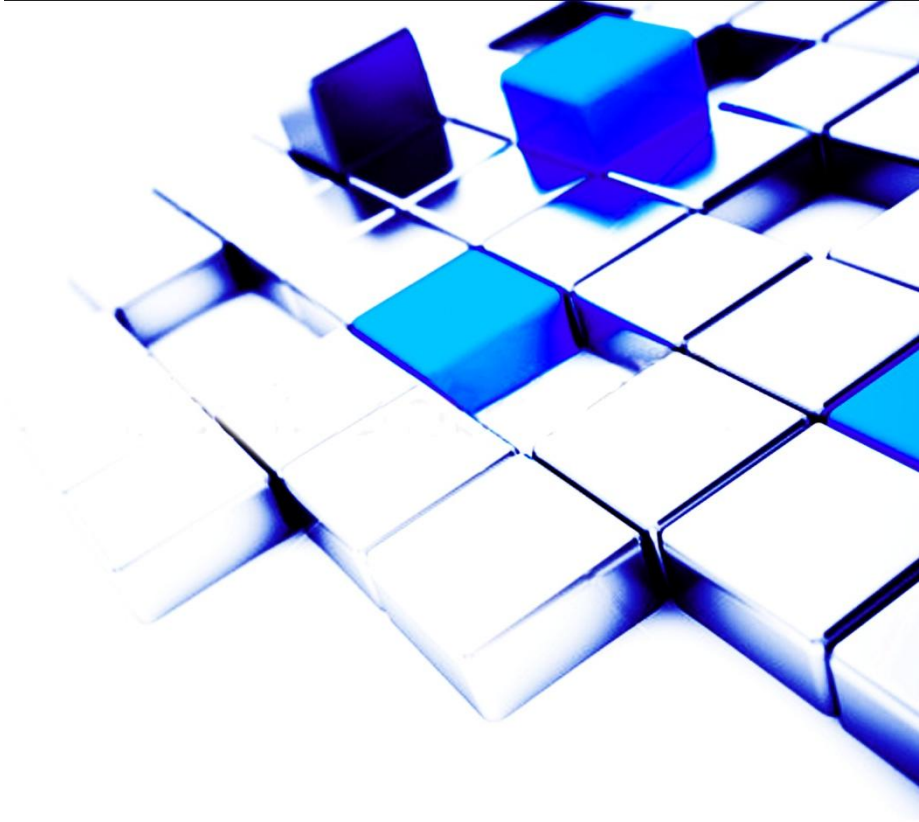
DNS architectures



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Agenda

- Introduction
- DNS Architecture Master-Slave
- DNS Architecture Multi-Masters
- DNS Architecture Stealth
- State-of-the-art Stealth DNS SMART Architecture

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Why different DNS architectures?

- Originally, DNS protocol was based on a Master-Slave architecture
- Network infrastructures are more and more complex
- There is an increase need of protection mechanisms against external attacks
- In some cases, the standard architecture is not enough

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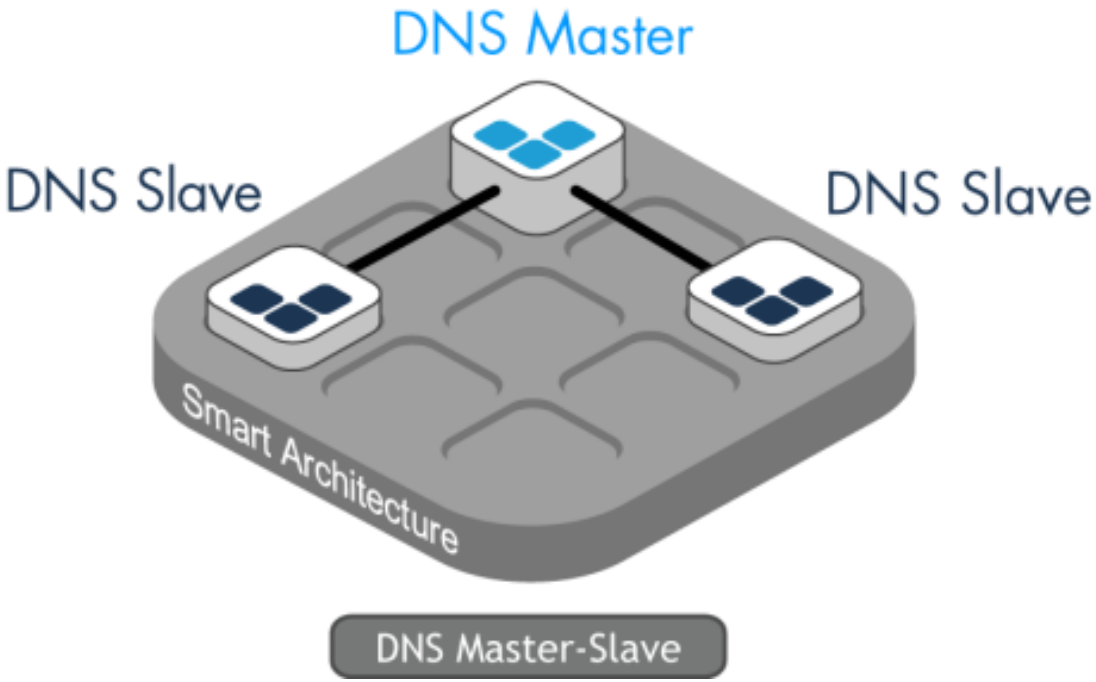
DNS Master-Slave architecture



