XKEYSCORE

25 Feb 2008

xkeyscore@nsa

DERIVED FROM: NSA/CSSM 1-52
DATED: 20070108
DECLASSIFY ON: 20320108

What is XKEYSCORE?

1. DNI Exploitation System/Analytic Framework

2. Performs strong (e.g. email) and soft (content) selection

3. Provides real-time target activity (tipping)

4. "Rolling Buffer" of ~3 days of ALL unfiltered data seen by XKEYSCORE:
   - Stores full-take data at the collection site – indexed by meta-data
   - Provides a series of viewers for common data types

5. Federated Query system – one query scans all sites
   - Performing full-take allows analysts to find targets that were previously unknown by mining the meta-data

Methodology

- Small, focused team
- Work closely with the analysts
- Evolutionary development cycle (deploy early, deploy often)
- React to mission requirements
- Support staff integrated with developers
- Sometimes a delicate balance of mission and research

System Details

- Massive distributed Linux cluster
- Over 500 servers distributed around the world
- System can scale linearly – simply add a new server to the cluster
- Federated Query Mechanism

Query Hierarchy

User Queries

Query

XKEYSCORE web Server

Query

Query

Query

F6 HQS

FORNSAT site

SSO site

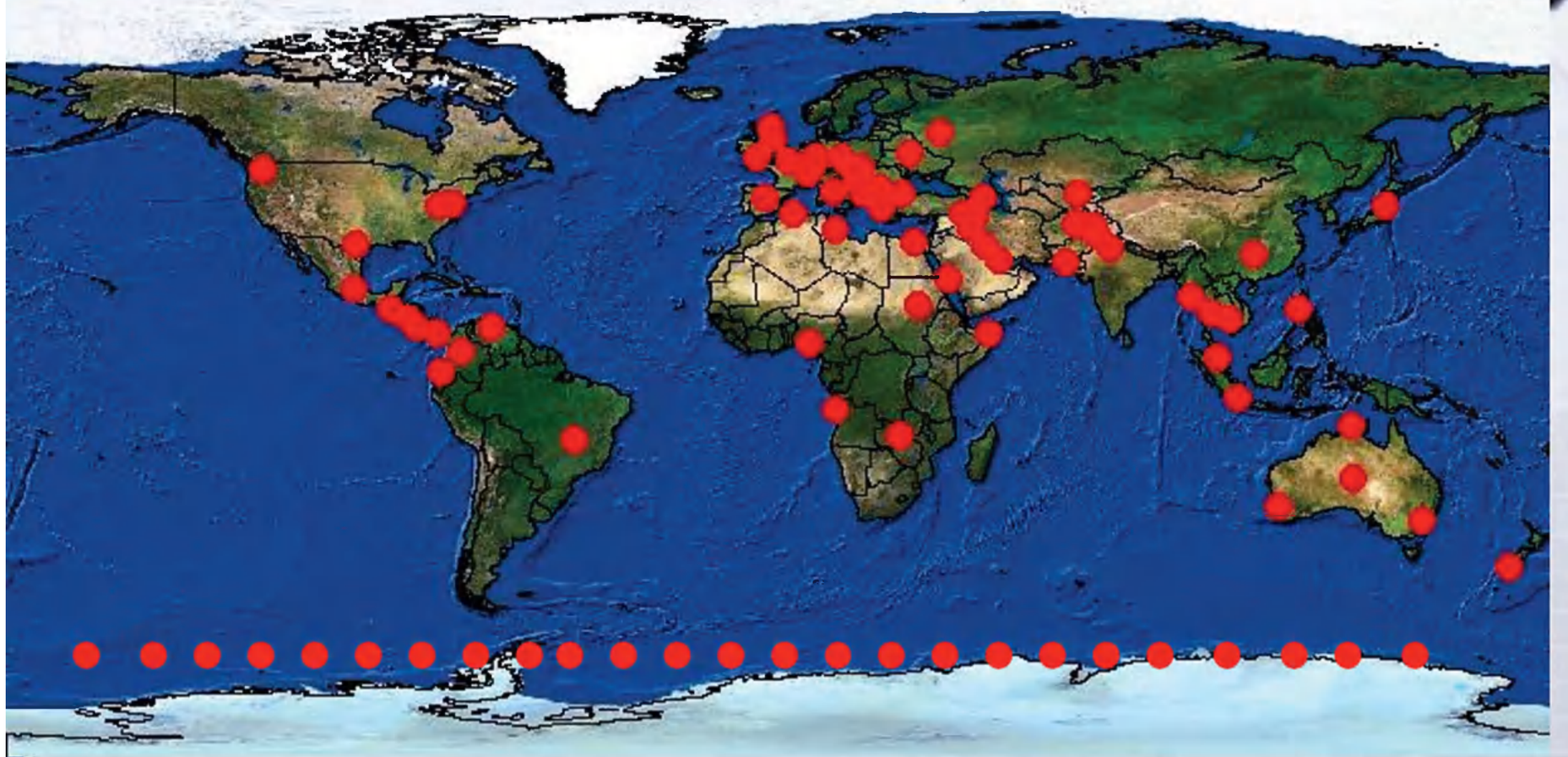
Query

Query

F6 Site 1

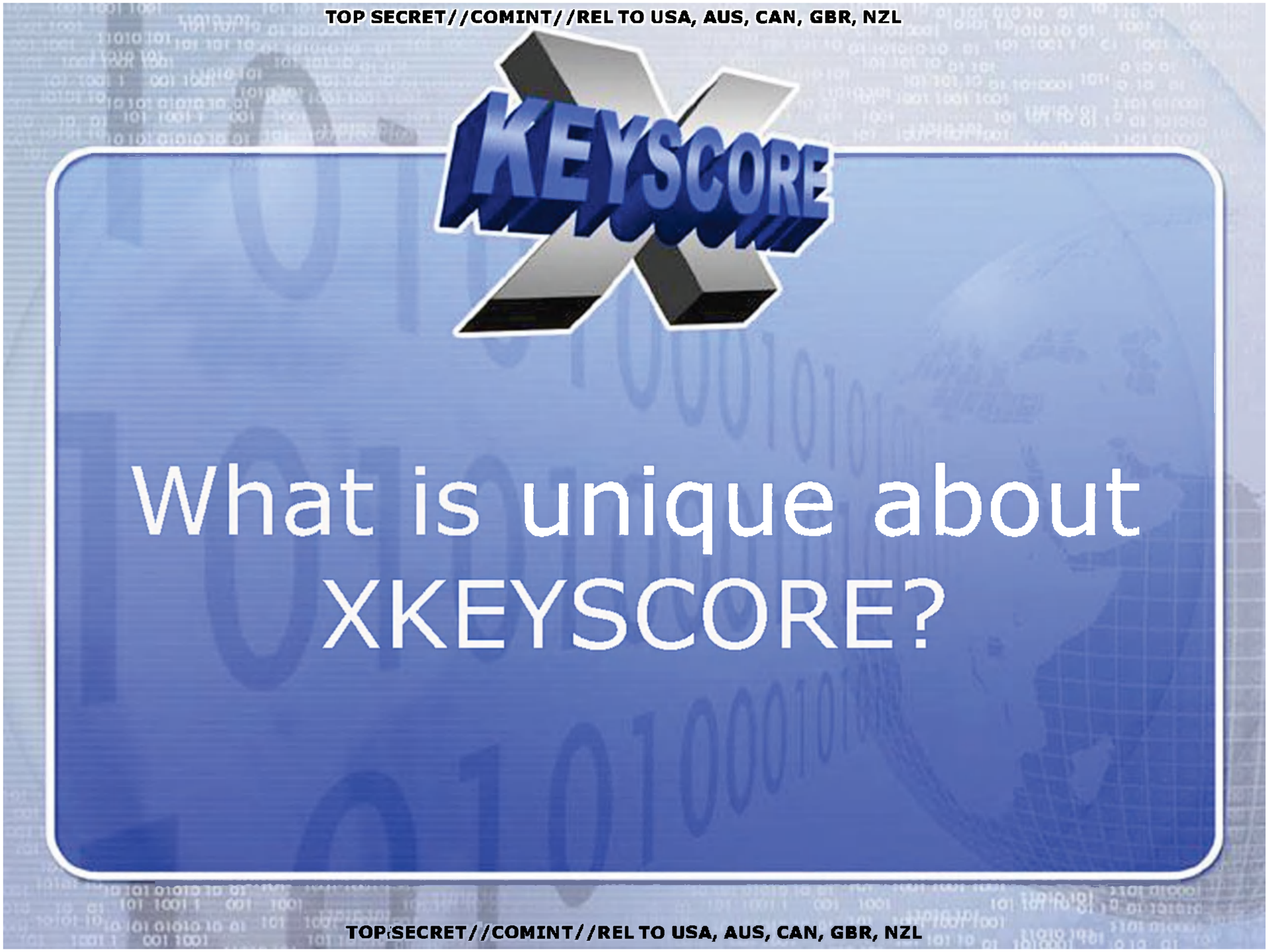
F6 Site 2

Where is X-KEYSCORE?

