



Steganography made easy using Hide & Reveal

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**Hide secret information within
innocuous carriers**



- Introduction to steganography
- `org.steganography` library principles
- Hide & Reveal screenshots



Steganography

“What does not look ciphered has no meaning
for being decrypted”

– Anonymous



Definition

www.hidereveal.org

- Science of invisible communications
- Consists in hiding messages so that any unauthorized observer cannot guess a secret information is present



Current use (excerpt)

www.hidereveal.org

- Information exchange in a supervised environment
- Proof of ownership
- Overcome cryptography legal limitations



Well-known carriers

www.hidereveal.org

- ⦿ Uncompressed images (BMP, PNG)
- ⦿ Compressed images (JPEG)
- ⦿ Videos (MPEG, AVI)
- ⦿ Uncompressed sounds (WAV)
- ⦿ Compressed sounds (MP3)
- ⦿ Other formatted formats (HTML, XML)
- ⦿ ...



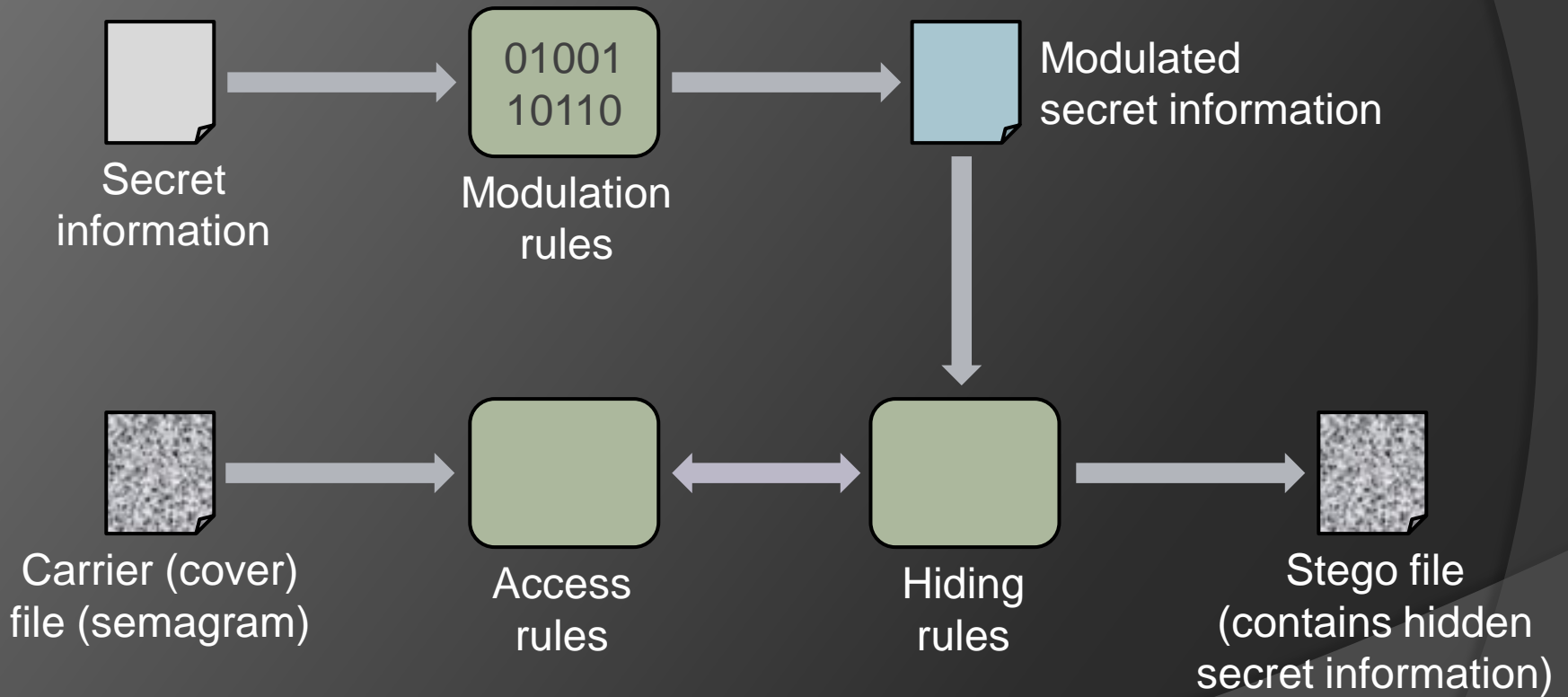
`org.steganography` library

Open-source library written in Java, available at
[`www.hidereveal.org`](http://www.hidereveal.org)



