BACKSTABBED

abusing disaster recovery systems

hd moore – first2005

Who

- **Who am I?**
  - Researcher at Digital Defense
    - Managed risk assessments
    - Security code reviews
  - Founder of the Metasploit Project
    - Created the Metasploit Framework
    - Project manager and exploit developer

- **What is this about?**
  - Network backup architectures
  - Backup agent discovery services
  - Backup agent vulnerabilties
  - Remotely exploitable flaws (0day)

Why

- **Why does this matter?**
  - Every company need backups
  - Backup software is in a bad state
    - Requires administrative privileges
    - Requires architecture changes
    - Software quality is terrible
  - Attackers are exploiting this **now**

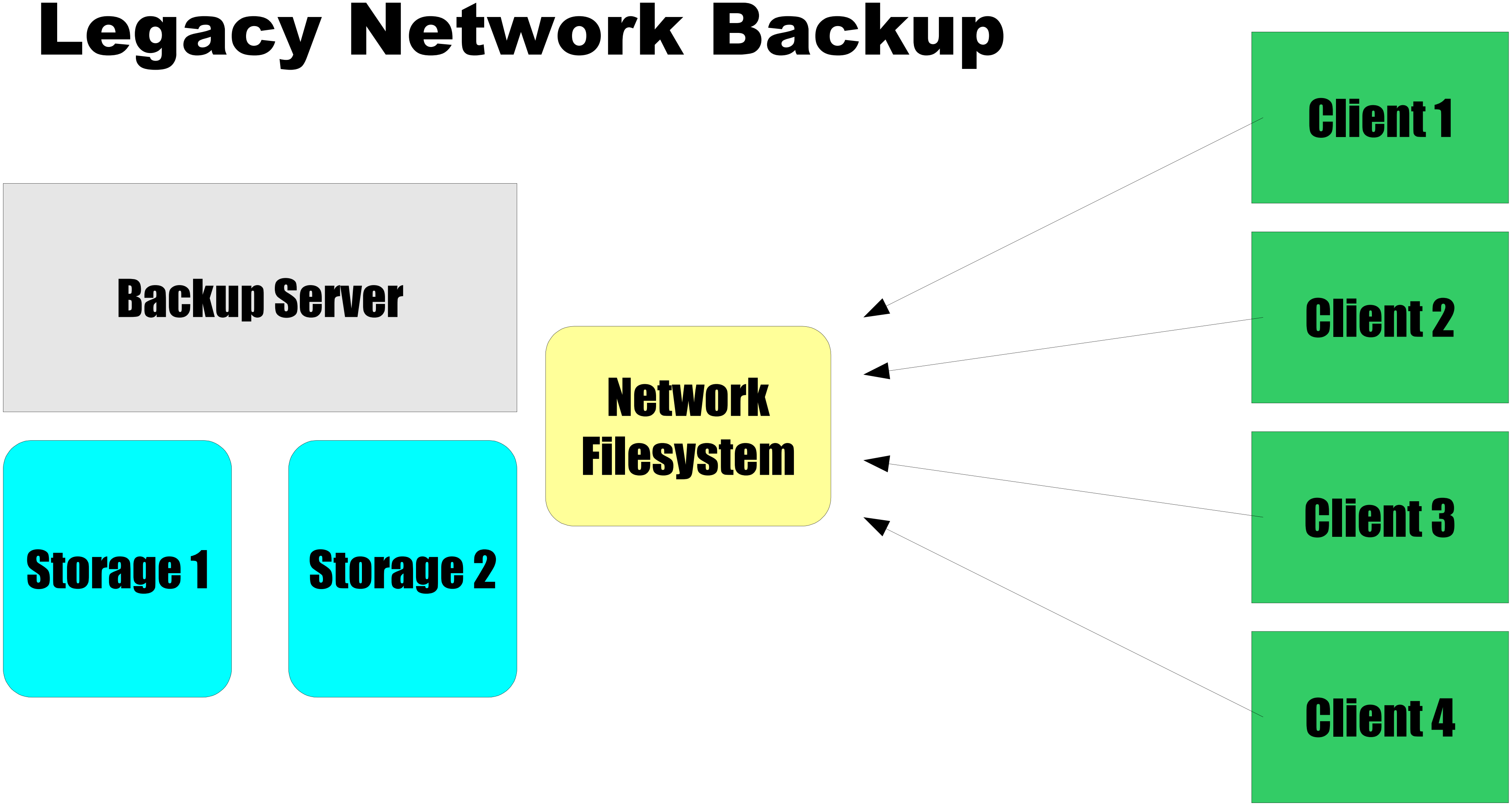
Network Architecure

Architecture

- **Topologies are changing**
  - Storage requirements increase
  - Bandwidth limits affect backups
  - Network topology is updated...
    - Efficient is not always secure
    - Can invalidate internal firewalls

