Document Authentication Workshop

U.S. Government Printing Office

June 18, 2010

Agenda

- Introductions and Welcome
- Authentication Background
  - Authentication for Individuals
  - Authentication for Automated, High Volume (Bulk data) applications/uses
- Standards and Methods for Bulk Data Authentication
- Chain of Custody Use Cases
- Re-authentication over Time
- Granular Authentication

Introduction

Focus for today's dialogue:

- Authentication of publicly disseminated GPO electronic documents on the Internet

What is OUTSIDE the scope of today's dialogue:

- Authentication as applied to GPO products that are not electronic documents publicly available on the Internet

Introduction

Desired Outcomes:

- Feedback from the constituencies represented here to GPO to inform GPO decisions on future system deployments
  - Input for RFI for future Industry Day with vendors at GPO

- GPO decision topics:
  - Does the community require different levels of authentication assurance on the same content (some parties willing to use less robust means and others requiring the current digital signature approach)?
  - What standards and techniques to use for native XML authentication?
  - What techniques and standards should be used for "Chain of Custody" (if content originators support it)?
  - What are the community requirements for "Granular Authentication"?

Authentication Background

- GPO publishes PDF files digitally signed using cryptographic digital signatures and PKI
  - Signature method uses open standard (IETF 2315/5652, aka PKCS#7)
  - PDF based on an open standard
- Positive feedback from all stakeholder and user communities
- Easy to use and reliable for users and citizens

Authentication Background

- GPO publishes digitally signed PDF files
  - Starting with President's Budget in FY2009 on GPOAccess web site
  - Congressional Bills starting with the 110th Congress on GPOAccess web site
  - FDsys Beta starting in FY2009
  - FDsys is signing all collections; as collections are published signed PDF files available

GPO Authentication Goals

- Provide assurance to document recipients or readers of:
  - Source identity (publisher) for the document
  - GPO as the source for GPO disseminated documents
- Provide assurance document not altered since publication
  - Provide means of reliably detecting if document was altered
- Provide a method that supports authentic chain of custody
  - Chain of custody can be reliably provided and not altered
  - Provide a means of reliably detecting if the chain of custody was altered

Authentication Background

- Factors that seem important to future direction:
  - Authentication technique that is strong enough to maximize the length of time it is valid
  - Authentication technique that works even when disconnected from the Internet
  - Authentication technique that is based on established international, open standards (as opposed to proprietary methods)
  - Authentication technique based on binary data (rather than proprietary formats)

Authentication Background

- Factors that seem important to future direction:
  - Authentication technique that is clear and simple about the publisher of the document
  - Authentication technique that is easily extensible, using open international standards, to clearly and simply displaying for the consumer the chain of custody (provenance of the document)

- FEEDBACK ON THESE FACTORS. ARE THERE OTHER IMPORTANT FACTORS?
  - Participant feedback

Authentication Techniques Beyond PDF

- Since Cryptographic Digital Signatures used and effective for PDF → Cryptographic Digital Signatures seem natural for other data types
- Question: Is a 2nd assurance level technique like Hash based schemes (that may not do all that digital signature does) needed for a segment of the user community?
  - See Comparative Table on Next Slide
- Follow on Question: If so, what standards should guide that 2nd technique?
- FEEDBACK IS REQUESTED. IS SOME OTHER STANDARDIZED TECHNIQUE "BETTER"?
  - Participant feedback

Comparison Among Authentication Techniques

	COMPARATIVE FACTORS							
	Trusted Third Party Involved?	***Could Trusted Third Party be GPO?***	***Does it use Open Standards?***	***Does the method show the publisher of the document?***	***Does the method facilitate "Chain of Custody"?***	***Free Client software available for users to validate?***	***Is the method included in the NIST guidance for Electronic Authentication? (NIST Special Publication 800-63)***	***Is offline validation possible?***
Method								
Hash Based Method	Yes	Yes	Yes (for Hash)	No	No*	Yes	No	No
Cryptographic digital signature	Yes (Root CA)	Yes	Yes (IETF RFC 5652 for binary data; W3C standards for XML data)	Yes	Yes	Yes	Yes	Yes

*=No standards exist for this function

Authentication Techniques Beyond PDF

- An option is to use PDF as a “carrier” to encapsulate other file types
  - Embed (encapsulate) other file types inside of a PDF file
  - Disadvantages:
    - Embedded files don’t have direct authentication – it would be tied to the PDF file
    - No standards for linking the authentication information between all the files
- GPO conclusions, to this point:
  - Not the best option
  - Examine other options (next slides)

Authentication Standards for Automated, High Volume applications

Options :

