Adobe Acrobat 9 Digital Signatures, Changes and Improvements

Updated for Adobe Acrobat and Adobe Reader 9.1

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Introduction

The Adobe Acrobat 9 family of products and Adobe Reader 9 (collectively called Acrobat 9) offer better support for digital signatures in forms created in Acrobat and Adobe LiveCycle Designer ES. This support improves the usability and validity of digital signatures. These changes should be of interest to business process developers and PKI owners.

Acrobat 9.0 has improved the distinction between unsigned and signed changes. It also refines the rules about the kinds of changes that invalidate all signatures in a document. These improvements are especially important to PDF documents that represent forms that can be filled out and signed by multiple people.

NOTE: In certain workflows, these improvements may require you to revise business processes that use signed or certified PDF documents.

Acrobat 9.1 (and Adobe Reader 9.1) further extend the work begun in Acrobat 9.0 to provide more consistent and easier to understand validation of all types of digital signatures, especially for signatures on forms created in LiveCycle Designer ES and for XML data signatures. Acrobat 9.1 also improves ease of signature validation in the long term. In this document, changes introduced in Acrobat and Adobe Reader 9.1 are designated with change bars.

In Adobe Reader 9.1 and earlier, support for digital signatures is enabled only when opening PDF documents to which usage rights have been applied. You can use Acrobat Pro, Acrobat Pro Extended, or LiveCycle ES to apply such usage rights to a PDF document.

Here is a summary of the Acrobat 9 changes to digital signature usability and the associated signature validation.
<table>
<thead>
<tr>
<th>Change</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indication of overall signature validity state</td>
<td>Changes the Document Message Bar to specify the overall validity and integrity of the document. You can use this information to make a quick decision about the document.</td>
</tr>
<tr>
<td>Revision tracking in Signature panel</td>
<td>Describes the changes made to each revision of the document. The changes to a revision include all changes made to the document between signings. This information is displayed in the signature panel for an Acrobat form.</td>
</tr>
<tr>
<td>Change in status of forms that take multiple signatures</td>
<td>Allows additional signatures to be applied to a document, without changing earlier signatures to a “Valid with subsequent changes” status (green check with a yellow warning triangle)</td>
</tr>
<tr>
<td>Allowed and disallowed changes</td>
<td>Refines the definition of the kinds of changes that can be made to a certified or signed document without invalidating the signatures applied to the document. Disallowed changes invalidate the signatures on a document.</td>
</tr>
<tr>
<td>Individual signature status icons removed from signature fields</td>
<td>Removes the signature status icon from the signature appearance. The Signature panel is a better source of information about the validity and integrity of a document.</td>
</tr>
<tr>
<td>Individual signature status icon meanings</td>
<td>Replaces Acrobat 8 icons with new icons that are compatible with the new overall signature validity state icons.</td>
</tr>
<tr>
<td>Lock document after last signature</td>
<td>Allows the last signer of the document to lock the document, which prevents further changes.</td>
</tr>
<tr>
<td>Certification requirement for XML forms</td>
<td>Adds requirement to certification of forms created with LiveCycle Designer E5.</td>
</tr>
<tr>
<td>Verification time for signatures</td>
<td>Makes changes to the default time used to verify signatures in Acrobat 9.1 and may affect some applications.</td>
</tr>
<tr>
<td>Long-term signature validation changes</td>
<td>Adds new capabilities in Acrobat 9.1 that may affect the signature status of documents when opened in earlier versions of Adobe Reader or Acrobat.</td>
</tr>
<tr>
<td>Other signing changes</td>
<td>Makes changes to some menu and options in Acrobat 9.1 and Adobe Reader 9.1.</td>
</tr>
</tbody>
</table>

Signature validation capabilities in Acrobat 8 are among the many topics discussed in the *Digital Signature User Guide*. 
Indication of overall signature validity state

When Acrobat 9 displays a certified or signed document, the Document Message Bar contains an overall signature state described by an icon and text (illustrated below):

**Icon.** Indicates the *overall signature validity state* of the document, which is a cumulative picture of the validity of all signatures in the document and whether changes have been made to the document since the last signature was applied. (See *Overall signature validity states in a certified document* and *Overall signature validity states in a signed (but uncertified) PDF document.*)

**Text.** Describes the overall signature validity state and provides guidance about the potential impact of changes in the document that were added after the last signature was applied.