Hiding principle

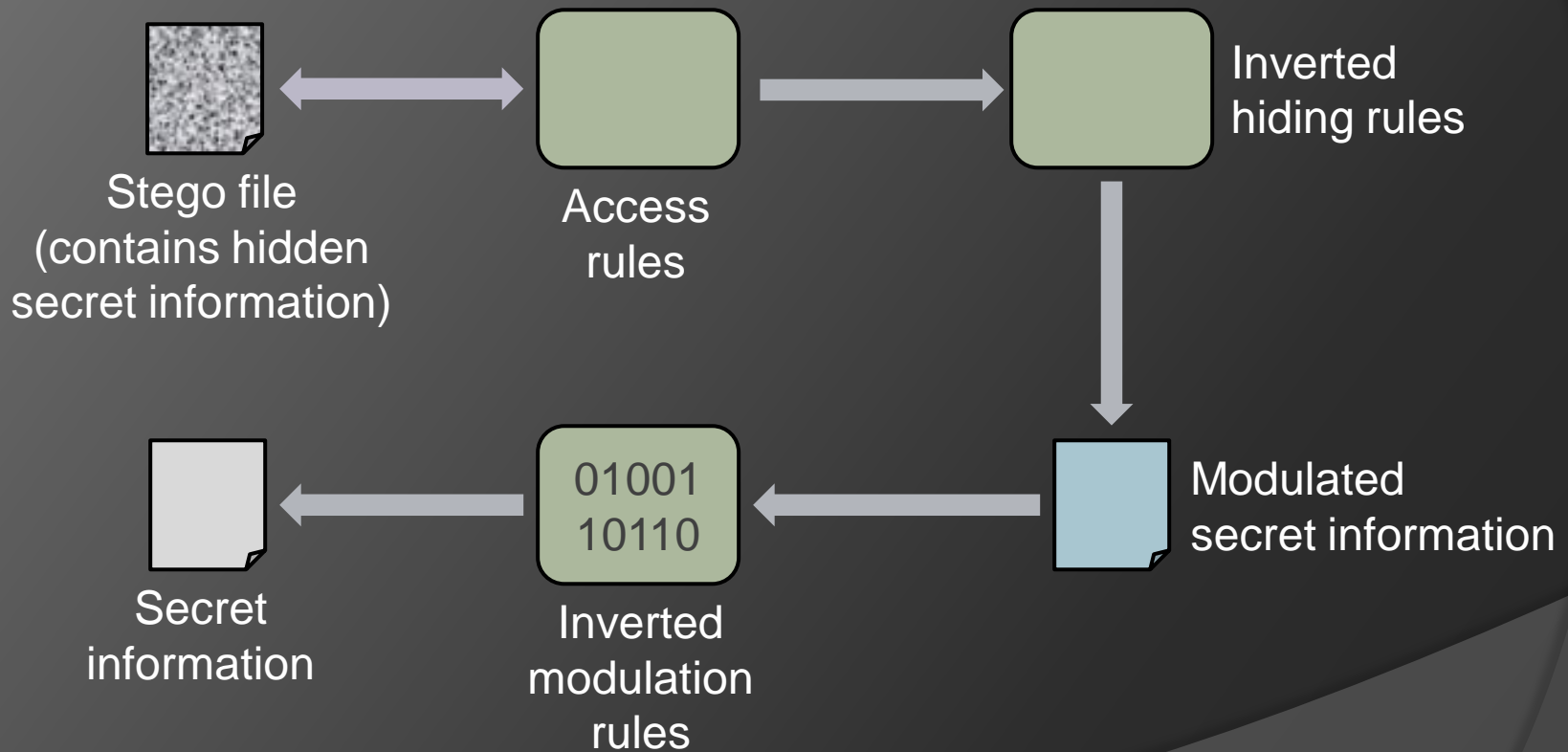
www.hidereveal.org





Revealing principle

www.hidereveal.org





org.steganography library components

- Extensive documentation (javadoc)
- Many carriers and secret content types
- Defines 3 dissimulation schemes :
 - Secret information modulation schemes
 - Carrier access rules schemes
 - Hiding schemes
- Designed for reseachers
- Customizable: interfaces, abstract classes



