Wholesome Practices for Securing a FOSS VistA Stack

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Acknowledgements

- Developed in collaboration with

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Objective

- Convert “unknown unknowns” into “known unknowns”

What is security?

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- Simplistic view
  - Ensuring that the wrong people don't have access
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  - Knowing who has had access and what they have done

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  - Machinery to implement your simplistic view

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- Complex view
  - Machinery to implement your simplistic view
- Ultimate view
  - Knowing how well your simplistic view represents reality

In our imperfect universe

- Absolute security does not exist
- Practical security is a matter of trade-offs between
  - The value of what is being protected
  - The potential cost of its loss (including litigation liability & criminal prosecution)
  - Cost of protection
  - Usability of the protected asset
- Don't forget wetware, also known as “Layer 8”

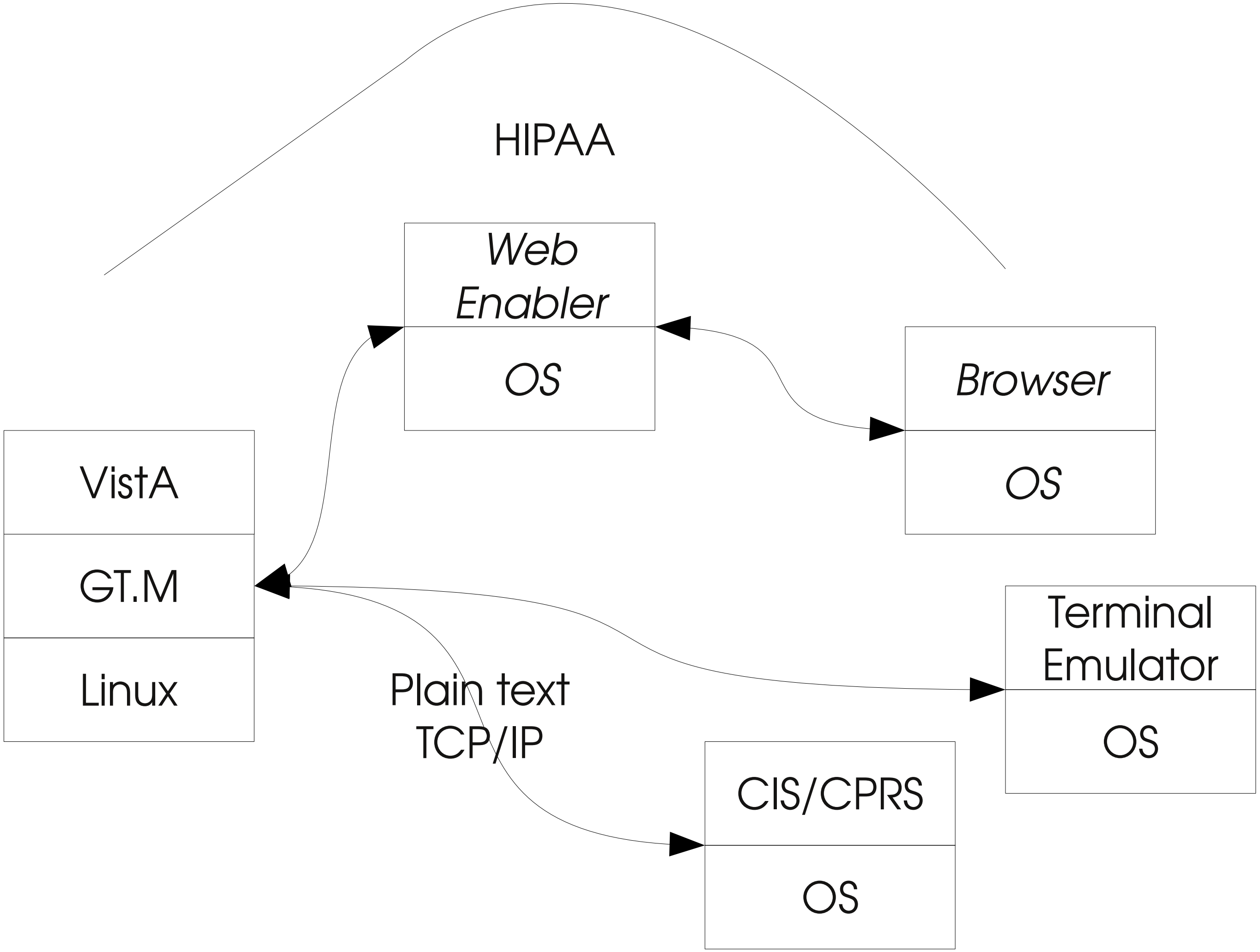
Security Policy

- Yes, you do need a written security policy
  - Identification
    - What are the information assets?
    - Who legitimately needs access?
    - To what? Why? When?
  - Standards
  - Actions
- Yes, you should go through business exercises simulating simulated security violation scenarios
- Even if you are Superman, think about times when you must be away

http://www.sans.org/resources/policies/Policy_Primer.pdf

http://www.sans.org/reading_room/whitepapers/policyissues/1331.php

Pieces of the Puzzle



HIPAA

- Hire an expert or do it yourself
- Not discussed further here

http://www.sans.org/resources/policies/#hipaa
http://www.sans.org/reading_room/whitepapers/hipaa/