Acrobat 8 does not present an overall signature state. Instead, you must view the status of every signature in a document to draw conclusions about the overall signature validity state.

Beginning with Acrobat 9.1, the validity of XML data signatures in a document is included in the overall document signature status. In Acrobat 9.0, data signatures were not considered in the overall document signature status and could be invalid even if the overall signature status showed valid for other signature types.

Overall signature validity states in a certified document

Unlike Acrobat 8, Acrobat 9 presents information in the Document Message Bar that provides a view of a certified document’s overall signature validity and document integrity. The icon and descriptive text in the Document Message Bar for a certified document change to indicate the overall signature validity state for the document.

Here is the Acrobat 9 Document Message Bar for a certified document that has not been changed or has been changed and then signed.

Here is the Acrobat 9 Document Message Bar for a certified document that contains changes that have not been followed by an approval signature.
In Acrobat 8, the Document Message Bar for a certified document does not change as subsequent users fill in and sign the document. Regardless of changes made to a document, the Document Message Bar displays the blue ribbon document status icon and this explanatory text: “This document was certified by Signer’s ID, Organization with a valid signature and has restrictions.” The certifying signature is always the first signature applied to the document.

Here is the Acrobat 8 Document Message Bar for a certified document. This icon and descriptive text do not change as the document is modified and signed.

The following table shows the icons and descriptive text that appear in the Document Message Bar as the document is changed and signed.

<table>
<thead>
<tr>
<th>State</th>
<th>Description</th>
<th>Signature validity state icon</th>
</tr>
</thead>
</table>
| Certified only                  | **Text in Document Message Bar:** Certified by Signers Name <Signers email>, Organization, certificate issued by Issuer.  
**Explanation:** Content is unaltered and the certifying signature is valid. This is the simplest usage scenario of publishing “Certified Documents with no changes allowed”. The blue ribbon icon denoting the document authenticity and validity is displayed in the Document Message Bar as well as with the signature in the signature panel (not as part of the document). | ![Blue Ribbon Icon] |
| Certified and then signed       | **Text in Document Message Bar:** Certified by Signers Name <Signers email>, Organization, certificate issued by Issuer. Signed and all signatures are valid. If you are a form author, choose Distribute Form in the Forms menu to send it to your recipients.  
**Explanation:** Same as the Certified only state except that additional signatures have been applied, each of which has been validated. | ![Blue Ribbon Icon] |
| Unsigned changes since last valid signature | **Text in Document Message Bar:** Certified by Signers Name <Signers email>, Organization, certificate issued by Issuer. Signed and all signatures are valid, but with unsigned changes after the last signature.  
**Explanation:** Same as the Certified and then signed state except that allowed changes have been made since the last valid signature was applied. (See Allowed and disallowed changes.)  
This workflow could be an intermediate state where a certified document goes through these stages (in order):  
1. Filled in with allowed changes (optional).  
2. Signed with a valid signature.  
3. Filled in with allowed changes.  
In some extreme cases, the allowed changes in step 3 may actually be nefarious tampering. | ![Blue Ribbon Icon] |
| Problem with one or more signatures | **Text in Document Message Bar for a problematic signature:** At least one signature has problems.  
**Explanation:** A signature in the document is absent from the list of trusted identities. | ![Blue Ribbon Icon] |
Overall signature validity states in a signed (but uncertified) PDF document

Unlike Acrobat 8, Acrobat 9 presents information in the Document Message Bar that provides a view of a signed (but not certified) document’s overall signature validity state.

In Acrobat 8, changes to the document after a signature was applied change the status of the signatures to “Valid signature with subsequent changes” (green check with yellow warning triangle). In Acrobat 9, if an allowed change is made after the document is signed, the signature retains its valid status, but the overall signature validity state indicates this state: “All signatures are valid. Document was updated after signing.”