Available modulation schemes

www.hidereveal.org

- ◎ None: no modification of the secret data
- ◎ Negation of the secret information:
 - Of all secret information bytes
 - One byte out of two
 - Depending on the previous byte
- ◎ Exclusive OR based on a password



Available image access schemes

www.hidereveal.org

- Sequential: one pixel after another, from the beginning to the end of the image
- Inverted sequential: from the end to the beginning of the carrier image
- Uniform: pixels section is uniform, from the beginning to the end of the image
- Inverted uniform: from the end to the beginning of the carrier image

Available LSB hiding schemes within RVB images

◉ Double LSB:

- Each secret byte coded using 2 pixels of 32 bits
- Pixel 1 codes 6 bits of the secret byte
- Pixel 2 codes the 2 remaining bits
- Minimum carrier size is (t refers to the size of the secret information):

$$T_{\min} = 32 + (4 \times t) \times 2 = 8 \times (t + 4)$$

● Triple LSB :

- Each secret byte is coded using a single pixel
- Minimum carrier size is (t refers to the size of the secret information):

$$T_{\min} = 16 + (4 \times t) = 4 \times (t + 4)$$




Hide & Reveal

Make steganography available for all people
Provide a research framework for validating
new schemes and steganalysis techniques



Software overview

www.hidereveal.org

- ◎  Hide & Reveal :
 - Pure Java
 - Current version: 1.4.1
 - Supported carrier type = BMP, PNG, TIF images
 - Hides any file type within carriers
 - All schemes from **org.steganography** made available
 - Executable and downloadable from **www.hidereveal.org**

- ◎ Based on **org.steganography** library



Welcome screen

www.hidereveal.org

Hide

Reveal





File hiding – Step 1

www.hidereveal.org

Select carrier
(cover)
32 bits color-
depth BMP,
PNG and TIF
file types
supported

Select
secret
file to
hide

Add a
textual note

Select
stego file to
be created

Hide & Reveal

File Options Help

Hide & Reveal

Hiding process - Step 1

Select host (carrier), secrets (file and textual note) to hide and destination file (holding the secrets) to be created

Carrier: ...

Secret: ...

Note:

Destination: ...