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Master-Slave Principles

- The DNS Master-Slave architecture relies on the DNS transaction type called zone transfer Full (AXFR RFC 1035) or incremental (IXFR RFC 1995)
- One server is authoritative for a zone. It is the value defined in the SOA RR MNAME field
- All zones list the name servers that are members of the architecture as NS
- The DNS master is authorized to notify slave zones and answer to AXFR or IXFR DNS transactions

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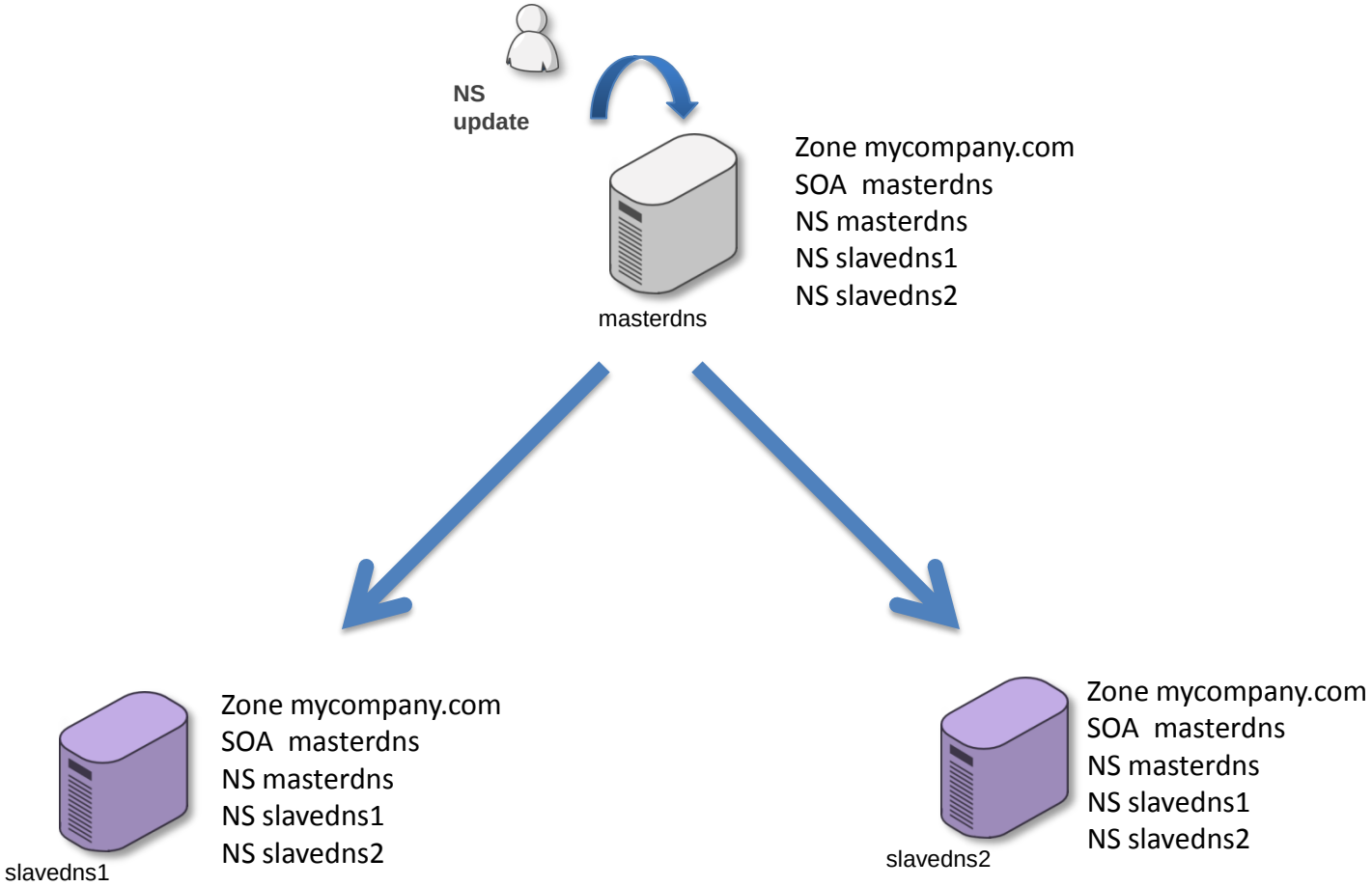
Master-Slave Principles



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Master-Slave pros

- Only one server has to be updated
- The DNS protocol itself is used to update slave zones