<table>
<thead>
<tr>
<th>State</th>
<th>Description</th>
<th>Signature validity state icon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Updated and signed after previous signature, perhaps iteratively</td>
<td><strong>Text in Document Message Bar:</strong> Certified by Signers ID, Organization, certificate issued by Issuer. Signed and all signatures are valid. Document was updated after signing. Open Signature Panel to view the document change history. <strong>Explanation:</strong> Same as <strong>Certified and then signed</strong>, except that the form was subsequently modified with allowed changes (typically field fill-in) and signed with a valid signature. This cycle of form modification and signing can happen iteratively. Subsequent signers may have changed data entered by earlier signers, unless such modifications are prohibited by the form design. The revision history is provided in the Signature panel (see <strong>Revision tracking in Signature panel</strong>).</td>
<td>![signature validity state icon]</td>
</tr>
<tr>
<td>Certification or signature is bad</td>
<td><strong>Text in Document Message Bar for a bad certification:</strong> Certification by Signers ID is invalid. <strong>Explanation:</strong> The certification is invalid for one of these reasons: Certificate used to sign the document is not known to be good. Certifying signature has a bad timestamp. Signatures can be invalid for one of these reasons: Document has been changed in a way that is not allowed. (See <strong>Allowed and disallowed changes</strong>.) A signature on the document is invalid.</td>
<td>![bad certification icon]</td>
</tr>
<tr>
<td>Validation undetermined for one or more signatures</td>
<td><strong>Text in Document Message Bar:</strong> At least one signature requires validating. <strong>Explanation:</strong> Overall signature validity state is undetermined or signature check may be pending. This state may also indicate that security preferences are set to not validate on file open. (Users can direct Acrobat to validate signatures. They can also change the security preferences setting, restart Acrobat, and then reopen the document in question.)</td>
<td>![validation undetermined icon]</td>
</tr>
</tbody>
</table>
Here is an image that shows the Acrobat 9 Document Message Bar for a signed document.

The following table shows the overall signature validity states for signed documents that have signature fields:

<table>
<thead>
<tr>
<th>State</th>
<th>Workflow Description</th>
<th>Overall signature validity state icon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form signed</td>
<td><strong>Text in Document Message Bar:</strong> Signed and all signatures are valid. <strong>Explanation:</strong> The form has been signed by one or more people, and all signatures have been validated. The document is unmodified except for the addition of signatures.</td>
<td>![Icon]</td>
</tr>
<tr>
<td>Unsigned changes since last valid signature</td>
<td><strong>Text in Document Message Bar:</strong> Signed and all signatures are valid, but with unsigned changes after the last signature. <strong>Explanation:</strong> Same as the Form signed state except that allowed changes have been made since the last valid signature was applied. (See Allowed and disallowed changes.) This workflow could be an intermediate state where a certified document goes through these stages (in order): 1. Filled in with allowed changes (optional). 2. Signed with a valid signature. 3. Filled in with allowed changes. In some extreme cases, the allowed changes in step 3 may actually be nefarious tampering.</td>
<td>![Icon]</td>
</tr>
<tr>
<td>Problem with one or more signatures</td>
<td><strong>Text in Document Message Bar for a problematic signature:</strong> At least one signature has problems. <strong>Explanation:</strong> A signature in the document is absent from the list of trusted identities.</td>
<td>![Icon]</td>
</tr>
<tr>
<td>Updated and signed after previous signature</td>
<td><strong>Text in Document Message Bar:</strong> Signed and all signatures are valid. Document was updated after signing. <strong>Explanation:</strong> Same as Form signed, except the form was subsequently modified with allowed changes (typically field fill-in) and signed with a valid signature. This cycle of filling in fields and signing can happen iteratively. Subsequent signers may have changed data entered by earlier signers, unless such modifications are prohibited by the form design. The revision history is provided in the Signature panel (see Revision tracking in Signature panel).</td>
<td>![Icon]</td>
</tr>
</tbody>
</table>
Revision tracking in Signature panel

In Acrobat 9, the Signature panel provides a revision history of the document and the status of a certifying signature (if any) and all approval signatures in the document. In Acrobat 8, the Signature panel does not provide such a revision history and instead groups signature information by these categories: certifying signature, unsigned fields, and approval signatures.