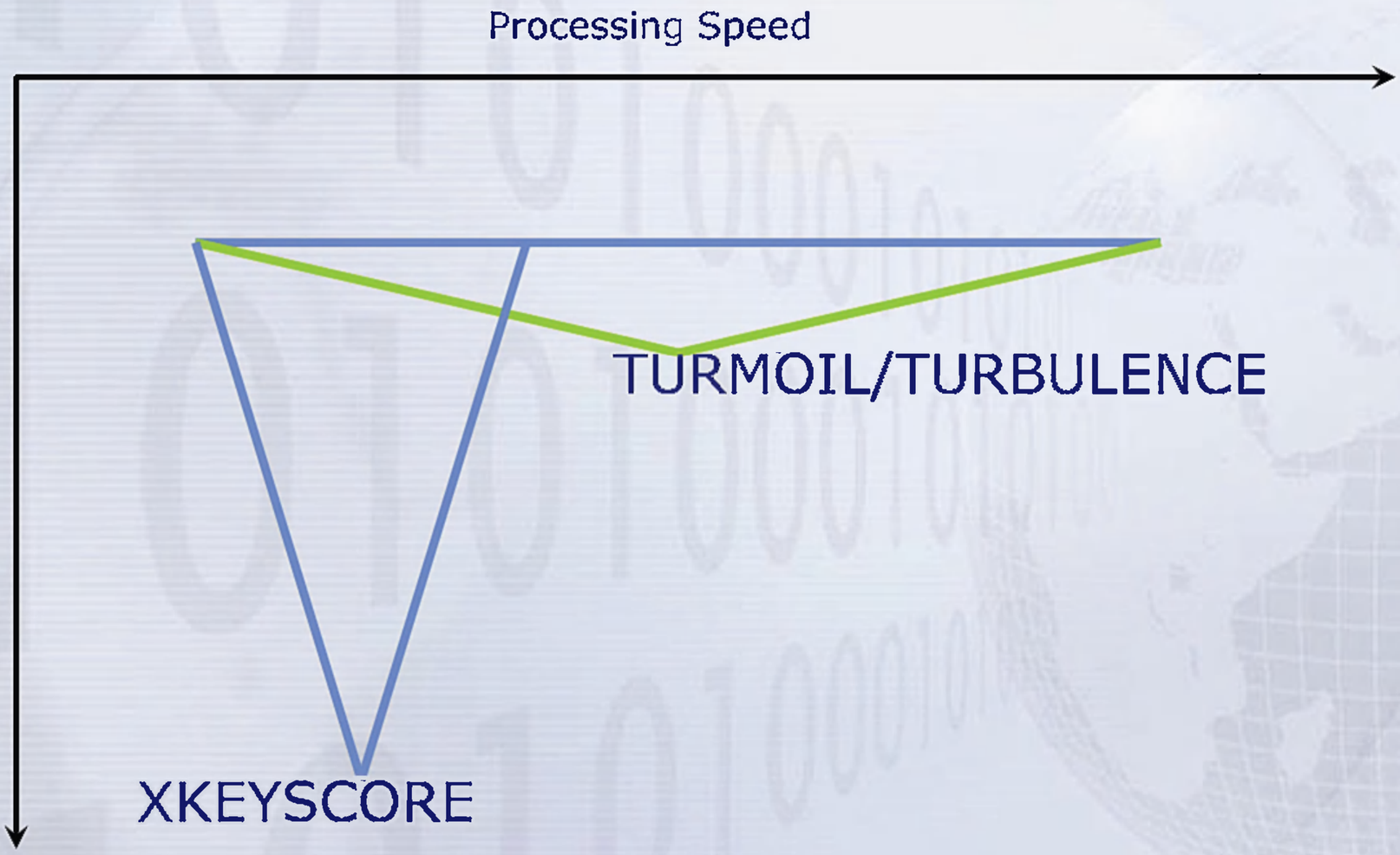


Approximately 150 sites

Over 700 servers


XKEYSCORE
What is unique about XKEYSCORE?

General Capability



