

# Automating Your Network Management

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# Typical Network Requirements

- DHCP
- PXE
- DNS
- Firewall
- Monitoring / nagios



# Example : dhcpd.conf

```
host finlaggan {  
    hardware ethernet 00:1E:4F:44:B0:B4;  
    fixed-address 129.215.25.92;  
    filename "/pxelinux.0";  
    option root-path "129.215.33.10:/export/linux/installroot/sl5";  
    option host-name "finlaggan";  
}
```



# DRY

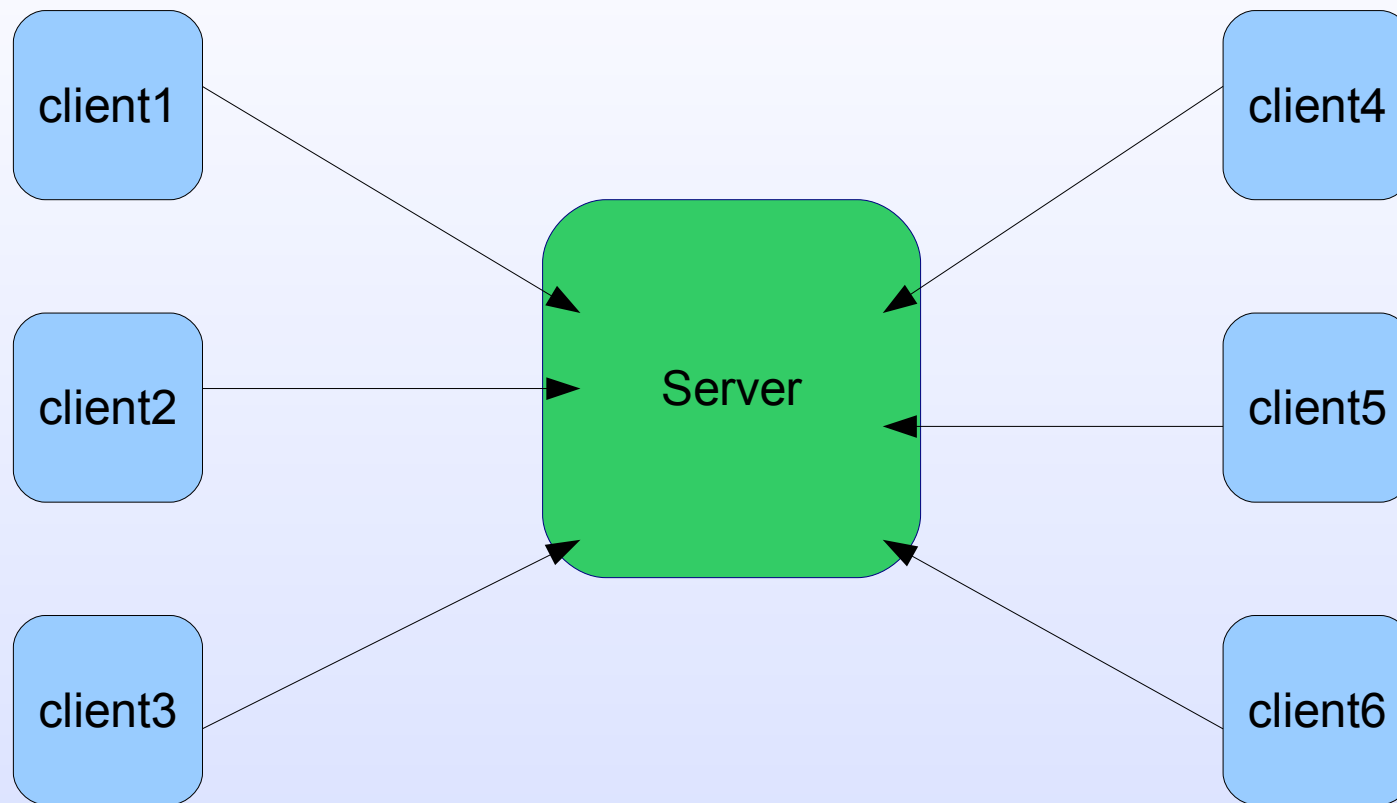
(**D**on't **R**epeat **Y**ourself)