➔ No additional script needed

- Easier to configure and maintain

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Master-Slave cons

- **Administrators will not be able to locally update the DNS servers, when the master is down**
- **In the case of a public DNS, the identity of the DNS master is known**

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Master-Slave usage

- **This is the first DNS architecture created and the most deployed**
- **This is a standard DNS architecture**

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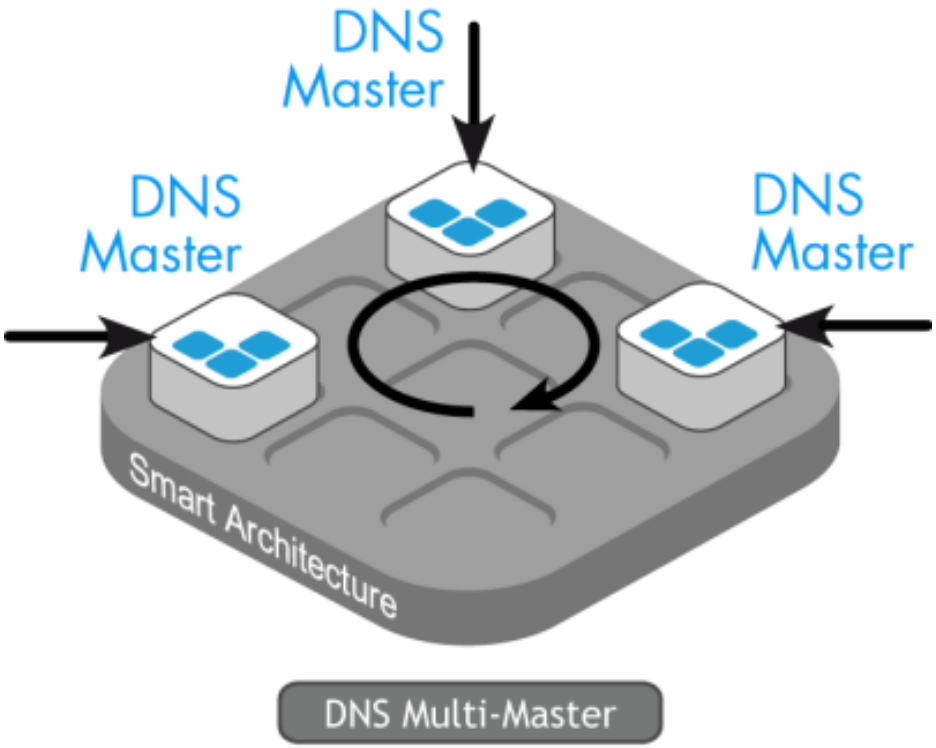
DNS Multi-Masters architecture



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Multi-Masters Principles

- **The DNS Multi-masters architecture relies on the SOA RR MNAME field (RFC 1035).**
- **Each DNS server will list itself as MNAME.**
- **All zones list the name servers that are members of the architecture as NS.**

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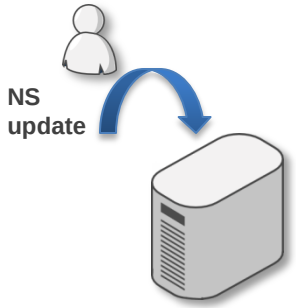
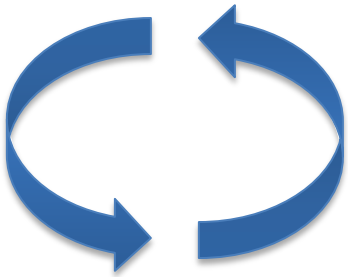
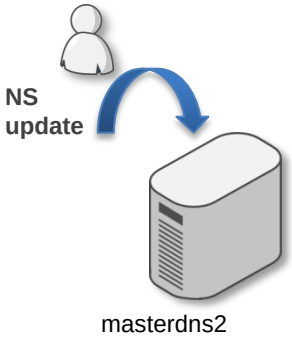
Multi-Masters Principles