The Acrobat 9 organization of the Signature panel has these characteristics (listed in order of appearance):

- First entry is the first signature applied to the document. Changes made before this signature are not tracked.
- Each signature starts a new revision of the signed document.
- Changes or additions after signing are listed after that signature. The changes within a revision are not in chronological order. For example, if certain form fields were altered or filled in after a signature was applied, these changes or additions are listed under the most recent signature.
Here is an image that shows the Acrobat 9 Signature panel.

The last change in this image is that a City field was filled in after the second signature. You can also notice a series of data entries that were made before the second signature was placed but after the certification.

Beginning in Acrobat 9.1, there are some improvements to the information provided by the security panel:

- The change history for forms with a flowable layout is shown in the signature panel. In Acrobat 9.0, this history was not available.
- Some signature panel messages have been moved up one level in the hierarchy so that it is no longer necessary to expand subitems in order to see them.
- The Validate All button in the signature panel validates data signatures as well as all document signatures. In Acrobat 9.0, data signatures had to be checked individually.

**Change in status of forms that take multiple signatures**

There are many documents and dynamic forms that accept data and then a series of signatures.

In Acrobat 9, when additional signatures are applied to a document, the earlier signatures continue to have the Valid status, subject to the certificate validation rules that have been part of Acrobat’s signature processing for a number of releases.

In Acrobat 8, all signature appearances except the last one would have changed their status to “Valid with subsequent changes” (green check with a yellow warning triangle) if their certificate was still valid.
Allowed and disallowed changes

Acrobat 9 clarifies the allowed changes that can be made to a certified or signed document without invalidating the signatures applied to the document. These types of changes are called *allowed changes*. With certified documents, you can specify the allowed changes that can be made to the document without invalidating the signatures applied to the document. With signed documents, the allowed changes are predefined.

In Acrobat 9, if a user makes disallowed changes to a signed or certified document, all signatures in the document at that time are invalid.

In Acrobat 8 and 9, form designers can also control whether fields can be modified after signatures are applied. In addition, Acrobat 9 allows the last signer to lock a document, preventing further changes (see *Lock document after last signature*).

Allowed actions for certified documents

When you use Acrobat 9 to certify a document, the Certify Document dialog lets you specify the types of changes that can be made to the document without invalidating the signatures applied to the document. The following table describes these change types.

<table>
<thead>
<tr>
<th>Permitted actions after certifying</th>
<th>Allowed</th>
<th>Disallowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certified with no changes allowed</td>
<td>No changes allowed</td>
<td>Digitally signing&lt;br&gt;Supplying form field values&lt;br&gt;Adding or editing annotations&lt;br&gt;Adding form fields&lt;br&gt;Changing page content</td>
</tr>
<tr>
<td>Certified with form fill-in and digital signatures allowed</td>
<td>Supplying form field values&lt;br&gt;Digitally signing</td>
<td>Adding or editing annotations&lt;br&gt;Adding form fields&lt;br&gt;Changing page content</td>
</tr>
<tr>
<td>Certified with annotations, form fill-in, and digital signatures, allowed</td>
<td>Adding or editing annotations&lt;br&gt;Supplying form field values&lt;br&gt;Digitally signing</td>
<td>Adding form fields&lt;br&gt;Changing page content</td>
</tr>
</tbody>
</table>

Allowed actions for signed but uncertified documents

When a document is first signed, the set of allowed actions by default is set to those specified in the following table. Applying disallowed changes to a signed document invalidates the signatures on that document.

<table>
<thead>
<tr>
<th>Allowed</th>
<th>Disallowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Adding signature fields (see <a href="#">Limitations on adding signature fields to signed but uncertified documents</a>)&lt;br&gt;• Adding or editing annotations&lt;br&gt;• Supplying form field values&lt;br&gt;• Digitally signing</td>
<td>• Adding form fields other than signature fields&lt;br&gt;• Changing page content</td>
</tr>
</tbody>
</table>
Limitations on adding signature fields to signed but uncertified documents

Acrobat Pro and Acrobat Pro Extended let you add signature fields to a PDF document, provided certain conditions exist. These required conditions have changed from Acrobat 8 to Acrobat 9, as described in the following table.