Architecture

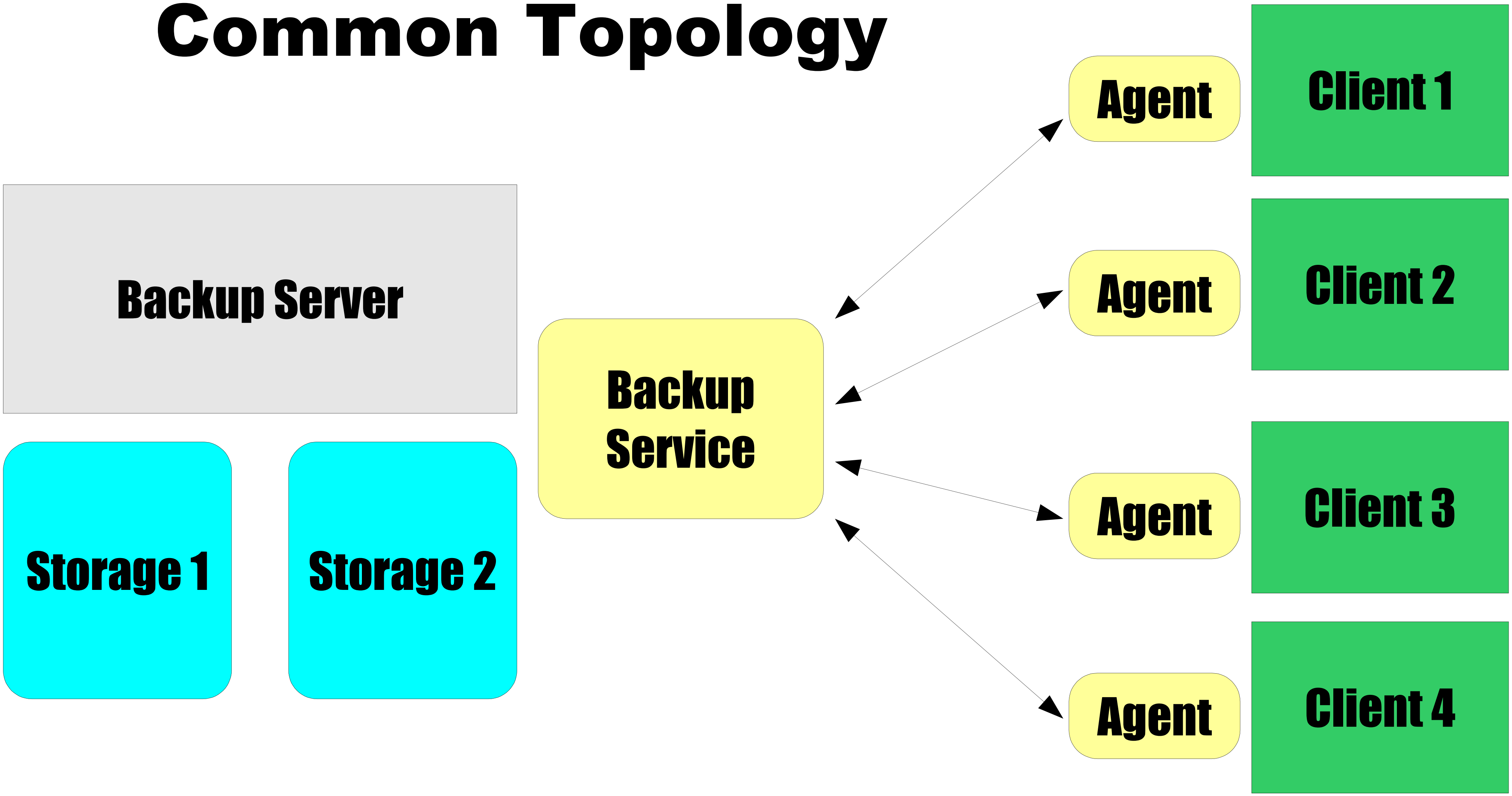
Legacy Network Backup



Client systems copy data to a central network file system

Architecture

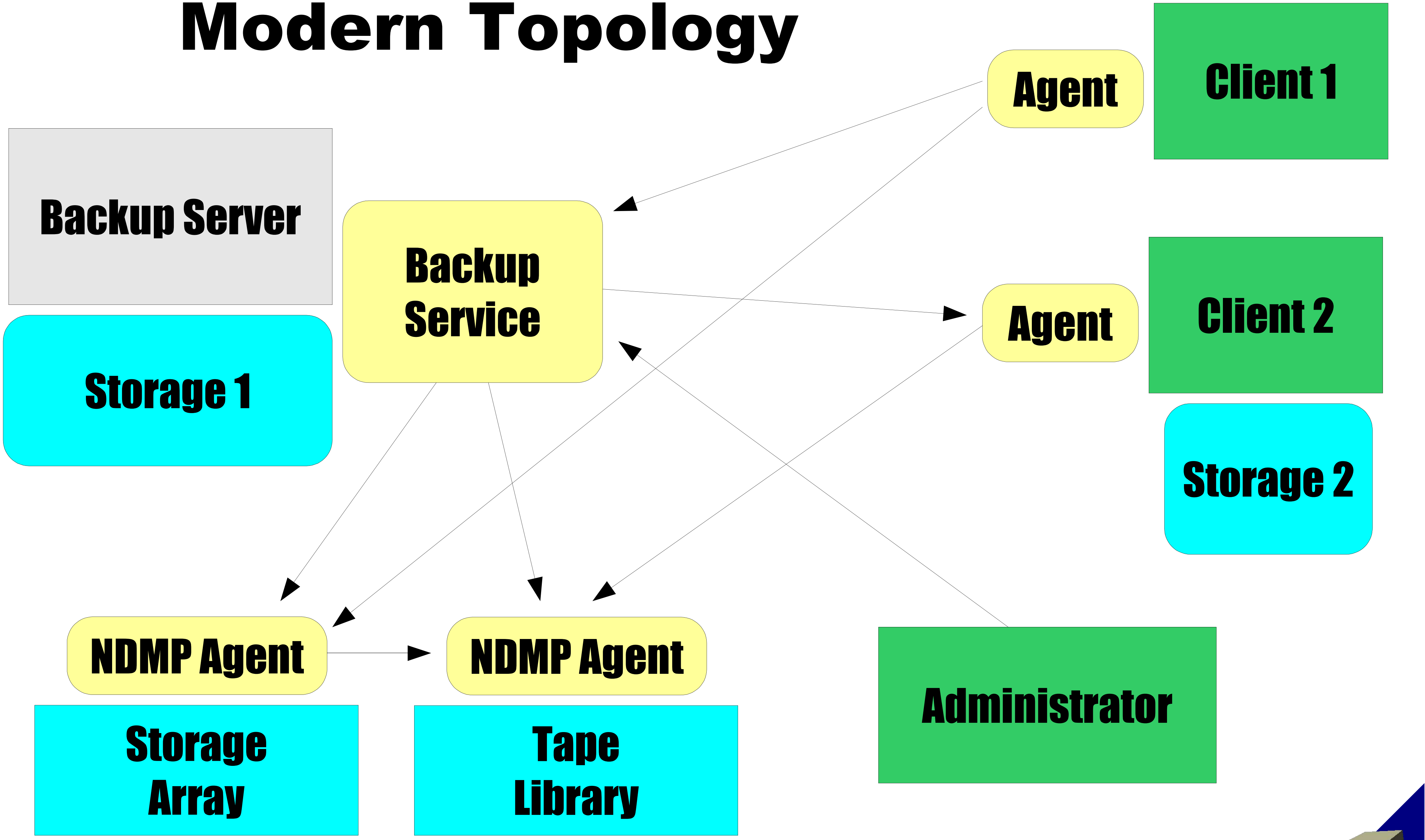
Common Topology



Client backup agents communicate with the backup server

Architecture

Modern Topology



Admin connects to backup server, everything else cross-connects

Architecture

- **Distributed backup systems**
  - Storage distributed across network
  - Clients talk to storage devices
  - Traffic between agents is common
  - Each vendor has their own protocol
  - Many are firewall “compatible”...

