

Steganography & Steganalysis

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COURSE OVERVIEW

Can YOU See the Difference?

- Which one are the Stego - Images ???



- One has 146,553 randomized bytes embedded
- 25.38% of total file size of 577,345 bytes
- One has 138,668 (24%) compressed bytes embedded

Can YOU See the Difference #1



Can YOU See the Difference #2



Can YOU See the Difference #3



Here is the Hidden Data



Schedule

- Session #1: 9:00 am - 10:30 am
 - Introductions
 - Background
 - Hands-On
- Session #2: 10:45 am – 12:15 pm
 - LSB Substitution
 - More Advanced Substitution
 - Bit-Plane Complexity Segmentation
 - Pixel-Value Differencing
 - Hands-On

Schedule

- Session #3: 12:45 pm - 2:15 pm
 - Introduction to Jpeg Algorithm
 - Jpeg Hiding Techniques
 - DCT Swap
 - DCT LSB
 - High-Capacity Hiding
 - Hands-On
- Session #4: 2:30 pm – 4:00 pm
 - Steganalysis Techniques
 - Exposing bitmap hiding
 - Exposing Jpeg Hiding
 - Hands-On

A Little About Me

- Joined L3Harris Corporation in 2010
 - Reverse engineer/scientist research
- Began teaching at the University of Texas in San Antonio (UTSA) in 2003
 - Computer science and electrical engineering courses
 - Developed and taught Steganography course since 2004
- Served in the U.S. Air Force for 12 years
 - Taught computer networks course ... dial-up modems were the way to go!
 - TCP/IP has not changed!

Topic Overview

- Introduction to Steganography
- Required Background
 - Math concepts
 - Information Theory
 - Real Random Numbers
 - Cryptographic Hashing
 - Data Compression
- Audio Visual Overview
 - Graphics basics
 - Audio Basics

Topic Overview

- Basic Hiding and Substitution - Spatial Domain
 - Picture in Picture
 - Least Significant Bit (LSB) Images
 - Least Significant Bit (LSB) Audio
- More Advanced Substitution
 - Bit-Plane Complexity Segmentation

Topic Overview

- Advanced Hiding – Transform Domain
 - Detailed Jpeg Algorithm
 - Jpeg Hiding Techniques
 - High Capacity Jpeg Hiding
- More Advanced Audio Steganography
 - Echo Hiding
 - Statistical Hiding

Topic Overview

- Introduction to Steganalysis
 - Detecting hidden data in bitmaps
 - Detecting hidden data in Jpeg
- Time Permitting
 - Visual Cryptography
 - Hiding in an Executable File
 - PE File Format
 - Hydan
 - STILO

Which one has hidden data

- The file is 1,027,303 bytes – has a 21.00 % data hiding capacity



Picture #1



Picture #2



The Hidden Data



Questions & Comments

- Complaints?