Next >>

Disseminate secret information

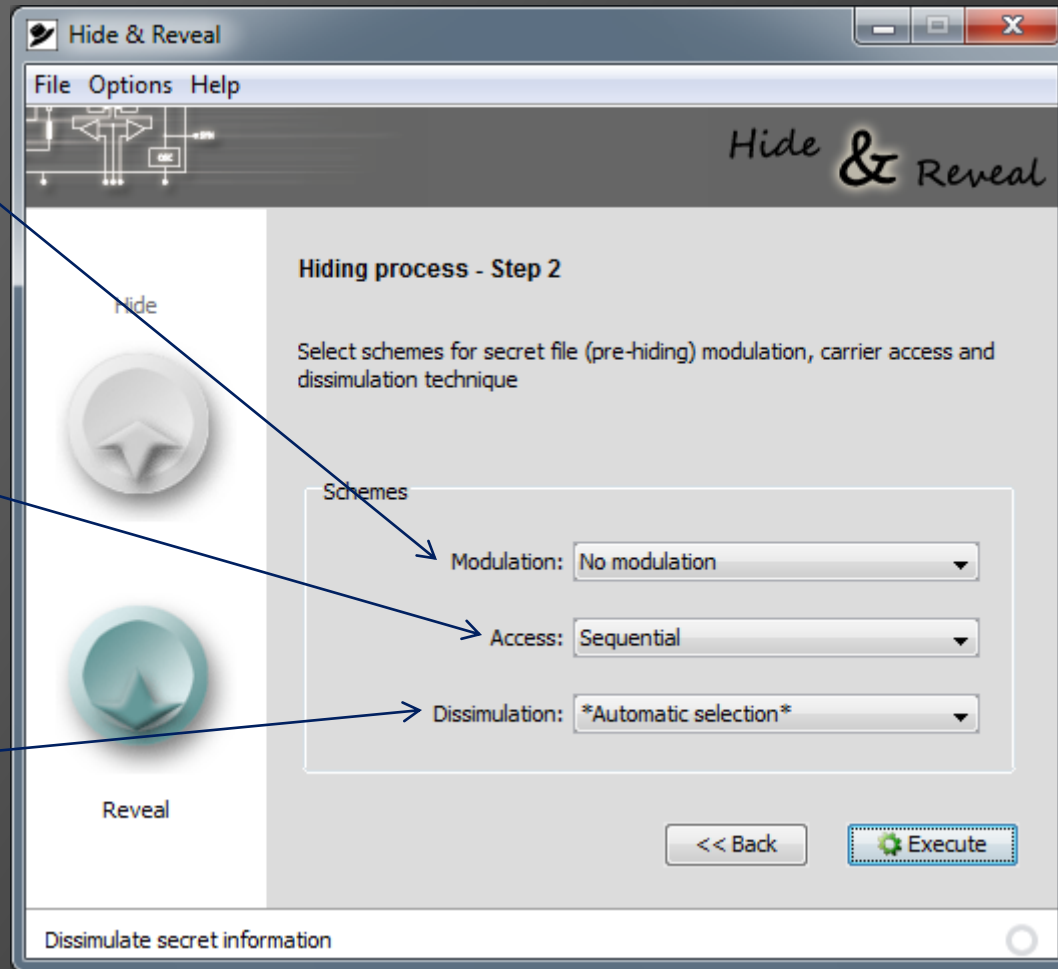


File hiding – Step 2

Select modulation scheme

Select access scheme

Select hiding scheme



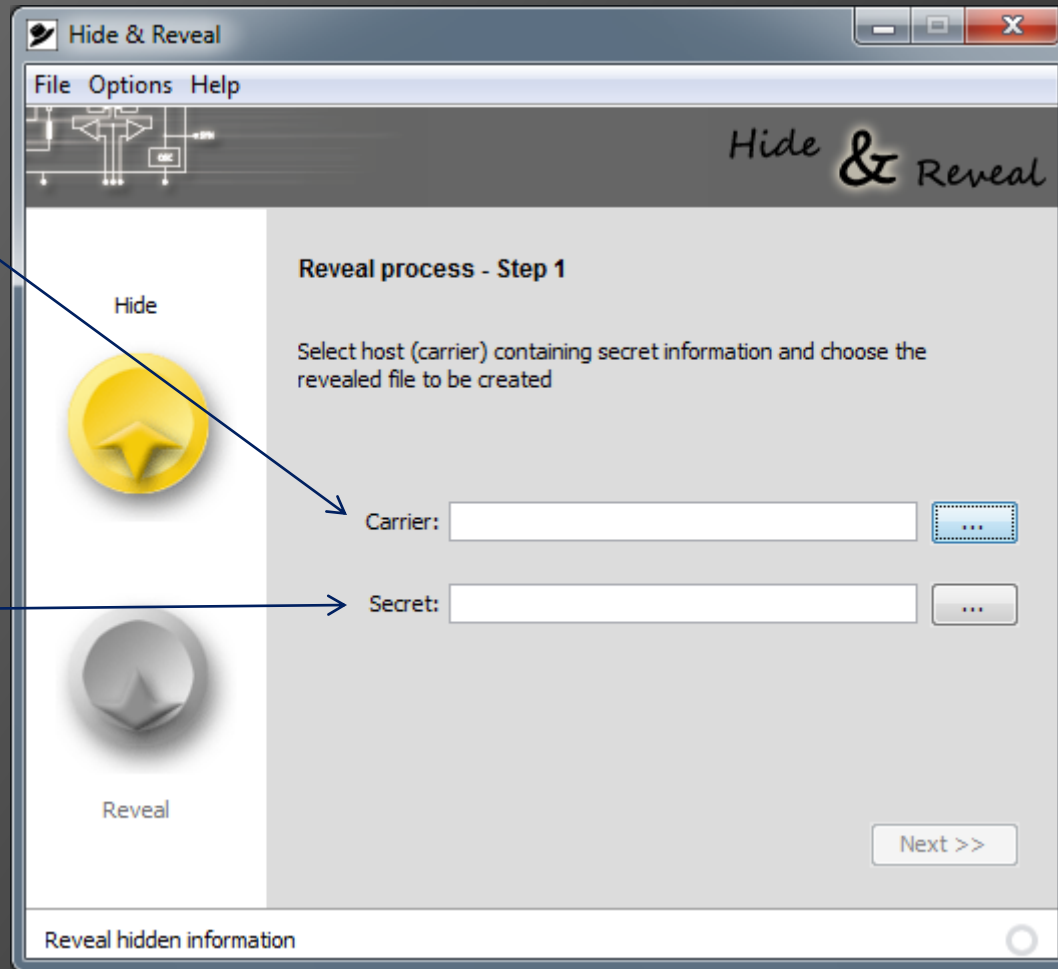
Access and hiding schemes will depend on the carrier file type