<table>
<thead>
<tr>
<th>Type of form</th>
<th>Restriction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrobat forms and static forms created in LiveCycle Designer ES</td>
<td>Acrobat 8 and 9 let you add signature fields only if the document is not certified.</td>
</tr>
<tr>
<td>Dynamic forms created in LiveCycle Designer ES</td>
<td>Acrobat 9 lets you add a single signature field (for capturing approval signatures) only if the document does not already have any unsigned signature fields. Acrobat 8 lets you add multiple signature fields to such an unsigned form.</td>
</tr>
</tbody>
</table>

Individual signature status icons removed from signature fields

In Acrobat 9, by default, the signature status icon appears only in the Signatures panel, as pictured below. The signature appearance does not display the signature status icon.

In Acrobat 8, the signature status icon is presented in the signature appearance and in the Signatures panel, as pictured below.

When upgrading to Acrobat 9, business users must be retrained to evaluate signature validity by inspecting the signature panel to protect themselves from any signature validity spoofing attacks. This default behavior is recommended as a best practice for signature usage.
Although not recommended, you can configure Acrobat 9 to display the signature status icon as part of the signature block within the document. This configuration involves setting up a registry setting (see Security Administration Guide).

**Individual signature status icon meanings**

Acrobat 9 distinguishes between the validity of a signature and the overall validity of a document. As a result, some of the individual signature validity states have changed from Acrobat 8 to 9. The following table describes the changes in Acrobat 8 and Acrobat 9 individual signature status. It also shows the icons used to represent those status.

<table>
<thead>
<tr>
<th>Individual signature status</th>
<th>Acrobat 9 signature status icon</th>
<th>Acrobat 8 signature status icon</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Certified signature.</strong></td>
<td><img src="icon1.png" alt="Icon" /></td>
<td><img src="icon1.png" alt="Icon" /></td>
</tr>
<tr>
<td>The signer used the certification process, and the signature was the first signature in the document. The document has changed only in ways specifically permitted by the certifier. The meaning of this icon is the same in Acrobat 8 and 9.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Valid signature.** | ![Icon](icon2.png) | ![Icon](icon2.png) |
| In Acrobat 9, this icon means the signature is valid and the document has not changed except for the addition of a subsequent valid signature. A signature is valid if there is a trust relationship with the signer or the organization that issued the signer’s digital ID (often called the CA or ICA). If a form is filled in and then signed multiple times with valid signatures, all signatures remain valid. In Acrobat 8 this icon means that the document has not changed since it was signed or only contains changes allowed by a previous signer, if any. |

| **Valid signature with subsequent changes.** | No equivalent icon | ![Icon](icon3.png) |
| The Acrobat 8 icon means the document has changed since it was signed and it applies only to signed (but uncertified) documents. Any change could have occurred after the signature, not just the allowed changes defined for Acrobat 9 (see Allowed and disallowed changes). Acrobat 9 does not have an equivalent individual signature validity state. If a document is changed after signing, the signature validity changes depending on whether the changes are allowed. In the case of allowed changes, the icon changes to the check mark with the blue “i”. In the case of disallowed changes, the icon changes to red “X”. |

| **Valid signature with allowed changes.** | ![Icon](icon4.png) | No equivalent icon |
| Allowed change (other than signing) made after signature and the changes have been signed by a valid signature. In Acrobat 8, any change to a signed document changes the signature status to the check mark with the yellow triangle (above). |
**Lock document after last signature**

Acrobat 9 adds a feature that allows the last signer of an Acrobat form to lock the document. This feature is available only for Acrobat forms that have no hidden fields in the document. This feature does not apply to forms designed with LiveCycle Designer ES.

The ability for people filling out forms to lock documents after the last signature field is signed is a feature that is targeted for signature workflows that do not involve LiveCycle ES or other server workflows. More specifically, it is for forms that do not contain JavaScript used to interact with a server. Such JavaScript interactions can invalidate the signatures on a locked document.

The default lock-document experience is that the last signer of the document is presented with an option to lock the document to prevent further changes.

Acrobat and LiveCycle Designer ES form authors can create signature fields that lock some or all fields in the form. To specify such Acrobat signature fields, specify the appropriate Seed Value and specify the fields to lock after signing. To specify such LiveCycle Designer ES signature fields, specify the MDP (certification) filter and specify the fields to lock after signing.

In Acrobat 9.0, signing a certified document with the Lock After Signing option selected caused the certification to be invalidated. This problem is corrected in Acrobat 9.1.