The Layers

- Client (OS, browser, terminal emulator)
- Network
- VistA
- GT.M
- Linux

- (Interactions)

Clients

- Security starts at the end user's device
  - Hardware/physical
    - Stolen laptops can contain sensitive information
      - Fortunately, standard VistA clients do not store patient information on the client
      - There may be information on the swap file
  - Software
    - Operating system
    - Web browser (if VistA applications are accessed through a web browser)
- Malware & social engineering can be used to steal sensitive information and passwords

Securing Clients

- Keep software current with latest security patches
- Use appropriate anti-virus, anti-malware, and personal firewalls (e.g., http://www.clamwin.com)
- Use dedicated client machines for VistA – no web-browsing and general use (set up dual boot of separate Windows partitions to reuse hardware)
- Ensure that only approved & secured clients are allowed to access VistA (e.g., via network routing)
- Encrypt disks (e.g., http://www.truecrypt.org)
  - Don't forget to encrypt swap files if you use them

Network

- Why network security?
  - VistA is accessed over the network
    - Not just clients, but also interfaces with other servers
  - You can prevent a wide range of attacks on your VistA server by limiting access at the network level
    - The VistA server has no need to be directly accessed from the Internet at large

Controlling Traffic

- Separate types of devices to different subnets/VLANs
- The router/firewall acts as a traffic cop
- Follow the principle of least privilege
  - Only give devices on a subnet the amount of access they require to function, but no more
    - Devices on the phone subnet should not be able to access your VistA server

“Trusted” Networks

- Even on a trusted network, devices on a subnet may be able to see traffic destined for other devices on that subnet
  - This can happen even if you're using a switch, e.g., ARP spoofing
  - Keep unknown devices off your network
  - Use protocol-level encryption

Encryption

- Encryption should always be used when traffic is traveling over untrusted networks such as the Internet
  - TCP/IP
    - VPNs create an encrypted “tunnel”
    - Add-on software (e.g., stunnel – http://stunnel.org)
  - Protocol-level encryption
    - Example: HTTPS
    - Use certificates to ensure you know who you're talking to
- Something to ponder: can you really trust your LAN?

Securing Endpoints

- Even the best encryption can be defeated if the endpoint is not secure
  - Key loggers and video cameras can steal passwords
  - Screen scrapers can steal sensitive information
  - Consider something like Dasher (http://www.inference.phy.cam.ac.uk/dasher) for password entry
- Applies to both clinical desktops at the hospital/clinic and remote VPN clients
  - If you can't control or guarantee the environment of your remote clients, don't give them access
  - Consider remote desktop (http://www.rdesktop.org/) or VNC (e.g., http://www.tightvnc.com)

Wireless

- Protect your wireless with a secure encryption standard such as WPA2
  - Some vendors may have their own proprietary protocols - the robustness of these protocols is less well known
  - Avoid WEP and WPA which have known weaknesses
- Also use protocol-level encryption
  - Assume new vulnerabilities will be found tomorrow

VistA

- VistA has its own user database and permissions scheme
  - Access Code
  - Verify Code
  - Electronic Signature Code
  - Keys
  - Menus

A/V/ES Codes

- Access and verify codes are similar to usernames and passwords
  - In the VA, the access code was treated as sensitive information – essentially, it was a password that the IT department also knew
- Electronic signature code is used to sign orders and notes

