Ladar Levison

Stephen Watt

What is Dark Mail?

What is ~~Dark Mail~~?

What is DIME?

Did you write down the formula?

```
-----BEGIN RSA PRIVATE KEY-----
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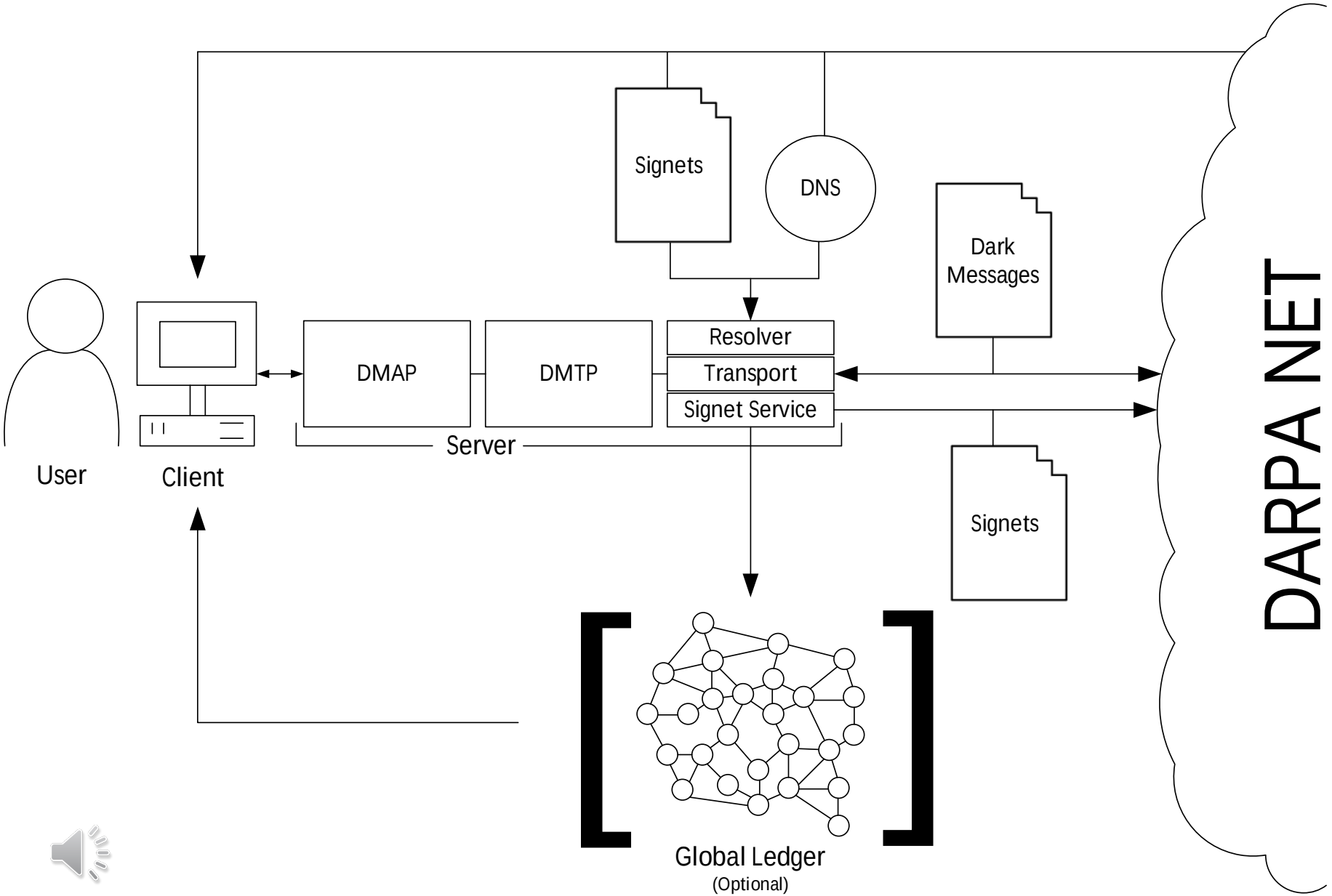
-----END RSA PRIVATE KEY-----
```

Dark Internet Mail Environment

DIME *Illustrated*



Why Do We Need It?

