HARVARD UNIVERSITY
Information Technology

The Bronzing of Harvard

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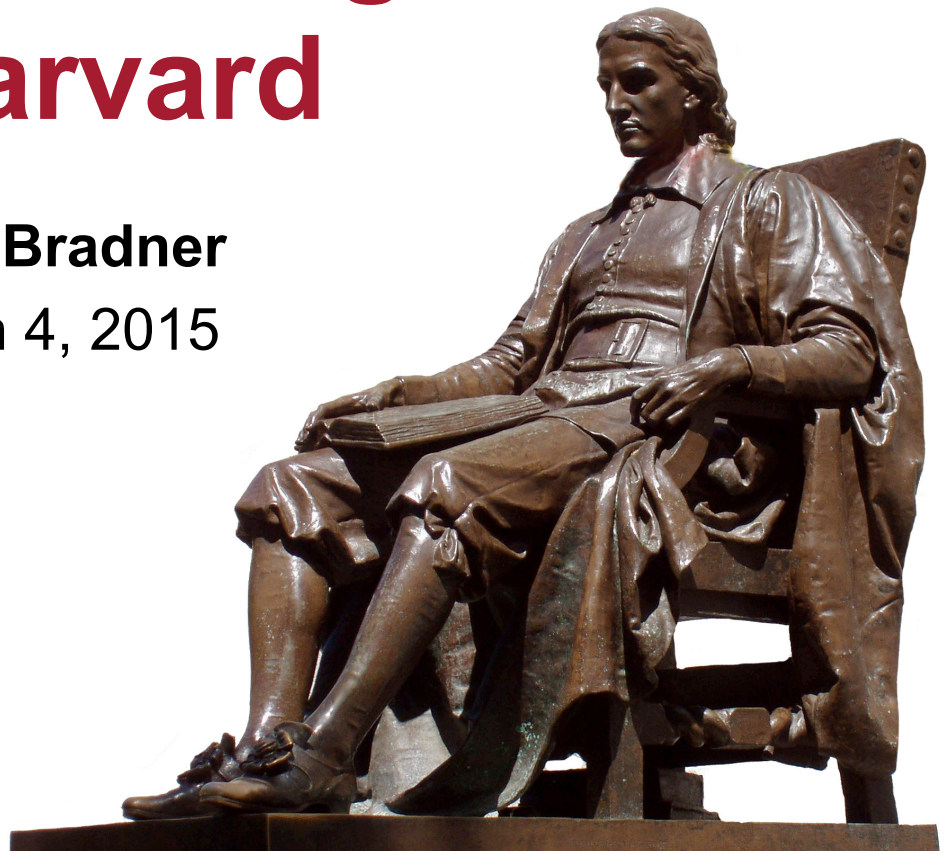

Agenda

- The Existing Environment
- Why InCommon Bronze?
- Coverage Decisions
- The Certification Process
- Dealing with Certification Issues
- Lessons Learned

The Existing Environment: Harvard University

- Harvard has been around for a while (since 1636!)
  - 47 Nobel Prizes
  - 32 heads of state
  - 48 Pulitzer Prizes
- 11 principal academic units
  - Significant IT distribution among academic units
- Scale
  - 2,400 faculty and 10,400 academic appointments
  - officially 6,700 undergraduate and 14,500 graduate students
    - database has 24,011 ☺
  - 58,800 employees (including student employees)
  - 323,000 living alumni

The Existing Environment: Harvard ID Numbers

- Non-sequential 8-digit ID number (HUID) assigned to Harvard staff, faculty, students, and others
  - "Others" include contractors, library borrowers, spouses, tenants, overseers, employees of the Smithsonian Astrophysical Observatory and Harvard Management Company, sponsored accounts …
- "HUID for life"
  - Effort to ensure that any one person is assigned a maximum of one permanent HUID
- Not in Harvard's FERPA directory list
  - Thus, must be kept confidential

The Existing Environment: Identity and Access Management

- Harvard started to develop a “single-sign-on” PIN System in late 1998
  - Based on then-existing ID card database … the only database that included all active persons assigned Harvard ID numbers
  - First augmented with telephone directory info
  - Later augmented with other info, such as roles
  - Evolved into Harvard’s current core person identity registry (IdDB)
- The system now supports more than 600 applications
  - This includes vendor applications through a proxy

The Existing Environment: Microsoft Active Directory

- Large University Active Directory
- Most active HUID holders are in University AD
  - Major use: Office 365 for staff
- Harvard's new password management system will push the same passwords to both the PIN System and AD
- Thus, the status of AD needs to be taken into account when certifying for Bronze (or Silver)

The Existing Environment: IdDB

- IdDB gets regular feeds from many sources, including:
  - Human resources
  - Registrar systems (many)
  - Student Information System
  - Division of Continuing Education
- Now never forgets: 642,129 entries (as of 2/17/15)
- Fields include:
  - HUID number
  - Directory information
  - Role and status information
  - Miscellaneous information, including UUID and EPPN (learn more: http://iam.harvard.edu/resources/iam-database-information)