Why do shallow

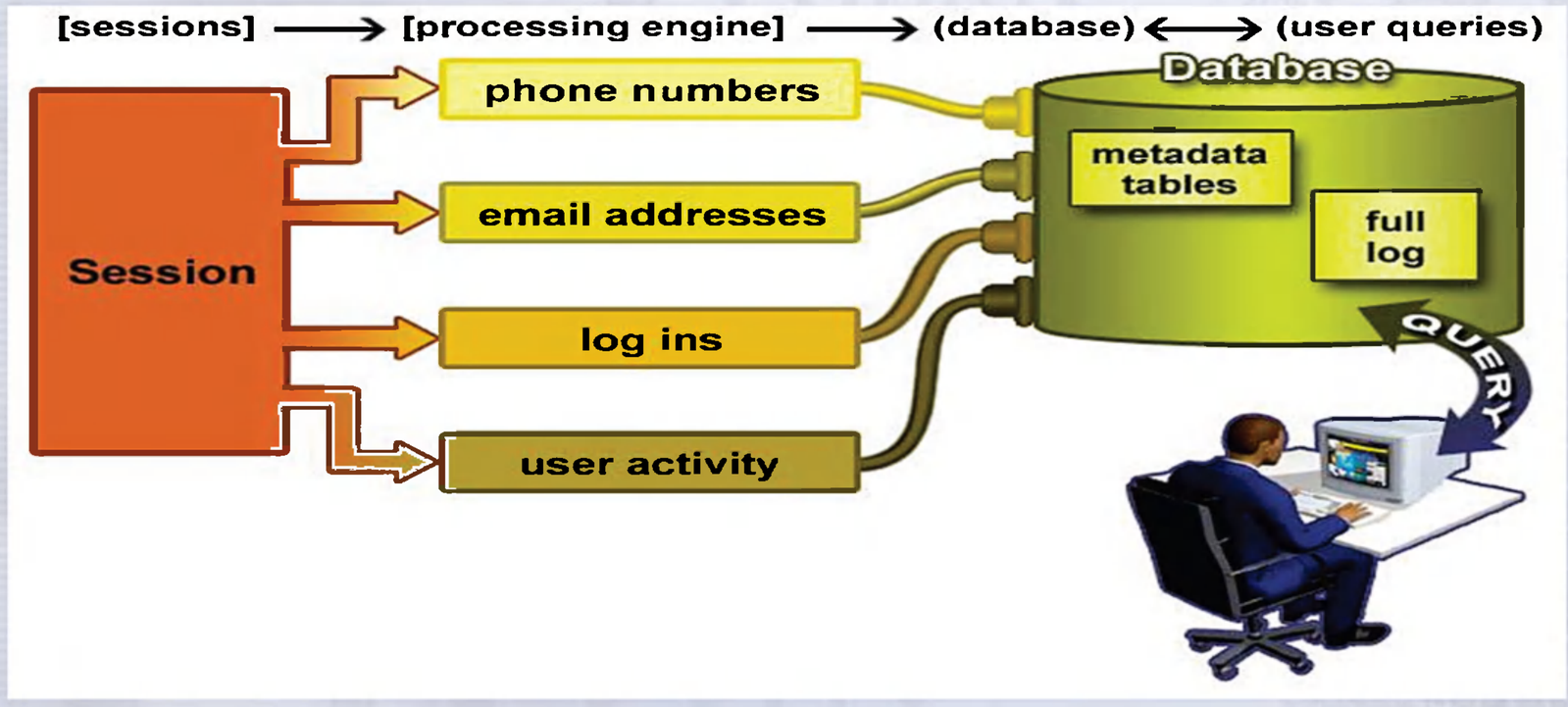
- Can look at more data
- XKEYSCORE can also be configured to go shallow if the data rate is too high