- Guilt by Association
- Mass Surveillance (Gotta Love Backbone Slurping)
- Service Provider (PRTT Orders, Search Warrants, NSLs, FISC Warrants)

within the mainstream, but this is a provider that specifically was started in order to have to protect privacy interests more than the average Internet service provider.

THE COURT: I can understand why the system was set up, but I think the government is -- government's clearly entitled to the information that they're seeking, and just because you-all have set up a system that makes that difficult, that doesn't in any way lessen the government's right to receive that information just as they would from any telephone company or any other e-mail source that could provide it easily. Whether it's -- in other words, the difficulty or the ease in obtaining the information doesn't have anything to do with whether or not the government's lawfully entitled to the information.

Goals

- Message Confidentiality
- Author Validation
- Minimize Metadata Exposure
- Automagical Key Management
- Efficient Access from Multiple Clients
- Deployment Flexibility

Get everyone using it! The more people using it, the more valuable it becomes.

THE COURT: All right. Mr. Levison.

MR. LEVISON: Good morning, Your Honor. I'm not sure what order I should make these in, but I would like to request a couple of things by motion.

I'd like to move that all of the nonsensitive portions of the documents that were provided, i.e., everything except the account in question, be unsealed. I believe it's important for the industry and the people to understand what the government is requesting by demanding that I turn over these encryption keys for the entire service.

THE COURT: All right. What do you say to that, Mr. [redacted] Deal with the motions before I --

MR. [redacted] What Mr. Levison is trying to do, Your Honor, is invite industry to come in and litigate as a surrogate for him the issue of whether the encryption keys are part and parcel of the pen register order. And that's one of the reasons we sought the search warrant, to make it clear, whether through the search warrant or pen register order, he is required to provide these keys.

We know he's been in contact with attorneys who also represent industry groups and others who have litigated issues like this in the WikiLeaks context and others. But we would object to unsealing this matter because it's just Mr. --

How far will they go?

Particular Things to be Seized

I. Information to be disclosed by Lavabit, LLC

To the extent that the information described in Attachment A is within the possession, custody, or control of Lavabit, LLC (Lavabit), including any e-mails, records, files, logs, or information that have been deleted but are still available to Lavabit, or have been preserved pursuant to a request made under 18 U.S.C. § 2703(f), Lavabit is required to disclose the following information to the government for each account or identifier listed in Attachment A:

a. The contents of all e-mails associated with the account, including stored or preserved copies of e-mails sent to and from the account, draft e-mails, the source and destination addresses associated with each e-mail, the date and time at which each e-mail was sent, and the size and length of each e-mail;

b. All records or other information regarding the identification of the account, to include full name, physical address, telephone numbers and other identifiers, records of session times and durations, the date on which the account was created, the length of service, the types of service utilized, the IP address used to register the account, log-in IP addresses associated with session times and dates, account status, alternative e-mail addresses provided during registration, methods of connecting, log files, and means and source of payment (including any credit or bank account number);

c. All records or other information stored at any time by an individual using the account, including address books, contact and buddy lists, calendar data, pictures, and files;

d. All records pertaining to communications between Google and any person regarding the account, including contacts with support services and records of actions taken.

For each of the categories above, if Lavabit is able to provide decrypted content, it must do so. If Lavabit is unable to provide decrypted content, Lavabit must provide any and all information necessary to decrypt the content, including, but not limited to public and private keys and algorithms.

II. Information to be seized by the government

[redacted]

b. Evidence of the identities of the users of the account and co-conspirators and others associated with the account and the criminal activities facilitated by the use of the account;

c. Evidence of the location of the users of the account and co-conspirators and others associated with the account, and;

d. Records relating to who created, used, or communicated with the account or identifier, including records about their identities and whereabouts.

How will they attack?

Weak Points

- DNS
- Password Strength
- Endpoint Security
- Cryptographic Algorithms
- Implementation Vulnerabilities
- JavaScript Clients
  - For those addicted to Webmail

* Warning: if the world adopts end-to-end cryptography for communications, then it's only a matter of time – hardware will start shipping from the factory with a backdoor.