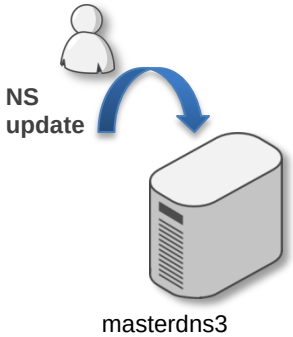


Zone mycompany.com
SOA **masterdns1**
NS masterdns1
NS masterdns2
NS masterdns3





Zone mycompany.com
SOA **masterdns2**
NS masterdns1
NS masterdns2
NS masterdns3



Zone mycompany.com
SOA **masterdns3**
NS masterdns1
NS masterdns2
NS masterdns3

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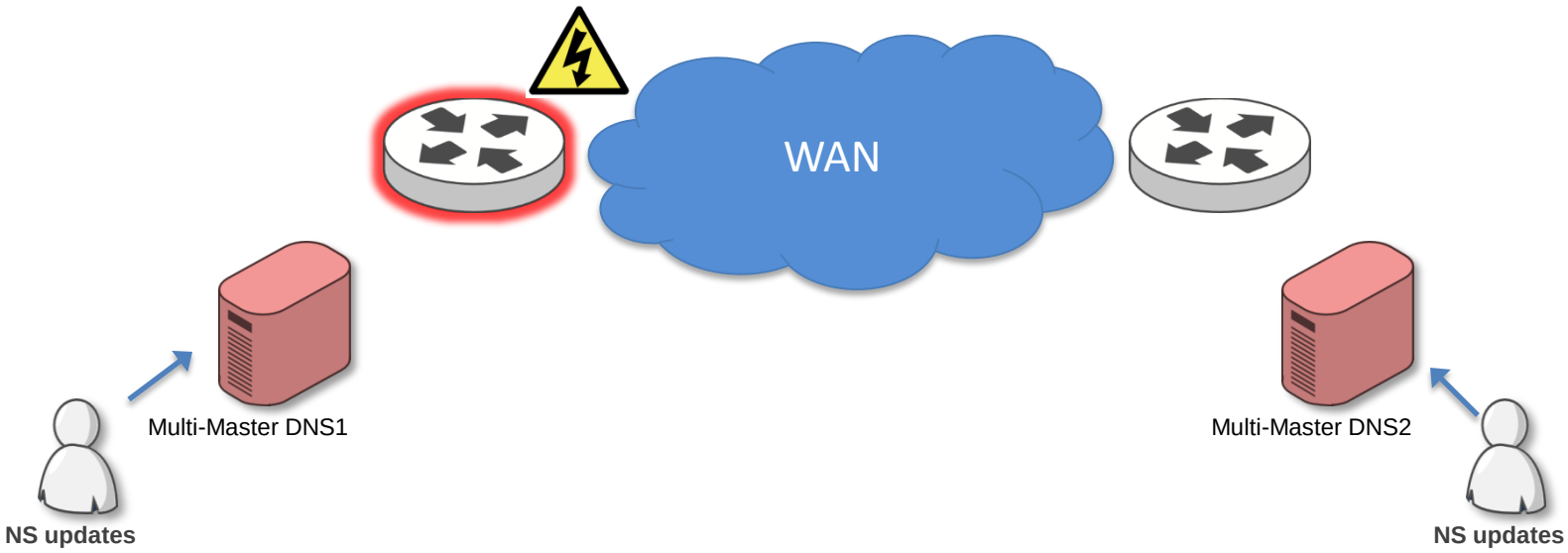
Multi-Masters pros

- **NS updates can be locally done on the servers, ensuring an up-to-date DNS even when the WAN/MPLS link is down.**



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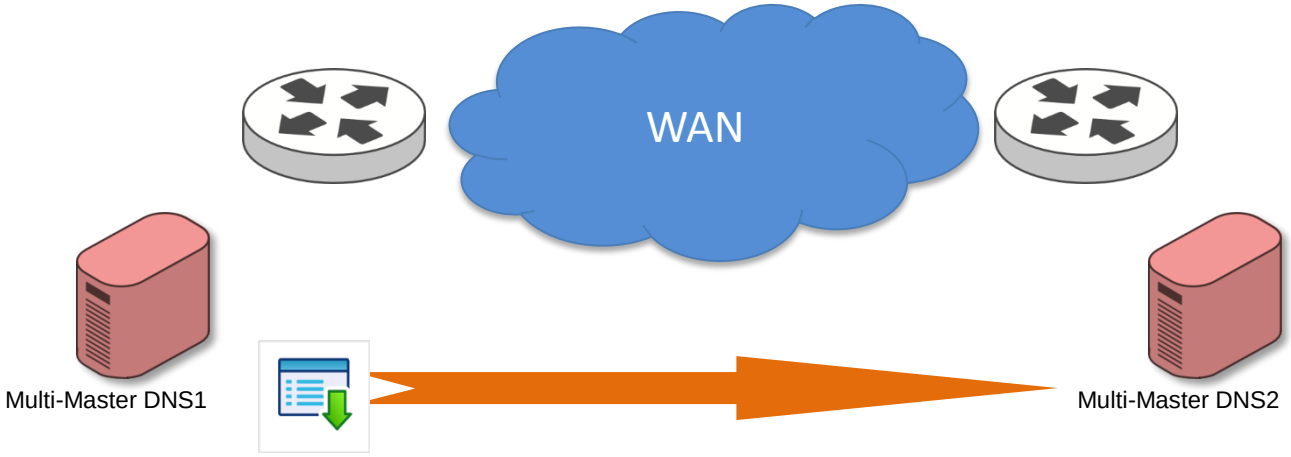
Multi-Masters cons

- **Complexity: a dedicated tool or a set of maintained scripts is necessary to replicate in real time all modifications on all servers**

- **Increase of the communication latency**



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Multi-Masters usage

- **The Multi-Masters architecture is mainly used on Microsoft Active Directory infrastructures.**
- **Any domain controller can send or receive updates of information stored in Active Directory.**