Why go deep

- Strong Selection itself give us only a very limited capability
- A large amount of time spent on the web is performing actions that are anonymous
- We can use this traffic to detect anomalies which can lead us to intelligence by itself, or strong selectors for traditional tasking

What XKS does with the Sessions

Plug-ins extract and index metadata into tables



Plug-ins

Plug-in	DESCRIPTION
E-mail Addresses	Indexes every E-mail address seen in a session by both username and domain
Extracted Files	Indexes every file seen in a session by both filename and extension
Full Log	Indexes every DNI session collected. Data is indexed by the standard N-tupple (IP, Port, Casenotation etc.)
HTTP Parser	Indexes the client-side HTTP traffic (examples to follow)
Phone Number	Indexes every phone number seen in a session (e.g. address book entries or signature block)
User Activity	Indexes the Webmail and Chat activity to include username, buddylist, machine specific cookies etc.

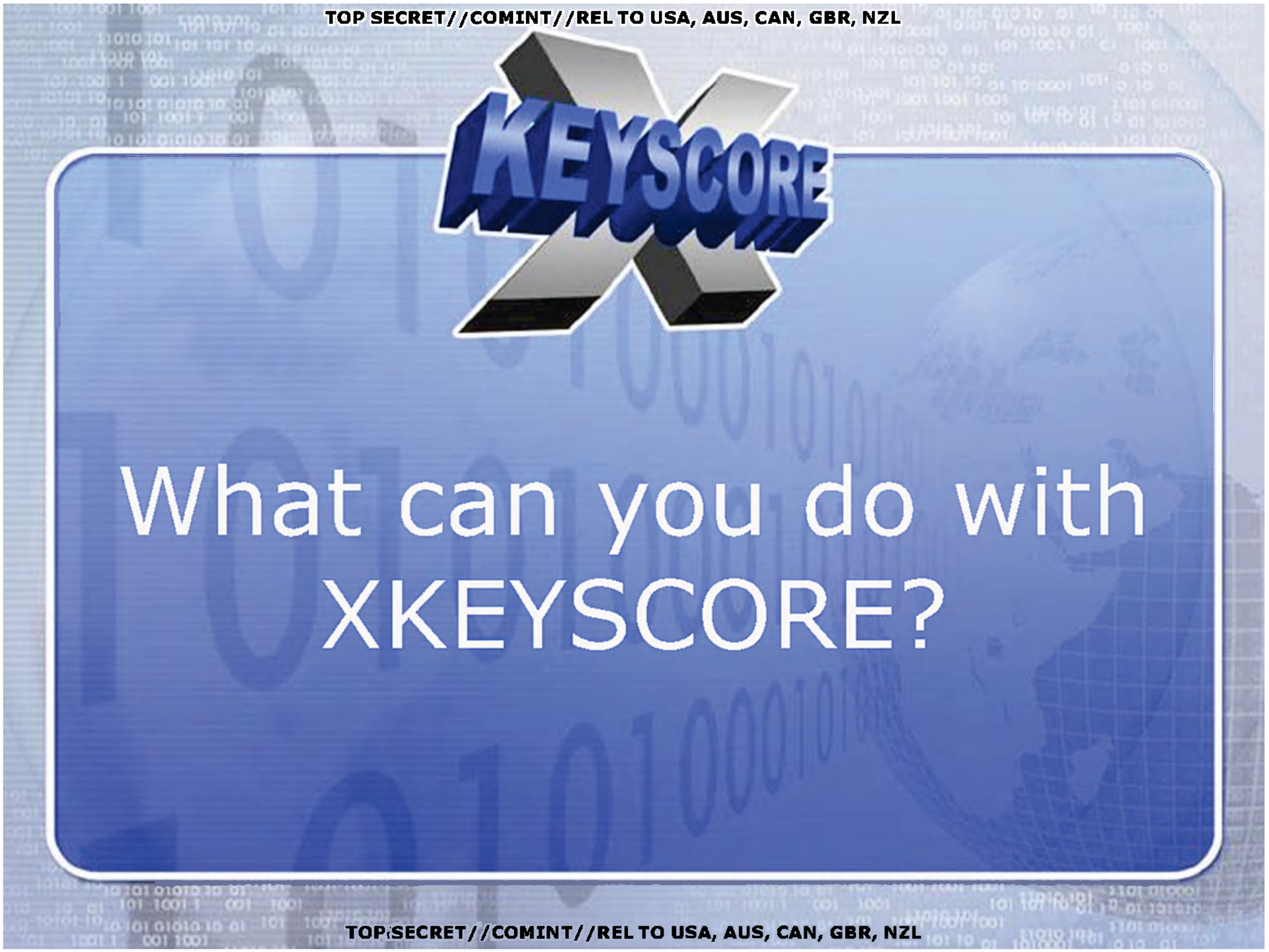
What Can Be Stored?

- Anything you wish to extract
  - Choose your metadata
  - Customizable storage times
  - Ex: HTTP Parser

```
FM IP 58.[redacted]  TO IP 64.[redacted]

GET /search?hl=en&q=islamabad&meta= HTTP/1.0
Accept: image/gif, image/x-xbitmap, image/jpeg, image/pjpeg, application/vnd.ms-
application/msword, application/x-shockwave-flash, */*
Referer: http://www.google.com.pk/
Accept-Language: en-us
User-Agent: Mozilla/4.0 (compatible; MSIE 6.0; Windows NT 5.1)
Host: www.google.com.pk
Cookie: PREF=ID=678fb0a34384e2f6:TM=1168503483:LM=1168503483:S=KKzZb3kPcw4vNxGt
Via: 1.0 proxy.[redacted]:8080 (squid/2.5.STABLE13)
X-Forwarded-For: 58.[redacted]
Cache-Control: max-age=259200
Connection: keep-alive
```

No username/strong selector


IKEYSCORE
What can you do with XKEYSCORE?

Finding Targets

- How do I find a strong-selector for a known target?