Let’s Get Back to DIME

Lead by Example


magma


VOLCANO

DIME Management Record

```
[ladar@defcon ~]# host -t txt _dx.lavabit.com
_dx.lavabit.com descriptive text "sig=VGhpcyBpcyBub3QgYSByZWFsIHNp
Z25pbmcga2V5LiBUaGlzIGlzIG5vdCBhIHJlYWwgc2lnbmluZyBrZXku"
```

DIME Management Record

```
[ladar@defcon ~]# host -t txt _dx.lavabit.com
_dx.lavabit.com descriptive text "sig=VGhpcyBpcyBub3QgYSByZWFsIHNp
Z25pbmcga2V5LiBUaGlzIGlzIG5vdCBhIHJlYWwgc2lnbmluZyBrZXku"
```

```
[ladar@defcon ~]# host -t txt _dx.complicated.lavabit.com
_dx.complicated.lavabit.com descriptive text "ver=1 dx=dx.l
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jlmMzI5Mzhi"
```

DIME Management Record

```
[ladar@defcon ~]# host -t txt _dx.lavabit.com
_dx.lavabit.com descriptive text "sig=VGhpcyBpcyBub3QgYSByZWFsIHNp
Z25pbmcga2V5LiBUaGlzIGlzIG5vdCBhIHJlYWwgc2lnbmluZyBrZXku"
```

```
[ladar@defcon ~]# host -t txt _dx.complicated.lavabit.com
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jlmMzI5Mzhi"
```

What is a Signet?