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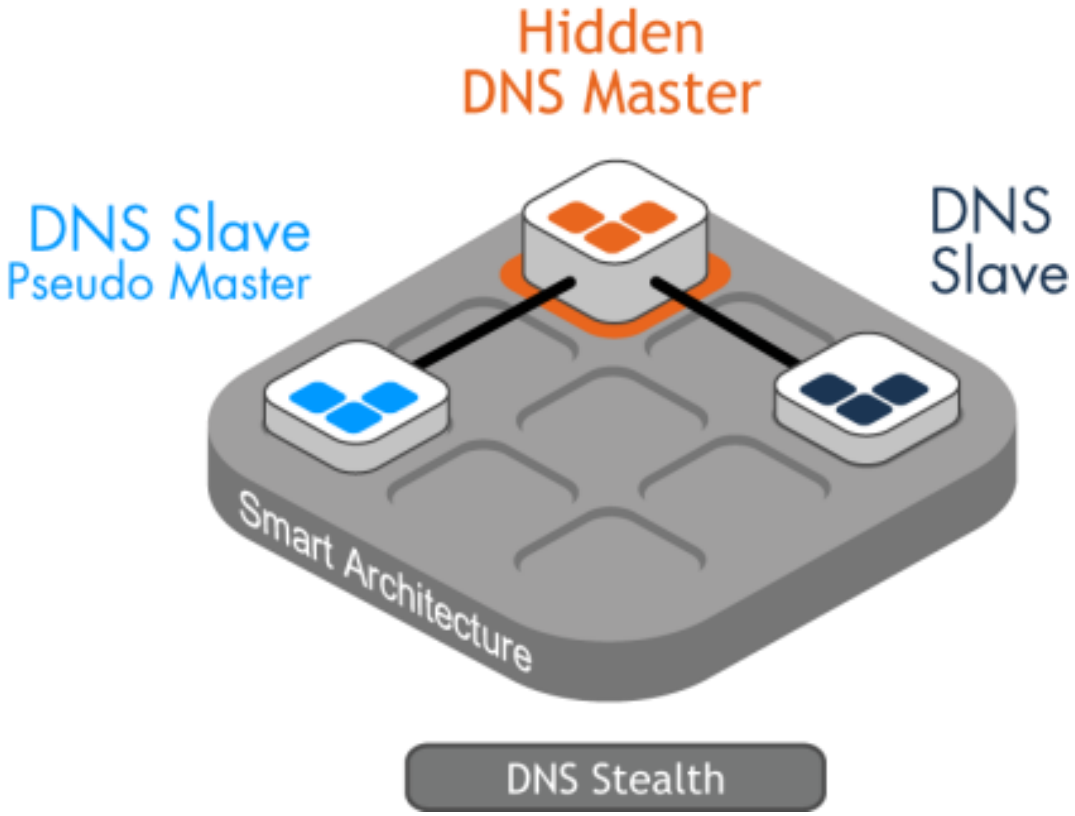
DNS Stealth architecture



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Stealth Principles

- The DNS Stealth architecture is a Master-Slave architecture where the DNS Master is hidden from DNS clients.
- One Slave server is chosen to be the Pseudo Master. This pseudo master will be the NS configure as MNAME of the SOA.
- All zones list the SLAVE and Pseudo Master name servers that are members of the architecture as NS. **BUT NOT THE HIDDEN MASTER**
- The DNS master is authorized to notify slave zone and answer to AXFR or IXFR DNS transactions from slaves members of the Stealth architecture.