# LCFG Spanning Maps

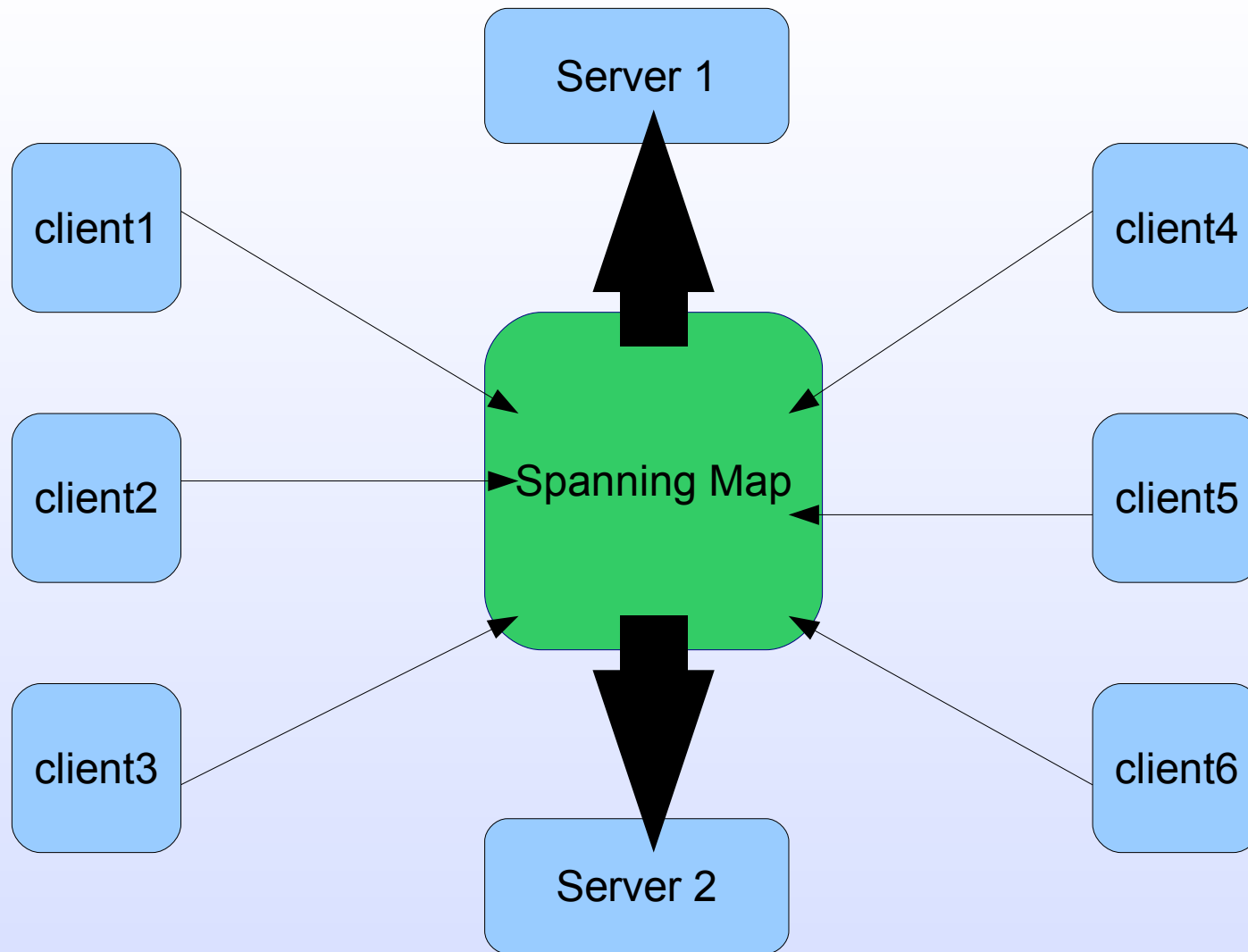
- Publish/Subscribe architecture
  - Each client publishes information
  - Each server subscribes to the information
- Possible to have multiple maps for a service