- World Wide Web Consortium (W3C) XML authentication standards
  - Based on cryptographic digital signature
- IETF 5652 (PCKS #7)
  - Uses cryptographic digital signature
  - Is used by many other standards (S/MIME v3, IETF RFC 3851, for example)

- FEEDBACK FROM PARTICIPANTS
  - Input from participants

Native XML Authentication

Options :

- Enveloped Signature
  - Signature is embedded within the document containing the signed content
- Enveloping Signature
  - Signature contains the signed content itself, all within the document
- Detached Signature
  - Signature is separate from the content
- Pros and Cons of these approaches on the following slides

Native XML Authentication

Enveloped Signature

- Signature is embedded within the document containing the signed content

Consequences:

- The signature is a Child of the content
- Document needs a placeholder to hold the signature

Advantages:

- Signature and content are coupled together
  - Easy to validate
  - Offline validation possible
- Signed/unsigned content have the same format

Native XML Authentication

Enveloping Signature

– Signature contains the signed content

Consequences:

- The signature is the Parent of the content being signed
- Processing the document requires processing the signature syntax

Advantages:

- Signature and content are coupled together
  - Easy to validate
  - Offline validation possible

Disadvantages:

- Signed and unsigned content have different formats ➔ More complicated software for viewing

Native XML Authentication

Detached Signature

- Signature is completely separate from the content

Consequences:

- Processing of the signature and the document are separated
- The no difference at all between signed and unsigned content

Advantages:

- If the content is a “mash up” of many disparate, separate documents, then this might be somewhat less complicated to manage

Disadvantages:

- Somehow the signature and the content must be linked together and tracked ➔ No standards for this ➔ Higher costs and more complex user experience
- Same disadvantage as the embedded files in PDF (discussed earlier)
- Since signed content and unsigned (non-authenticated) content are exactly the same, this could cause user confusion

Native XML Authentication

Preliminary GPO Conclusions, to date:

- Current signed PDF approach uses Enveloped signatures
  - This seems to bode well for the Enveloped Signature approach
- For the case in which there is no content originator signature, this is the simplest, most effective model
  - Since there is less to go wrong and positive experience with PDF
- For cases in which a content originator signature along with disseminator signature is desired (chain of custody use cases), the Enveloped Signature approach does require a common "template" or specification between content originators and publishers
  - XML requires coordination between GPO and content originator as it is, and we already coordinate closely together on many things
- For the Chain of Custody case, it seems more complex to use either the Enveloping Signature method or the Detached Signature method
  - More complex in terms of building and maintaining software
  - Thus, to preserve potential for efficient and effective capability for the "Chain of Custody" use cases, start with Enveloped Signature method
- ENVELOPED APPROACH may be good way to start

FEEDBACK REQUESTED FROM PARTICIPANTS

- Input from participants

Chain of Custody Use Cases

Chain of Custody for GPO published documents:

- Indication of the content originator → Provenance

Note that this requires:

- participation by content originators (external to GPO) – GPO can't dictate
- Education process for all the content originator agencies – value of adding this process at their site
  - GPO is communicating on this
- May also require coordination on common specification for signature location – not unexpected, but a potential challenge

Policy and operational implications for the federal agencies

Chain of Custody Use Cases

- Factors:
  - Is ability to view the entire chain custody with the document important?
  - Open Standards based seems to be required
  - If the chain of custody is completely present/preserved with the document, is this of value?
  - For XML and PDF files, the W3C and PKCS #7 methods allow full chain of custody to travel with the document
    - Seems simpler and less complex
    - No standards exist for the protocol for the “detached ” signature methods
    - The W3C and PKCS #7 methods allow full chain of custody to validated and viewed when off-line
- Other Use Cases?
- FEEDBACK REQUESTED
  - Input from Participants

Re-Authentication over time

- The Challenges:

  #1: Standard algorithms and techniques change over long time horizons.

  Examples:

  – SHA-1 hash algorithm is not recommended for new signing after January 1, 2011
  – 1024 bit RSA keys are not recommended for signing

  #2: Issues could arise without warning on any standard algorithm or technique, requiring re-authentication using stronger/different technique.

Re-Authentication over time

Current GPO Planning:

- Maintain awareness of requirements and changes in authentication standards (continuous)
- Periodically assess requirement to re-authenticate any content (annually; more frequent as awareness of changes and requirements dictate)
- Start any re-authentication required well in advance of known requirements changes
  - Use automated, high volume authentication engines to re-authenticate
- Canvas industry and suppliers for technical systems that can make such a re-authentication process as efficient and hands-off as possible (plan to do this near term)