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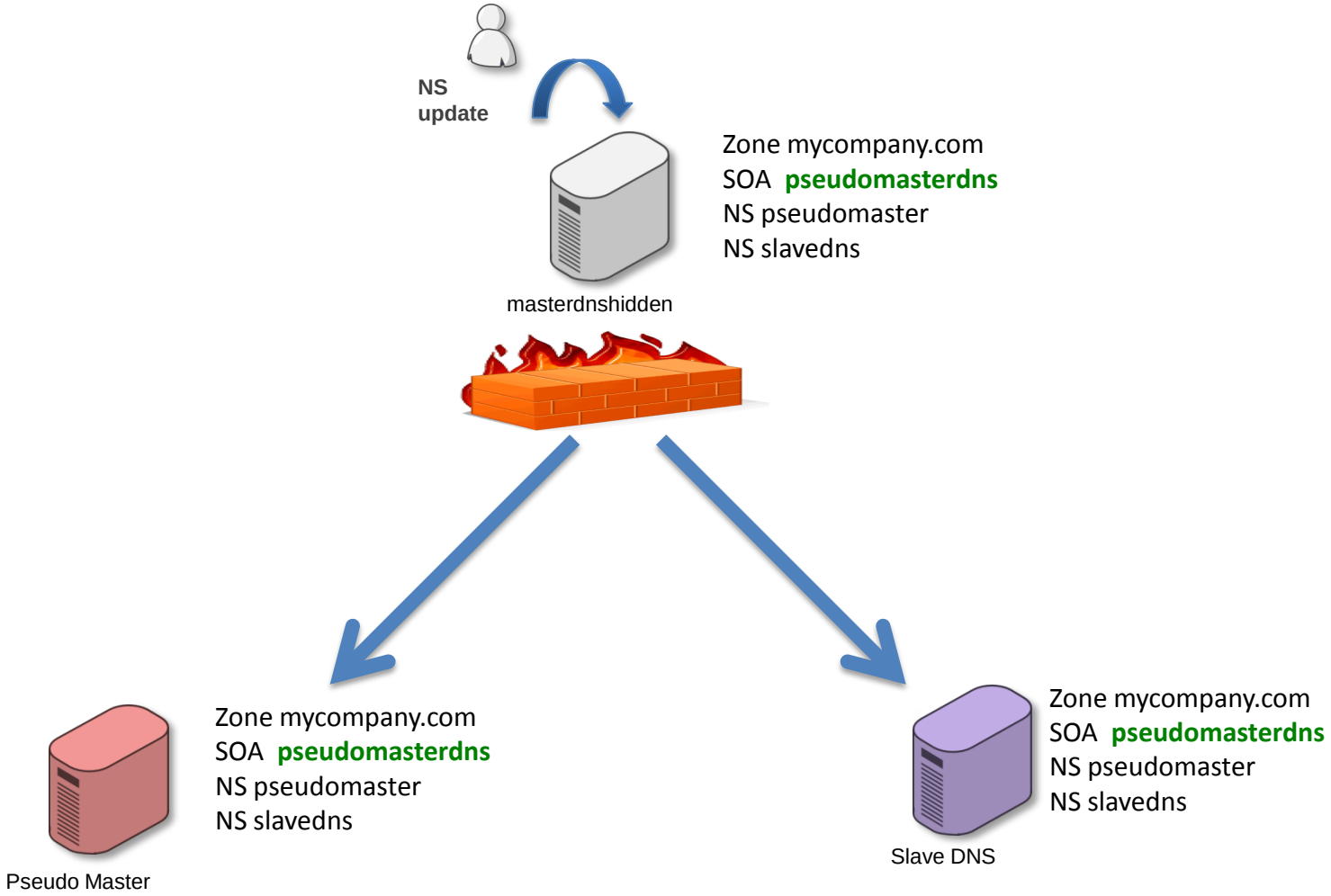
Stealth Principles



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Stealth pros

- Only one server has to be updated
- The DNS protocol itself is used to update slave zones
- The identity of the DNS master Hidden is only known by the administrator
- It is not mandatory to have a public IP as DNS Master Hidden

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Stealth cons

- **Administrators will not be able to locally update the DNS servers when the master is down**
- **The DNS hidden is not supposed to resolve DNS client queries**
- **This architecture is complex and a dedicated tool is necessary to deploy it properly**

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Stealth usage

- **The Stealth architecture is mainly used on Public DNS architectures**
- **It is a relevant architecture when data is critical and needs specific protection mechanisms.**

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The SmartArchitecture

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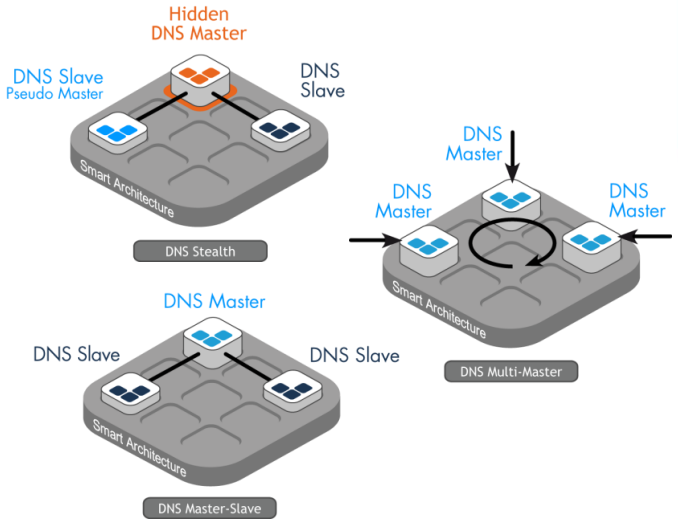
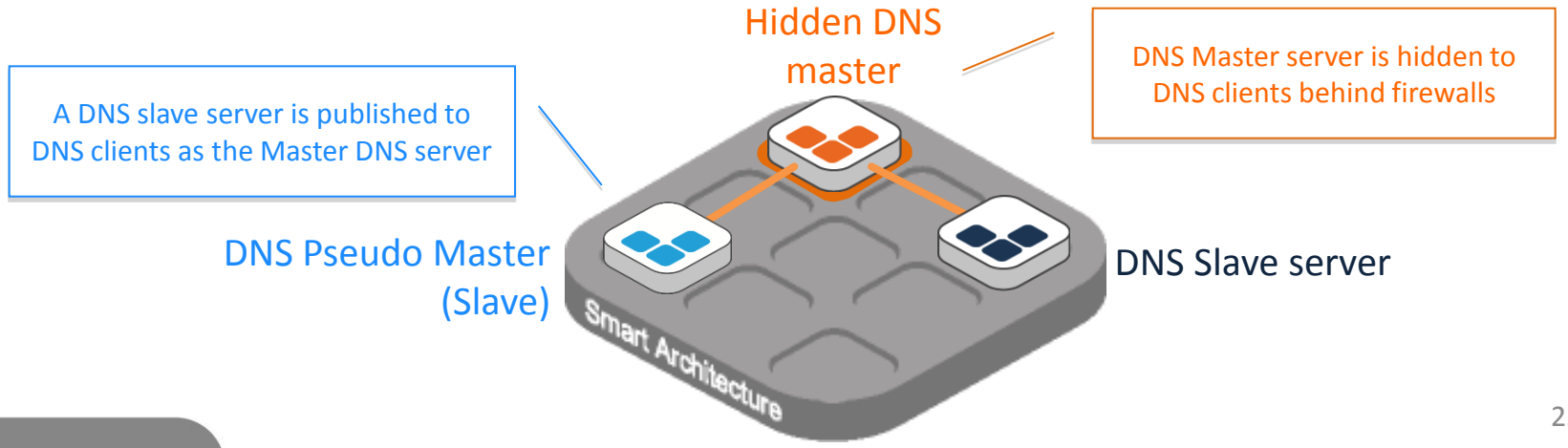
Ease of Deployment