Architecture

- **Network Data Management**
  - NDMP is an interoperability std.
  - Great firmware/hardware support
  - Software support via plugins
  - Extensive remote command set:

NDMP_CONFIG_GET_HOST_INFO, NDMP_TAPE_READ, NDMP_CONNECT_OPEN, NDMP_LOG_FILE, NDMP_MOVER_CONNECT, NDMP_TAPE_OPEN, NDMP_SCSI_OPEN, NDMP_GET_FS_INFO, ...

Architecture

- **Access control is a nightmare**
  - Connections between agents
  - Connections between devices
- **Vendors claim app-side security**
  - Software supports common auth.
  - Devices can auth against servers

Discovery Services

Discovery

- **Discovery services**
  - Each vendor has their own proto.
  - Easily find backup clients/servers
  - Integrated into GUI admin tools
  - Used to perform status checks
  - Often expose system information

Discovery

- **Discovery protocols**
  - UDP broadcast is most common
  - DNS and NetBIOS used as well
  - Some products scan the network
  - SNMP also for discovery

Discovery

- **Anything the software can do...**
  - Find servers, agents, and devices
  - Obtain system and version info
  - Automated exploitation is easy...
    - Definitely a potential for worms
    - Automated “bots” more likely

Discovery

- **Veritas BackupExec**
  - Exposes vendor and version
- **CA BrightStor ARCserve**
  - Leaks operating system and version
- **Knox/Arkeia Network Backup**
  - Leaks system information and version

Backup Agents

Backup Agents

- **We all know defaults are bad...**
  - Default agent settings are terrible
  - Security docs are hard to find
  - Installation docs rarely mention it
  - Agent install is often automated
  - Awareness is simply not there!

Backup Agents

- **Configuring a new client agent**
  - The admin installs a client agent
  - The agent and server need to talk
  - Who authenticates to who?
  - Each vendor does this different
  - One-way auth is a huge problem

Backup Agents

- **Veritas (Symantec) BackupExec**
  - Agent makes server authenticate
  - If the agent address is hijacked...
  - Unix agents are password-only
  - Unix agent registration spoofable
  - Authentication replay is possible

Backup Agents

- **CA BrightStor ARCserve**
  - Agent makes server authenticate
  - Similar problems to BackupExec
  - Backdoor user in the Unix agent
  - Various heap overflows...

Backup Agents

- **Knox Arkeia Network Backup**
  - Wide open to the world by default
  - Read and write any resource
  - Browse file system, registry, etc
  - View detailed system information
  - No authentication, only IP ACL's

Remote Exploits

Exploits

- **Exploits affect every vendor**
  - Public code for BackupExec, BrightStor, ARCserve, NetVault
  - Many of these are simple bugs
  - Immature industry security-wise
  - ..they sell as security products!

Exploits

- **No automatic updates...**
  - Patching can be really painful
    - 7 recent BE patches need reboot
  - Patches not included in releases
    - CA finally made “service pack 1”
  - Evals often way behind patches
    - “Upgrading” eval doesn't patch...

Exploits

- **Backup software at risk now**
  - About 7 new flaws in BackupExec
    - At least 5 serious unpublished bugs
  - NetVault has yet to patch anything
  - CA BrightStor still massively vuln...
    - At least 3 serious unpublished bugs
  - Arkeia has history of 0day...

Exploits

- **Information on Veritas flaws**
  - Remote overflow in win32 agent
  - Remote registry access
  - Many DoS vulnerabilties
  - Auth bypass in win32 agent
  - DoS flaws in Unix agent

Exploits

- **CA BrightStor/ARCserve users**
  - Many remotely exploitable flaws
  - Most of these still unpublished!
  - Firewalling is not really possible
  - Other CA services even worse:
    - The “CA Licensing” fiasco...
  - Remote “caroot” password retrieval

Exploits

- **BakBone NetVault users**
  - Run away as fast as you can
  - Over 3 remote 0days and counting...
- **Arkeia/Knox users**
  - Ask Arkeia to add authentication
  - Handful of DoS vulnerabilities

Questions?

Contact

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Code

http://metasploit.com/