Granular Authentication

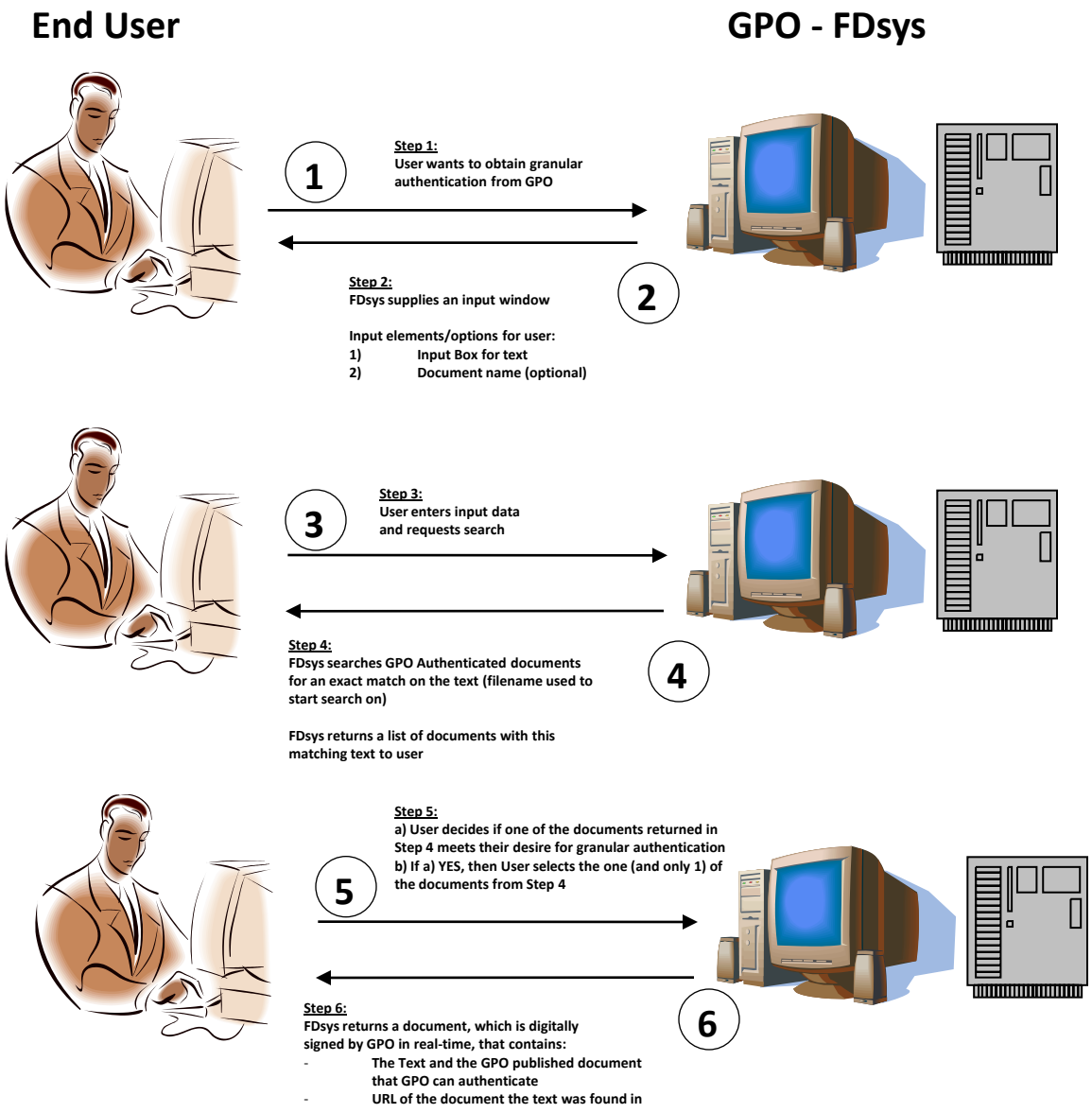
- The problem statement:
  1) Ability to authenticate an arbitrary portion of a document
     - Example: 1 page out of 500 page document
  2) Ability to locate text and relate it to a GPO authentic publication (published document)

- Goal:
  - An authenticated answer in a reasonable time period

- Feedback on GPO concept (next slide)
  - Concept addresses 2nd capability above (locate text)
  - Would such a concept be useful and be of value to end users?
  - Is it something GPO should investigate getting funded and built?

- FEEDBACK FROM PARTICIPANTS

Granular Authentication Concept – For Discussion



Wrap Up

Thank you for your time and participation!

GPO will post information concerning this workshop at the URL below:

http://www.gpoaccess.gov/authentication/

Information to be posted:

- today's slides (handout) (soon)
- transcript of the today's proceedings (5-10 days)
- summary report from GPO (4-6 weeks)

Wrap Up

Email comments to GPO concerning this workshop to:

authgpo@gpo.gov

Input will be accepted through July 9, 2010

The input received will be factored into the Summary Report GPO posts on this workshop