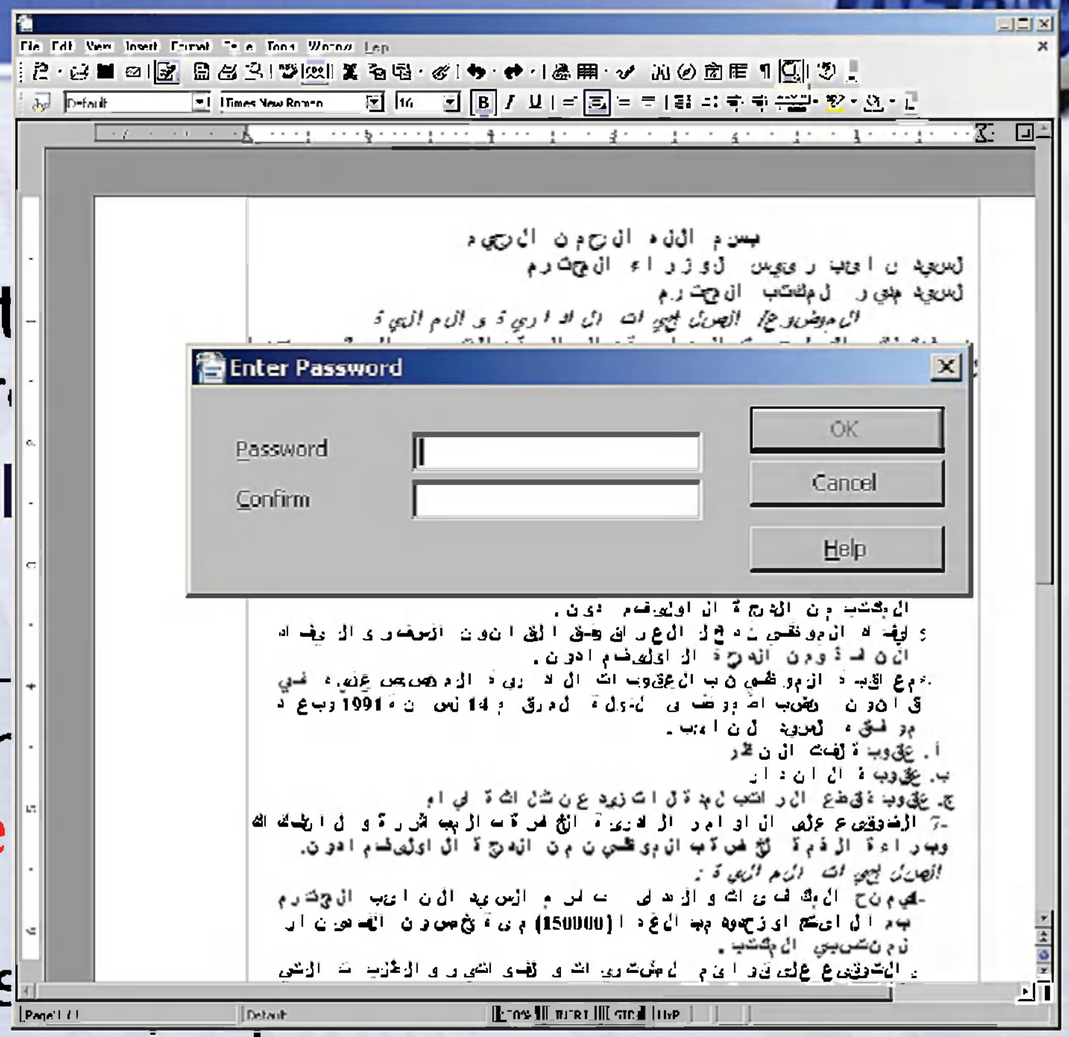
- How do I find a cell of terrorists that has no connection to known strong-selectors?