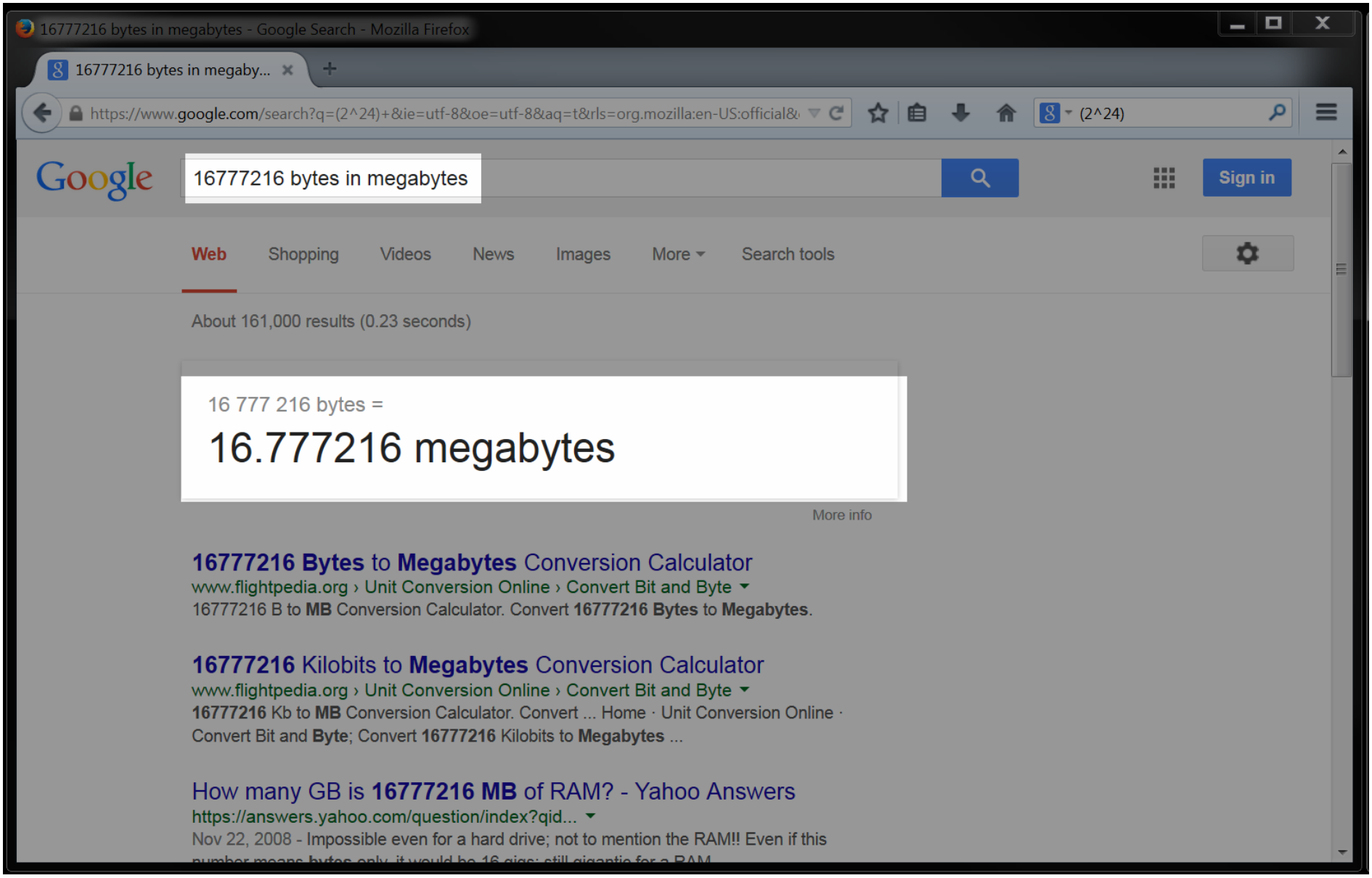
Signet

Header
Byte 1: Signet Format Version Number
Bytes 2-4: Length of the Signet *(minus the 4 byte header)*

Defined Attributes
Byte 1: Attribute Type (Signing key, Encryption Key, Org Signature, Etc.)
Bytes 2-3: Value Length
Bytes 4-X: Value

Undefined Attributes
Byte 1: Indicates Undefined Attribute Type (Value == 255)
Byte 2: Name Length
Bytes 3-N: Name
Bytes (N+1)-(N+3): Value Length
Bytes (N+4)-(N+4+X): Value

* Because the overall length is 3 bytes, the maximum size of a Signet is 16 megabytes.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How many GB is 16777216 MB of RAM? - Yahoo Answers
https://answers.yahoo.com/question/index?qid...
Nov 22, 2008 - Impossible even for a hard drive; not to mention the RAM!! Even if this

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gravitational constant

Google

gravity on earth

Sign in

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About 42,500,000 results (0.21 seconds)

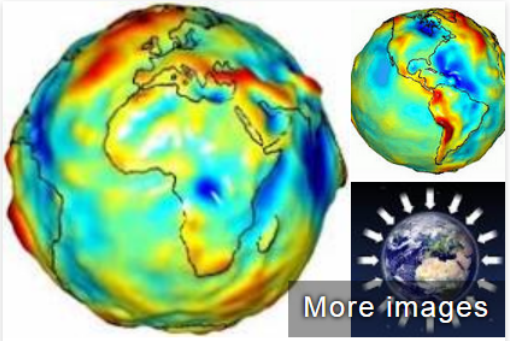
gravity on earth =

$9.80665\ m / s^2$

More info

Gravity of **Earth** - Wikipedia, the free encyclopedia
en.wikipedia.org/wiki/**Gravity**_of_**Earth** Wikipedia
The **gravity** of **Earth**, denoted g, refers to the acceleration that the **Earth** imparts to objects on or near its surface. In SI units this acceleration is measured in ...
Variation in gravity and ... - Estimating g from the law of ...

Standard **gravity** - Wikipedia, the free encyclopedia
en.wikipedia.org/wiki/Standard_**gravity** Wikipedia
Standard **gravity**. From Wikipedia, the free encyclopedia. Jump to: navigation, search. Further information: **Gravity** of **Earth**. The standard acceleration due to ...



Gravity of Earth

The gravity of Earth, denoted g, refers to the acceleration that the Earth imparts to objects on or near its surface. In SI units this acceleration is measured in meters per second squared or equivalently in newtons per kilogram. Wikipedia

gravity on earth - Google Search - Mozilla Firefox

gravity on earth - Google ...

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gravitational constant

Google

gravity on earth

Sign in

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About 42,500,000 results (0.21 seconds)

gravity on earth =

$10\ m / s^2$

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Variation in gravity and ... - Estimating g from the law of ...

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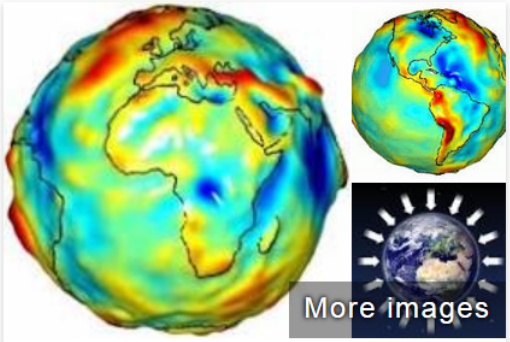
en.wikipedia.org/wiki/Standard_**gravity** Wikipedia
Standard **gravity**. From Wikipedia, the free encyclopedia. Jump to: navigation, search. Further information: **Gravity** of **Earth**. The standard acceleration due to ...