**Certification requirement for XML forms**

Acrobat 9 requires that forms created with LiveCycle Designer ES meet certain criteria to be certified. Specifically, any submit buttons in such XML forms must contain URLs. The URLs can be relative.

Acrobat 8 did not have such a requirement.
Verification time for signatures

In Acrobat and Adobe Reader 9.1, the default preference for Verification Time (in Edit > Preferences > Security Advanced Preferences) is changed from “Secure time” to “The time at which the signature was created”. This change enables long-term validation support without requiring all users to reconfigure their preferences. Note that this setting will use the secure timestamp time if there is one present in the signature. Customers who want to continue to use “Secure time” will need to configure their desktop deployment to change the default.

This change means that, by default, signatures will be valid if the certificate used was valid at the time of signing rather than valid at the time of checking the validation. So by default, a signature will continue to show valid in the long term, even after the certificate has expired.

But it also means that, as well as trusting the signature, you are also trusting the time at which the document was signed. It is possible for a signer to change their system date to a time when a certificate was valid and then sign the document, which would then lead to misleading results. Hence, it is suggested that signatures be configured to use time stamp servers to provide the time for signatures.

In Acrobat 9.0, if the verification time preference is set to "The time at which the signature was created", then the CRL validity window had to include the time-of-signing in order to be used in signature validation. In Acrobat 9.1, this behavior is changed so that the CRL validity window overlaps the interval from the time-of-signing to the end of validity of the signing certificate. This change allows CRLs issued after the time-of-signing to be more consistently used.

This change can result in a behavior change where signatures that could not be validated (but were in the problematic state) can now be successfully validated, yielding a valid or invalid signature status.

Long-term signature validation changes

In Acrobat 9.1, it is possible to add signature validation information to the document after it has been signed. This change results in the following behavior in prior versions of Acrobat and Adobe Reader:

• Documents certified with no-changes-allowed and validation information added after signing will show invalid certification in Acrobat 9.0 and earlier.
• Documents with validation information added after signing will show unsigned changes in Acrobat 9.0 if no subsequent signature is added.
• Documents with validation information added after signing will show as "Valid with modifications" in Acrobat versions before 9.0.

Other signing changes

These signing changes apply to Acrobat 9.1.

Script changes prevent signing

It is no longer possible to sign (or certify) a document in the same session when a document script change was made. You must first save, close, and reopen the document. This change mainly affects form authors and developers.
It should also be noted that scripts that modify scripts on the form can no longer be used in conjunction with signatures. This restriction is due to security vulnerability problems. Certified forms could never modify scripts and are unaffected. Uncertified forms that modified scripts during a fill-in and signing process must be changed so that the effects of the script updates can be achieved in other ways.

**New Apply Ink Signature command in Sign menu and toolbar**

A new command to apply an ink signature is available (please refer to the Acrobat online help for more information). This command is unrelated to digital signatures and may be disabled for some documents. It may, however, cause confusion for some users. Organizations may wish to educate users on when to sign with a digital signature and when to apply an “ink” or handwritten signature.

**Signing and certifying with Adobe-provided Reader Extensions certificates no longer permitted**

Prior to Acrobat 9.1, it was possible to use a Reader Extensions certificate, which was provided by Adobe for applying usage rights to a document, for signing or certifying a document. It has been determined that this is not a desirable practice and so Acrobat and Adobe Reader 9.1 no longer support using those certificates for signing or certifying. If a document was signed or certified using such a certificate in a previous version of Acrobat or in another product such as LiveCycle ES or Interactive Forms based on Adobe software, the certification will be shown as invalid in Acrobat and Adobe Reader 9.1 and later, although it will still show as valid in earlier versions of Acrobat and Adobe Reader.

**Known issues**

**Invalid Signature state in Reader 9.1**

Forms containing scripts that assign an illegal value, such as a string, to a numeric field cause invalid signature status in some cases.

1. If the document was signed by an earlier version of Acrobat and verified in Reader 9.1, Reader 9.1 shows the signature as invalid.

2. If the document is signed by Reader 9.1, future versions of Reader show the signature as invalid. The workaround is to remove the offending script. Future versions of Reader will throw an exception so that such script is easier to find.