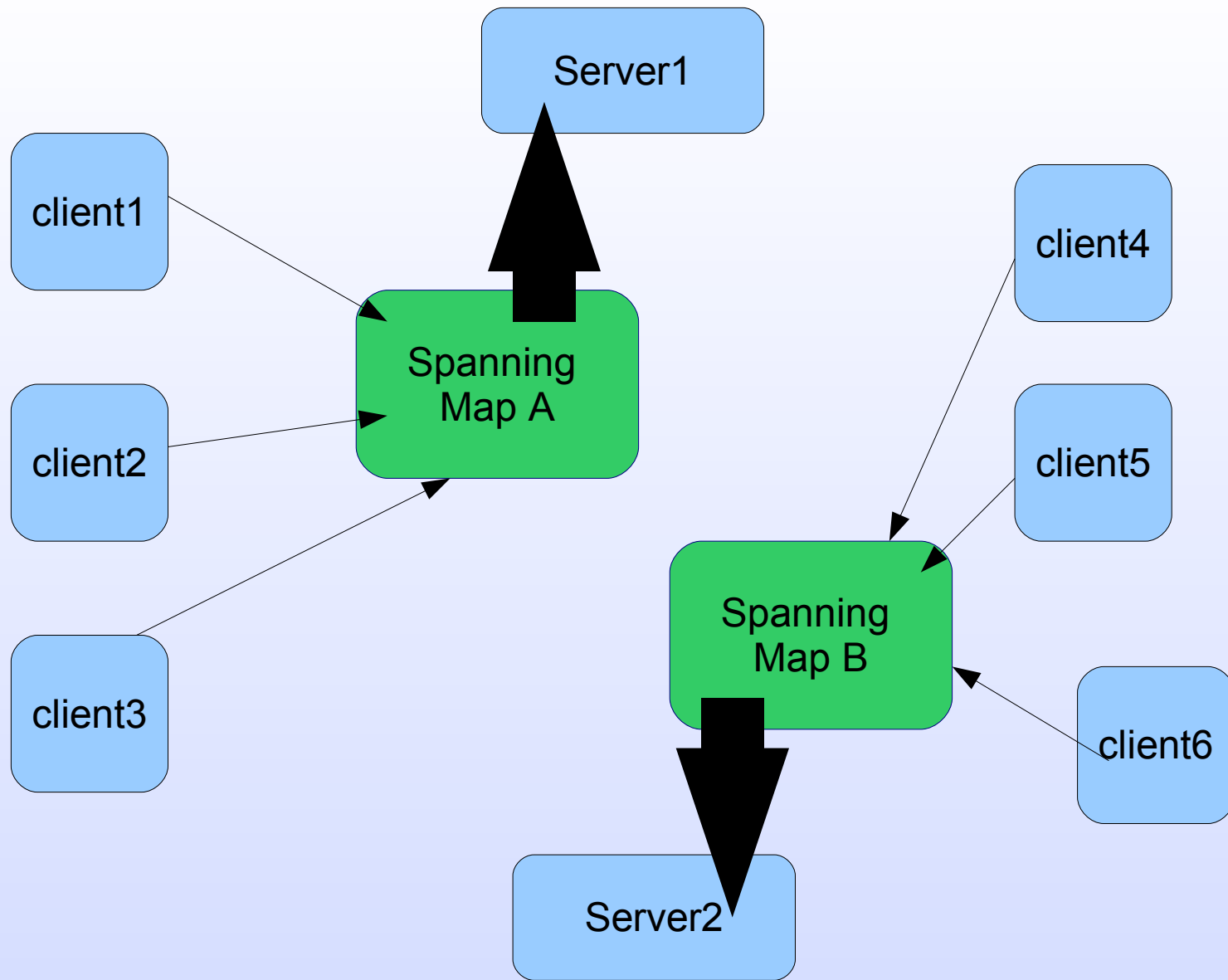
Arrows indicate the flow of information





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# Example : PXE

- 1) Available boot options must be appropriate for the host.
- 2) Need to password protect options for some hosts.
- 3) Some hosts need serial console support, ports vary per-host.
  - Need per-host configuration files.



# Example : PXE

- Config file name is based on either:
  - MAC address (e.g. 00-1e-4f-44-b0-b4)
  - IP address in hex (e.g. C000025B)
  - Part of IP address (removes one hex digit with each attempt)
  - File named 'default'



# PXE Server Schema Example

```
@entries hostname_$ idtag_$ platforms_$ \  
  serial_port_$ serial_rate_$ \  
  timeout_$ prompt_$ allowoptions_$ \  
  default_label_$ console_$ noescape_$  
entries
```



# PXE Server – Basic Usage

```
#include <ed/options/pxeserver.h>

!pxeserver.entries           mADD(inf)
!pxeserver.idtag_inf         mSET(129.215)
!pxeserver.platforms_inf     mSET(fc6 sl5 sl5_64)
!pxeserver.serial_port_inf   mSET(ttyS0)
!pxeserver.serial_rate_inf   mSET(9660)
```



# PXE Server Schema Example

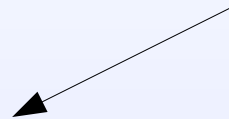
```
@entries hostname_$ idtag_$ platforms_$ \  
  serial_port_$ serial_rate_$ \  
  timeout_$ prompt_$ allowoptions_$ \  
  default_label_$ console_$ noescape_$  
entries
```

```
@pxemap %subscribe: entries  
pxemap pxe/all
```



# PXE Client Schema Example

Alias for resource name



```
@pxemap %publish: hostname idtag=mac platforms \  
serial_port serial_rate \  
timeout prompt allowoptions \  
default_label console noescape  
  
pxemap pxe/all
```



# PXE Client Usage

```
#include <lcfg/options/pxeclient.h>
```



# PXE Client Defaults

```
pxeclient.hostname    <%sysinfo.node%>.<%sysinfo.domain%>  
pxeclient.mac        <%dhclient.mac%>  
pxeclient.platforms  <%sysinfo.os_id%>
```





# Important Considerations

- Be aware of your data dependencies
  - Information not in the spanning map might change without your knowledge
- Removal from a map may not be instantaneous
  - Due to a design flaw & not easy to fix
- Client & Server schemas are coupled
  - must change together



# Conclusions

- Removes duplication of data.
- Reduces chances of error.
- Allows delegation of sections of configuration.



# Further Reading

- <http://www.lcfg.org/lcfgbook.html>
- <http://www.lcfg.org/doc/guide.pdf>
- lcfg-dhclient / lcfg-dhcpd
- lcfg-pxeclient / lcfg-pxeserver