Gravity of Earth

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Signet Construction

Signet Construction

```
sign=TG9yZW0gaXBzdW0gZG9sb3Igc2l0IGFtZXQsIGNvbnNlY3RldHVyIGFkaXBpc2NpbmcgZWxpdCBwb3N1ZXJlLiA
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Signet Construction

sign=TG9yZW0gaXBzdW0gZG9sb3Igc2l0IGFtZXQsIGNvbnNlY3RldHVyIGFkaXBpc2NpbmcgZWxpdCBwb3N1ZXJlLiA
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Signet Construction

sign=TG9yZW0gaXBzdW0gZG9sb3Igc2l0IGFtZXQsIGNvbnNlY3RldHVyIGFkaXBpc2NpbmcgZWxpdCBwb3N1ZXJlLiA
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name=Glenn Greenwald

photo=**/9j/4AAQSkZJRgABAQAAAQABAAD/2wCEAAkGBwgHBgkIBwgKCgkLDRYPDQwMDRsUFRAWIB0iIiAdHx8kKDQsJCYxJx8fLT0tMTU3Ojo6Iys/RD84QzQ5OjcBCgoKDQwNGg8PGjclHyU3**
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Signet Construction

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Signet Construction


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motto=It is the duty of every patriot to protect his country from its government.


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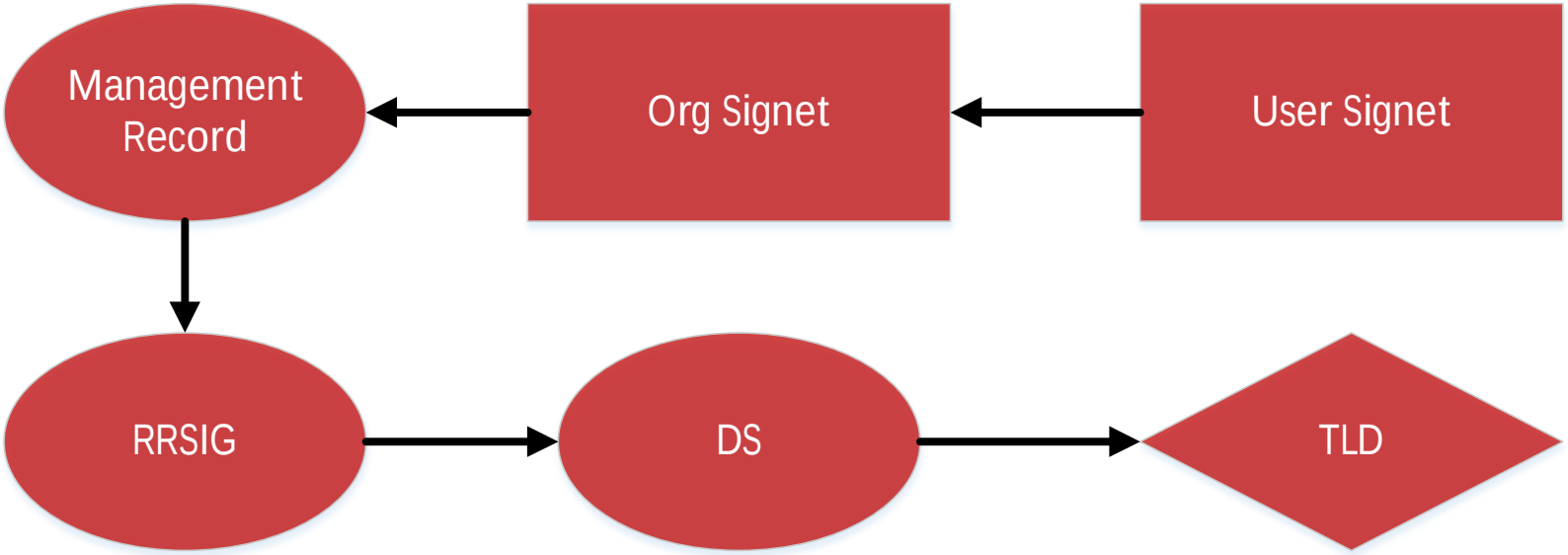
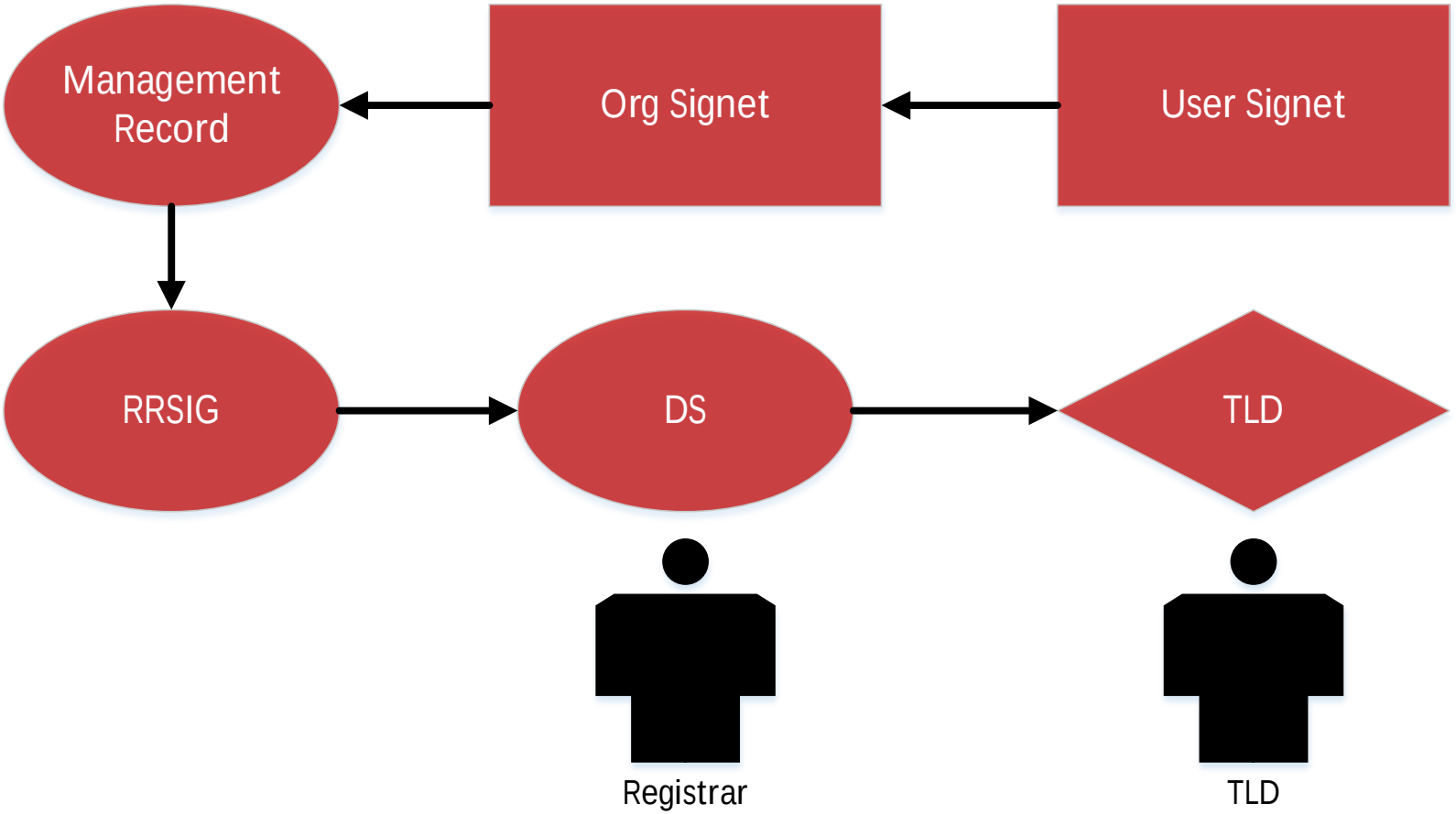
Trust Model

Signet resolver obtains a signet from an authoritative primary source and then validates it using a pre-authenticated secondary source.



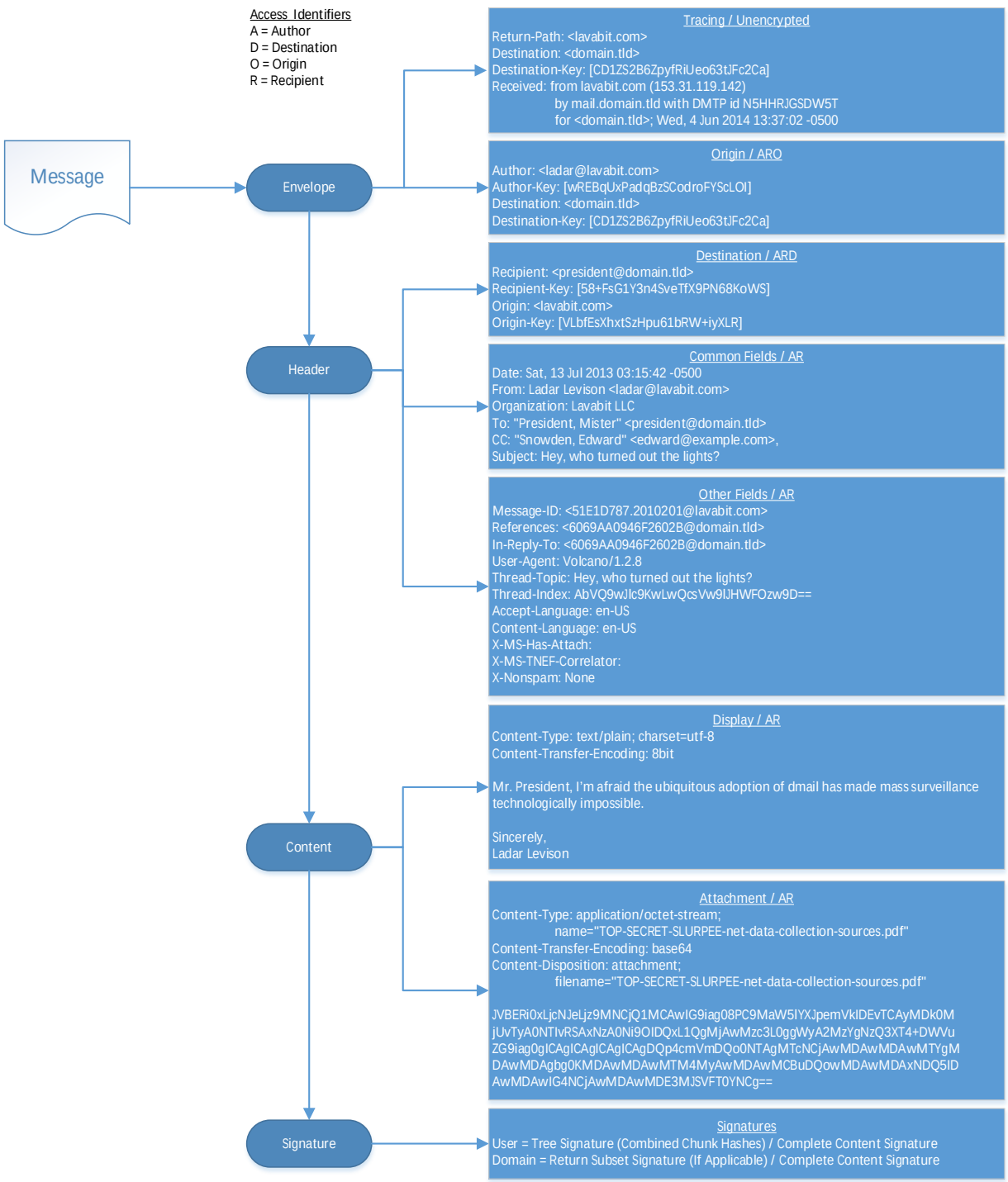
Trust Model

Signet resolver obtains a signet from an authoritative primary source and then validates it using a pre-authenticated secondary source.



* Trust no one. You'll live longer.

Princess


Access Identifiers
A = Author
D = Destination
O = Origin
R = Recipient
Message
Envelope
Header
Content
Signature
Tracing / Unencrypted