- **Automate DNS architecture deployment**
  - Library of SmartArchitecture DNS templates
  - Automated configuration of all DNS servers according to selected SmartArchitecture
  - Best practices enforcement



- **DNS Stealth: State of the Art Internet DNS architecture**
  - Most secure Internet DNS architecture



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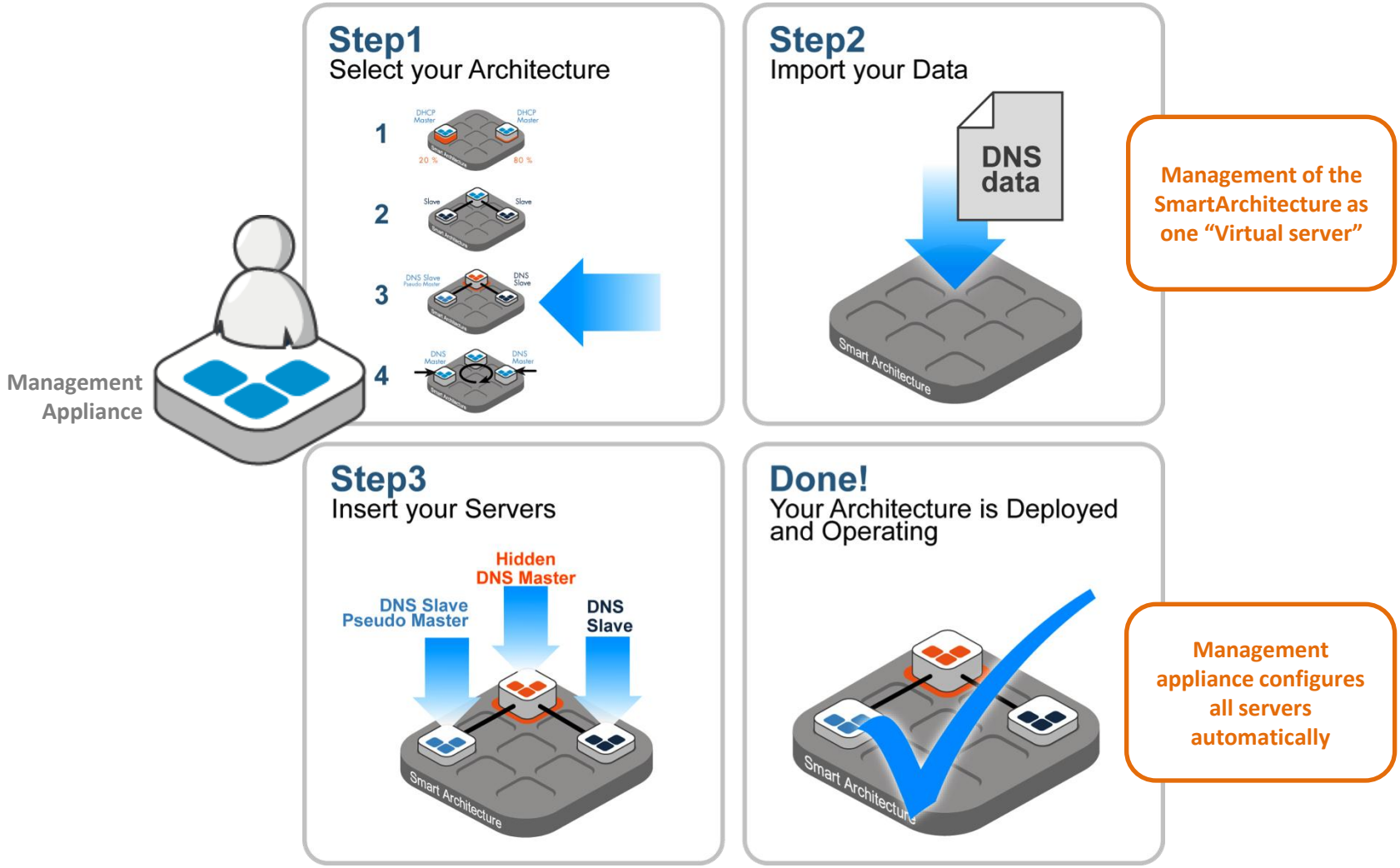
SmartArchitectures: Automated Architecture Deployment