Security Keys

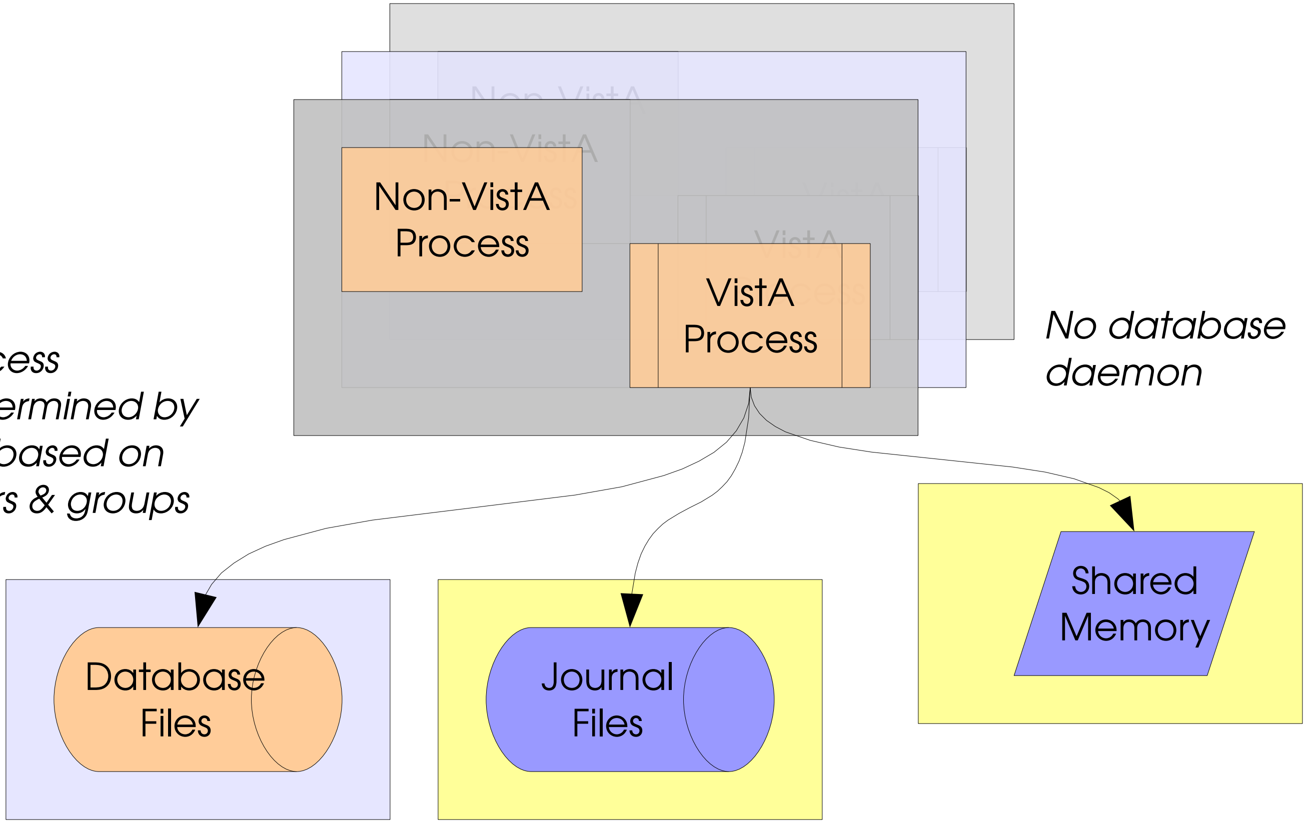
- Users are assigned various security keys
  - Multiple users can hold the same key
  - Keys typically grant permissions to the holder
  - Some are mutually exclusive
    - ORES allows you to write orders; typically given to doctors
    - ORELSE allows you to release orders; typically given to nurses

http://medsphere.org/docs/DOC-1361

Menus

- Functionality is grouped into menus
  - Tree-like structure
  - Menu items typically locked with keys
  - Primary menu option is executed when user first logs in
  - Secondary menu options are available
    - Allows jumping to another branch of the tree
    - Also used to restrict access to applications
      - OR CPRS GUI CHART

GT.M



Access determined by OS based on users & groups

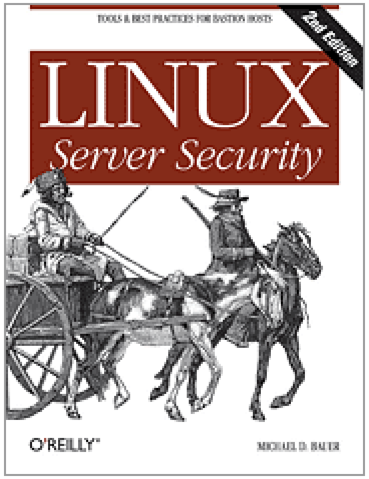
No database daemon

GT.M Recommendations

- Restrict GT.M access to a group
- Set user / group ownership and permissions correctly for database files and journal directories
- Put read-only users on replicating (secondary) instances
- Use database encryption
- Use journaling – and randomly audit journal files
- Consider mechanisms for logging access

Linux

- Dedicate servers for VistA production
- Build up from barebones with minimal required functionality; don't strip down a bloated installation
- Access only to those who need it
- Administration access via sudo
- Record all user logins and every keystroke by root users
- Implement authentication /authorization at data-center level
- Consider encrypted file systems (will require manual access on boot



http://www.puschitz.com/SecuringLinux.shtml

http://www.bastille-unix.org/

Physical

- Secure access to the server
  - What happens if it gets stolen?
    - Ensure any sensitive information not on an encrypted database resides on an encrypted file system
    - Swap – put on encrypted file system or generate random key at startup
- Secure the media
  - What about backups?
    - Backups of encrypted GT.M databases are also encrypted
  - What happens if a disk crashes?

Looking ahead

- The Cloud
  - Access to the virtual server is probably reasonably secure
    - Trust (that they have done it right) but verify
  - Virtual disks may or may not be secure, especially considering the long term
    - Encrypt file systems or databases

¿¿Questions?? ¡¡Comments!!