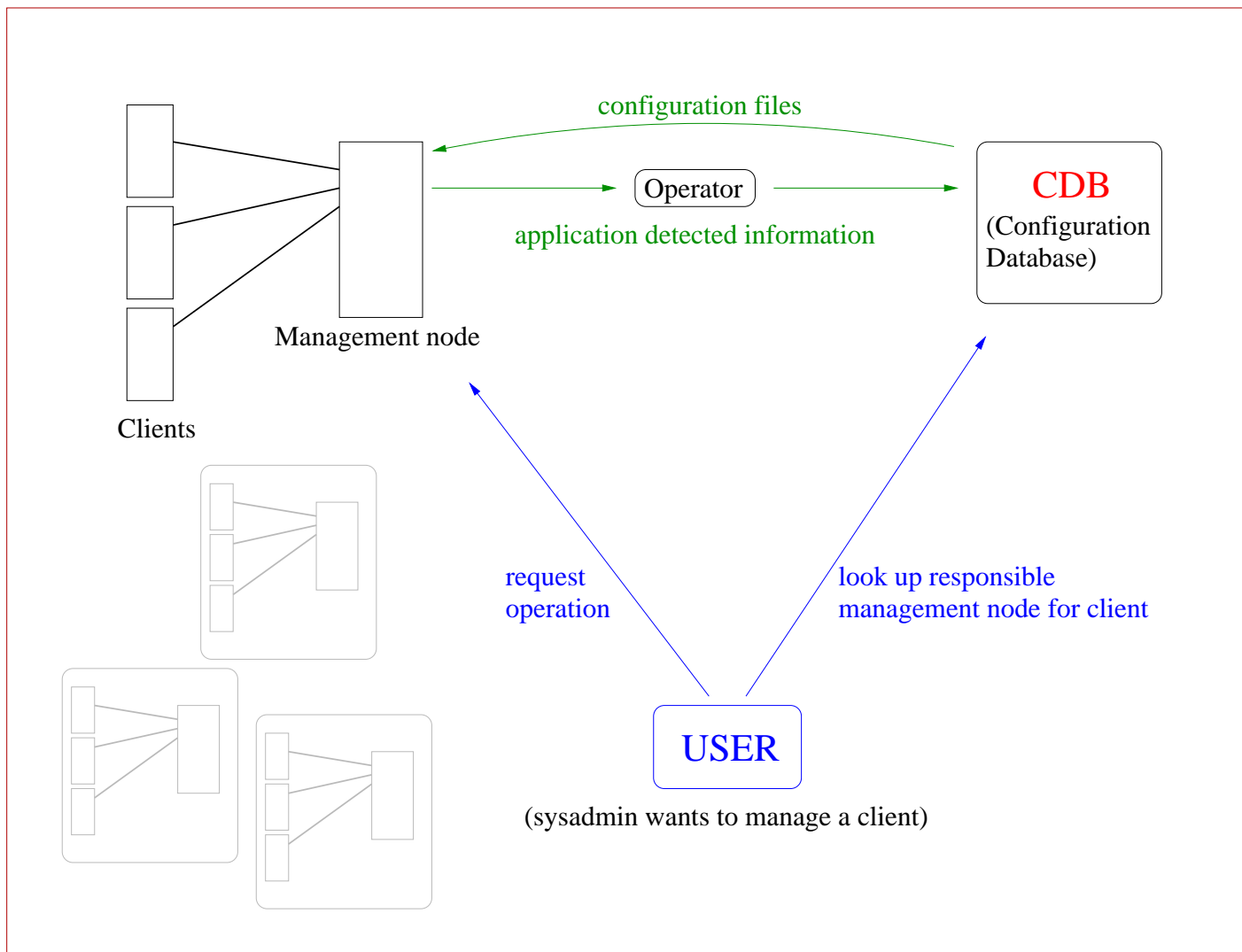


Architecture overview





Architecture overview





Console system features

Our serial console software:

- **Constant** serial console **logging** (via syslog)
- Automatic **console client detection** (on request)
- Full **integration** into local environment, authentication/authorisation systems
- **High security** — controlled access to consoles and restarting
- No read-only 'peeking', one user per console at a time

Possible alternative available from SLAC — needs adaptation



Costs

- Serial console system: **\$24 – \$59/node**
- Remote restart by relays: **\$17/node** (handmade cables)
- Remote restart by power bars: **\$30/node**

For comparison:

- Digital KVM switches: starting from **\$110/node**
- Commercial SSH-enabled console servers: **\$500/node**



Thank you for your attention

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