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Destination: <domain.tld>
Destination-Key: [CD1ZS2B6ZpyfRiUeo63tJFc2Ca]
Received: from lavabit.com (153.31.119.142)
by mail.domain.tld with DMTP id N5HHRJGSDW5T
for <domain.tld>; Wed, 4 Jun 2014 13:37:02 -0500
Origin / ARO
Author: <ladar@lavabit.com>
Author-Key: [wREBqUxPadqBzSCodroFYScLOI]
Destination: <domain.tld>
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Origin: <lavabit.com>
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Common Fields / AR
Date: Sat, 13 Jul 2013 03:15:42 -0500
From: Ladar Levison <ladar@lavabit.com>
Organization: Lavabit LLC
To: "President, Mister" <president@domain.tld>
CC: "Snowden, Edward" <edward@example.com>,
Subject: Hey, who turned out the lights?
Other Fields / AR
Message-ID: <51E1D787.2010201@lavabit.com>
References: <6069AA0946F2602B@domain.tld>
In-Reply-To: <6069AA0946F2602B@domain.tld>
User-Agent: Volcano/1.2.8
Thread-Topic: Hey, who turned out the lights?
Thread-Index: AbVQ9wJlc9KwLwQcsVw9lJHWFOzw9D==
Accept-Language: en-US
Content-Language: en-US
X-MS-Has-Attach:
X-MS-TNEF-Correlator:
X-Nonspam: None
Display / AR
Content-Type: text/plain; charset=utf-8
Content-Transfer-Encoding: 8bit
Mr. President, I'm afraid the ubiquitous adoption of dmail has made mass surveillance technologically impossible.
Sincerely,
Ladar Levison
Attachment / AR
Content-Type: application/octet-stream;
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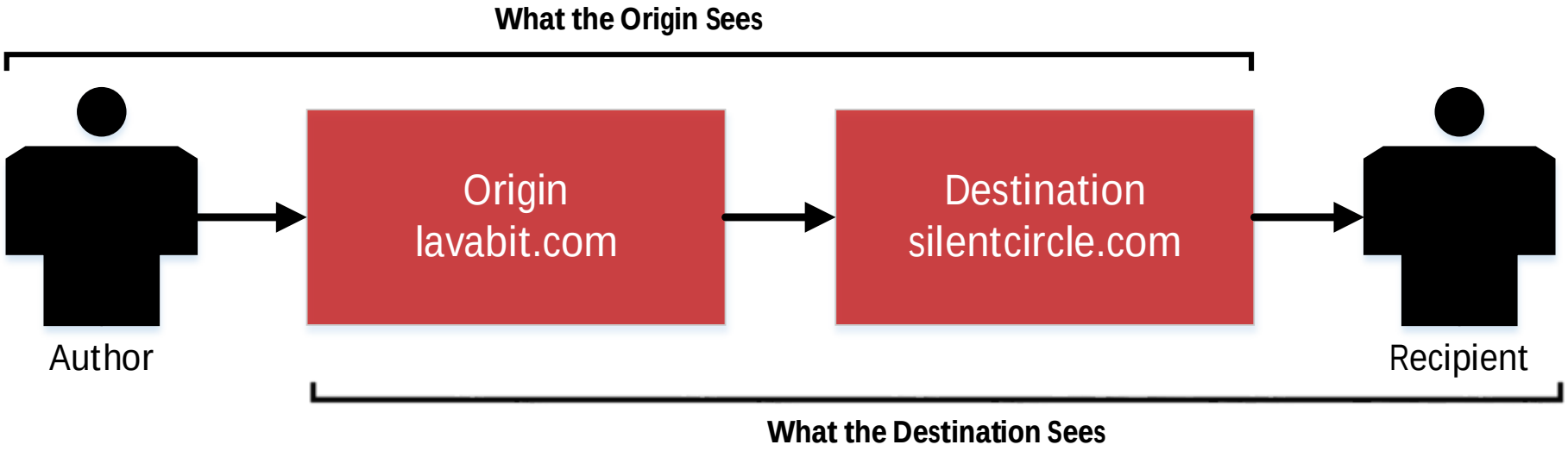
Signatures
User = Tree Signature (Combined Chunk Hashes) / Complete Content Signature
Domain = Return Subset Signature (If Applicable) / Complete Content Signature

Pseudo Onion



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