# AISS Secure Mail

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Applications and Implementations of Security Systems
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# Outline

1. Overview
   - Motivation
   - Requirements
   - Goals
   - Related Solutions
   - Challanges
2. System architecture
3. Results
4. Future Work
5. Conclusions

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# Motivation

- **Wikileaks**: 400.000 **Top-Secret** American Army Documents published
- Internet - Main Enterprise Communication Mean

# Requirements

**AISS Secure Mail** provides:

- Hidden Text & Attachments;
- Sender Authentication via Citizen Card
- Email Sending Time Assurance
- Secure Email Exchange

# Goals

- User-friendly program
- Compatible with file based applications
- Mac OS X Compatible
- Good performance

# Related Solutions

Comparation with other solutions:

| **Related Solutions** | **Our Solution** |
|---|---|
| Thunderbird interface | Generic Application Support |
| Manual Decipher Options | Automatic Process |

# Challanges

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- Memory Constraints
- Efficiency
- Unstable Citizen Card library

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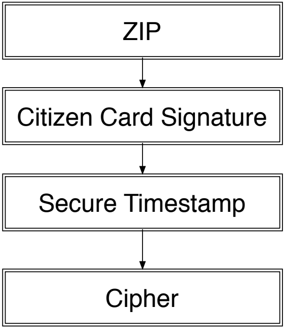
# System architecture



ZIP

Citizen Card Signature

Secure Timestamp

Cipher

Figure 1: System Architecture architecture.

# AISS Secure Mail

## Zipping

- All files and folder inside a directory are zipped;
- Support any file size
- Single file output

# AISS Secure Mail

## Citzen Card Signature

- PKCS11 Portuguese Citizen Card
- SHA-1, RSA

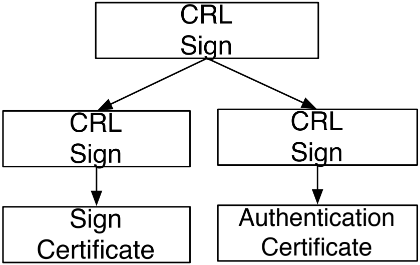


Figure 2: Certificate Tree

## Secure Timestamp

- Remote Rasperry Pi Server;
- Self signed RSA Keys;
- SHA-256;
- Retrieve hash from User and sign it
- Output: Kp(H(m),T),T

## Cipher

Cipher using ethernet box:

- JNI + C Connection;
- Block update;
- All data in memory;

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# Results

Fazer um teste para ver quanto tempo a zippar Quanto tempo a assinar Quanto tempo a cifrar Isto para um ficheiro grande
Tempo de utilização para uma pessoa comum

# Results

## Trace-driven simulation experiments

### Simulation

- IBM Thinkpad T22
- HP's Chai JVM (limited to 7/8 Mbytes of Heap Size)

### Performance metrics

- *Total offloading delay*
- *Average interaction stretch*
- *Total bandwidth requirement*

# Results

## Trace-driven simulation experiments

# Results

## Prototype experiments

### Mobile Device (emulated)

- 266 MHz HP laptop;
- 11 Mbps 802.11b

### Surrogate

- 733 MHz HP Kayak PC workstation
- 128 Mbytes of RAM

### Network

- 10Mbps

# Results

## Prototype experiments

# Results

## Prototype experiments

### Offloading, constrained memory

- 1.5% - 5.7% more slow;
- Cost of monitoring, remote accesses and partitioning increases the execution time.

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# Future Work

This work contributes to future research directions:

- Change to file on disk update;
- Buy CA certificate for secure timestamp;
- Integration with Thunderbird and Gmail
- Drag Drop interface

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# Conclusions

- Pervasive application delivery with fidelity;
- Avoid expensive application rewriting;
- **What**: Efficient partition selecting
- **When**: Fuzzy Control Model to achieve adaptability, stability and configurability;
- **Where**: Modified Java Virtual Machine
- **How**: Remote Process Call - RPC
- Relieve memory constraints for mobile devices.

# Thank you!

Q&A