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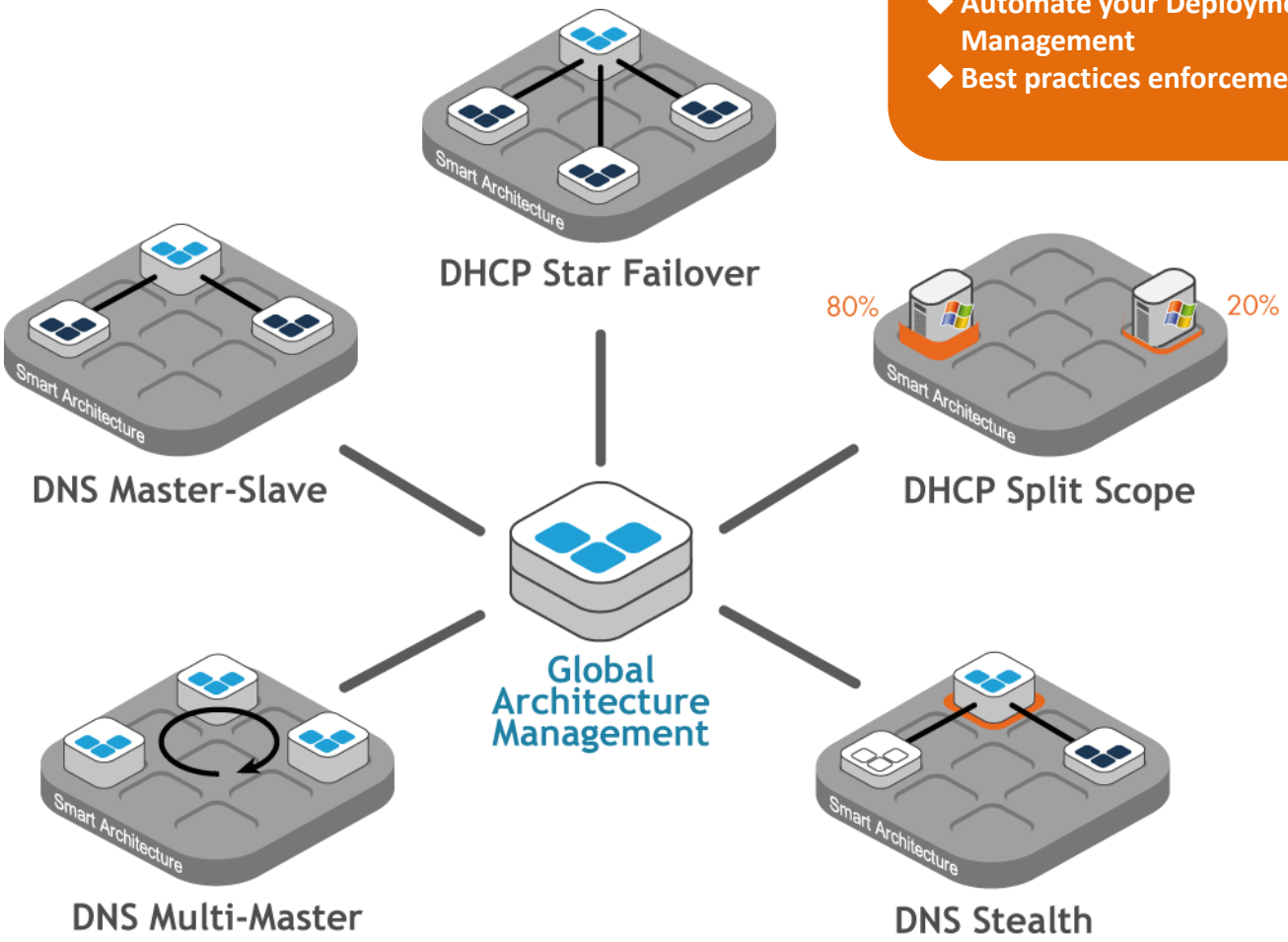
SmartArchitecture: Move to Architecture Management !

- Reduce Complexity : Manage Architectures rather than servers
- Automate your Deployment and Management
- Best practices enforcement



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