The Existing Environment: LDAP

- Harvard currently has two LDAP server sets, which are being combined:
  - HU-LDAP (directory information)
  - AuthLDAP (credentials)
- Many IdDB fields are exported into the LDAPs

The Existing Environment: Authentication via PIN System

- Applications redirect users to the PIN System for authentication
  - User prompted for credentials
    - HUID & password
  - Credentials checked against AuthLDAP
  - User redirected back to app with a signed token in the URL
- PIN System supports some “one-way federation”
  - Users can select other servers for credential checking, such as Active Directory or the Harvard Medical School authentication engine

The Existing Environment: Next-Generation Authentication System

- PIN System redone in 2013
  - From homebrew system to CAS-based solution (“PIN/CAS”)
  - Application interface and application configuration database maintained for compatibility
- PIN System will be rebranded in Summer 2015 as HarvardKey
  - Includes new login name based on email address
  - More robust self-service portal for users
  - Adding options for multifactor authentication

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The Existing Environment: Harvard IdP

- Harvard's Shibboleth IdP uses PIN/CAS for authentication
  - Gets attributes from LDAPs
  - *ScopedAffiliation* attribute calculated from role and status information
- Learn more: http://iam.harvard.edu/resources/incommon

Why InCommon Bronze?

- Theoretically useful by itself (in the future)
- An external set of technical and process standards also provides a good forcing function
  - "Certifying with InCommon verifies to the Harvard Community that University IAM efforts meet nationally recognized external standards"
- Reassures Harvard users that IAM is following good practices
  - Learn more: http://iam.harvard.edu/news/incommon-bronze

Coverage Decisions

- Basic decisions:
  - IdDB is for everyone, for all time
  - The Harvard IdP will only vouch to InCommon SPs for users we “know” and who are a current part of the Harvard Community
    - We do not vouch for others outside these criteria, even if they have valid Harvard credentials
- Specifically, we decided to not attempt to validate everyone in IdDB for Bronze

Coverage Decisions: How Do We Know You?

- The Harvard IdP will vouch to InCommon SPs for the following categories:
  - Active paid employees
    - ID proofed by employment process
  - Active Harvard Community members who have picked up ID cards
    - Government-issued photo ID checked during card pick-up process
- This includes faculty, staff, on-campus students and others
    - Does not currently cover distance learners
- Will also add an additional in-person verification mechanism
    - Not currently considering remote proofing

The Certification Process

- Imported Assurance Profile 1.2 into a spreadsheet outlining requirements for both Bronze and Silver
- Went through line-by-line describing current status
- Identified the few gaps in Harvard's systems:
  - Relevant to both Bronze and Silver:
    - Resistance to guessing authentication secret
    - SHA-1
  - Relevant to Silver only:
    - Securing authentication traffic
    - Stored authentication secrets
    - Strong protection of authentication secrets

Certification Issues: Resistance to Guessing

- The PIN/CAS system does not require people to change their passwords on a regular basis
- Harvard's password complexity requirements have recently been strengthened
- When verifying to a Bronze SP, the Harvard IdP will only verify users who have changed their passwords since the new rules went into effect *and* within the last 5 years (within the last year for Silver SPs)
  - If time requirement not met, user receives an error of "your password must be changed"
- Thus, impact only on those who want to use Bronze or Silver SPs

Certification Issues: SHA-1

- Took time to coordinate certainty that all SPs using the Harvard IdP could support SHA-2
- Reconfiguration put into production Jan. 6, 2015

Certification Issues: Stored Authentication Secrets

- Issue for Silver certification
- Credentials stored using hash — no seed
  - Implemented whole-disk encryption for PIN/CAS
    - The next PIN/CAS update will use seeded hash
  - Will implement whole-disk encryption for AD

Certification Issues: Securing Authentication Traffic

- AD-specific issue for Silver certification
- Must configure AD to not use LM or NTMLv1
  - NTMLv2 may also be an issue
- Learn more: http://tinyurl.com/silver-ad-cookbook

Certification Issues: A Surprise

- U.S. Federal ICAM Privacy Assurance addendum was a surprise
  - Not in IAP — only in agreement
- Had to publish information on attribute release, etc.
  - See section 9 in http://iam.harvard.edu/resources/incommon-bronze
- Will likely support user managed attribute release control (e.g., PrivacyLens) at some point

Lessons Learned

- Bronze certification wasn't difficult … once we made a few simplifying decisions:
  - Use role and status to decide whom we vouch for
  - Force password changes only on users of Bronze (or Silver) SPs
  - Use employment status and card pick-up status for ID proofing
- Harvard is ready for Silver certification, except for AD
  - And documenting (& paying) for an audit

Thank you!

Questions? Email scott_bradner@harvard.edu

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