File revealing – Step 1

Select
stego
file

Indicate
secret
file to
reveal
(file will be
created)



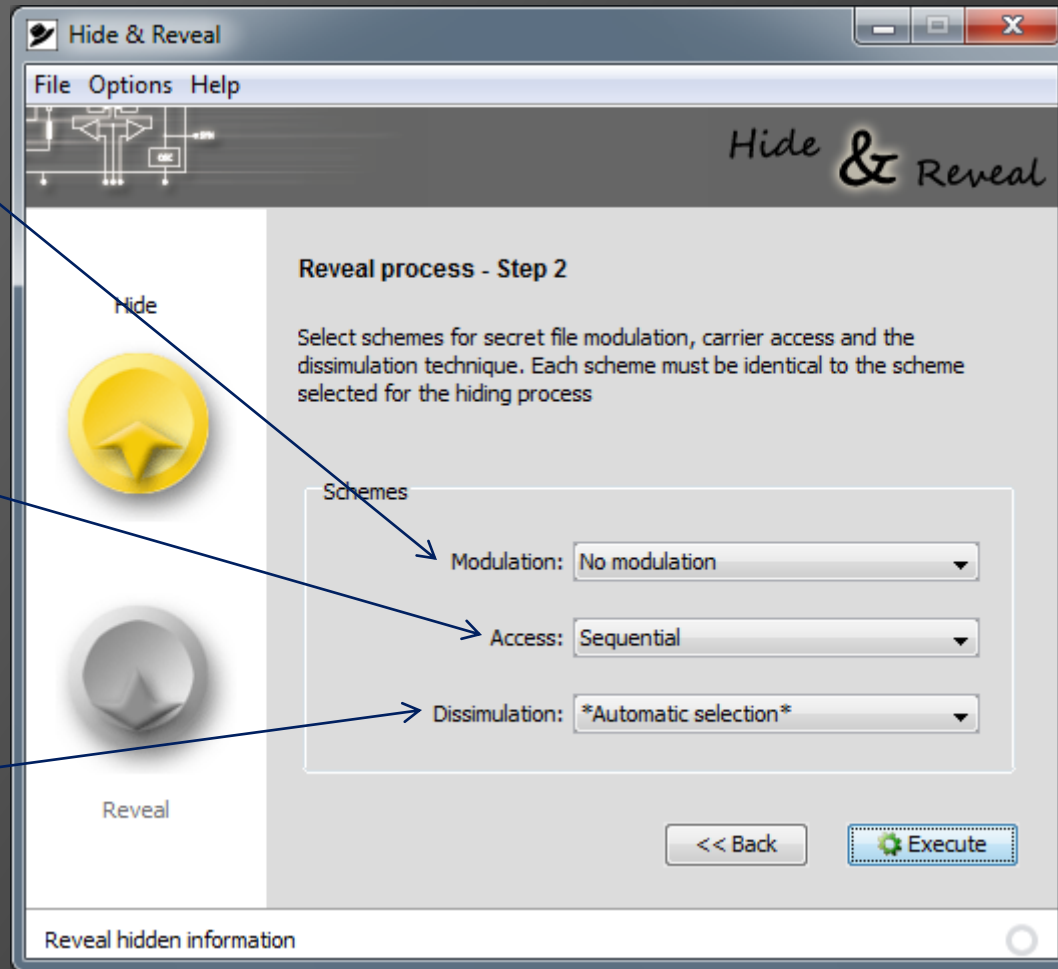


File revealing – Step 2

Select modulation scheme

Select access scheme

Select hiding scheme (to reveal the secret)



Schemes must be identical to the ones used during the dissimulation process