- Answer: Look for anomalous events
  - E.g. Someone whose language is out of place for the region they are in
  - Someone who is using encryption
  - Someone searching the web for suspicious stuff

Encryption

- Show me all t
  documents fr
- Show me all

- Once again –
  forwarding th
- No strong-se
- Can perform
  query, then s
  from site as required



Technology Detection

- Show me all the VPN startups in country X, and give me the data so I can decrypt and discover the users
  - These events are easily browsable in XKEYSCORE
    - No strong-selector
  - XKEYSCORE extracts and stores authoring information for many major document types – can perform a retrospective survey to trace the document origin since metadata is typically kept for up to 30 days
  - No other system performs this on raw unselected bulk traffic, data volumes prohibit forwarding

Persona Session Collection

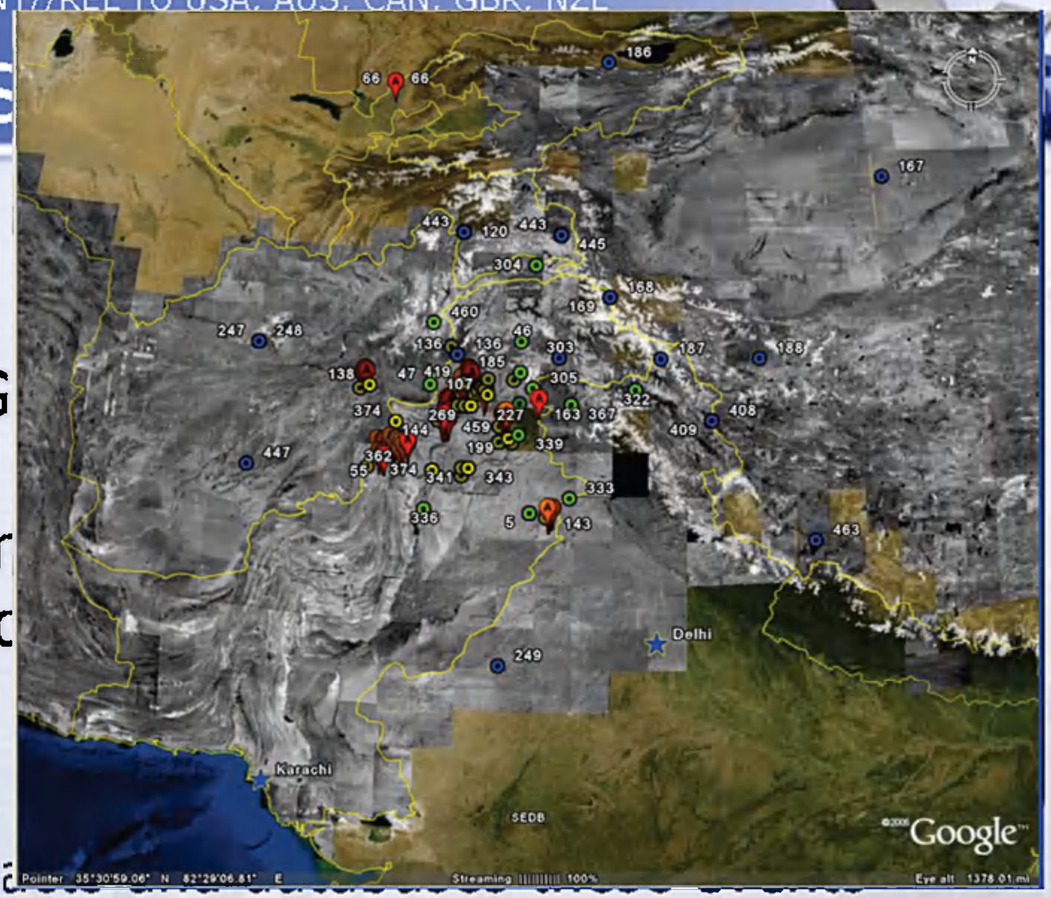
- Traditionally triggered by a strong-selector event, but it doesn't have to be this way
- Reverse PSC – from anomalous event back to a strong selector. You cannot perform this kind of analysis when the data has first been strong selected.
- Tie in with Marina – allow PSC collection after the event

Language Tracking

- My target speaks German but is in Pakistan – how can I find him?
  - XKEYSCORE's HTTP Activity plugin extracts and stores all HTML language tags which can then be searched
  - Not possible in any other system but XKEYSCORE, nor could it be –
    - volumes are too great to forward
    - No strong-selector

Google Maps

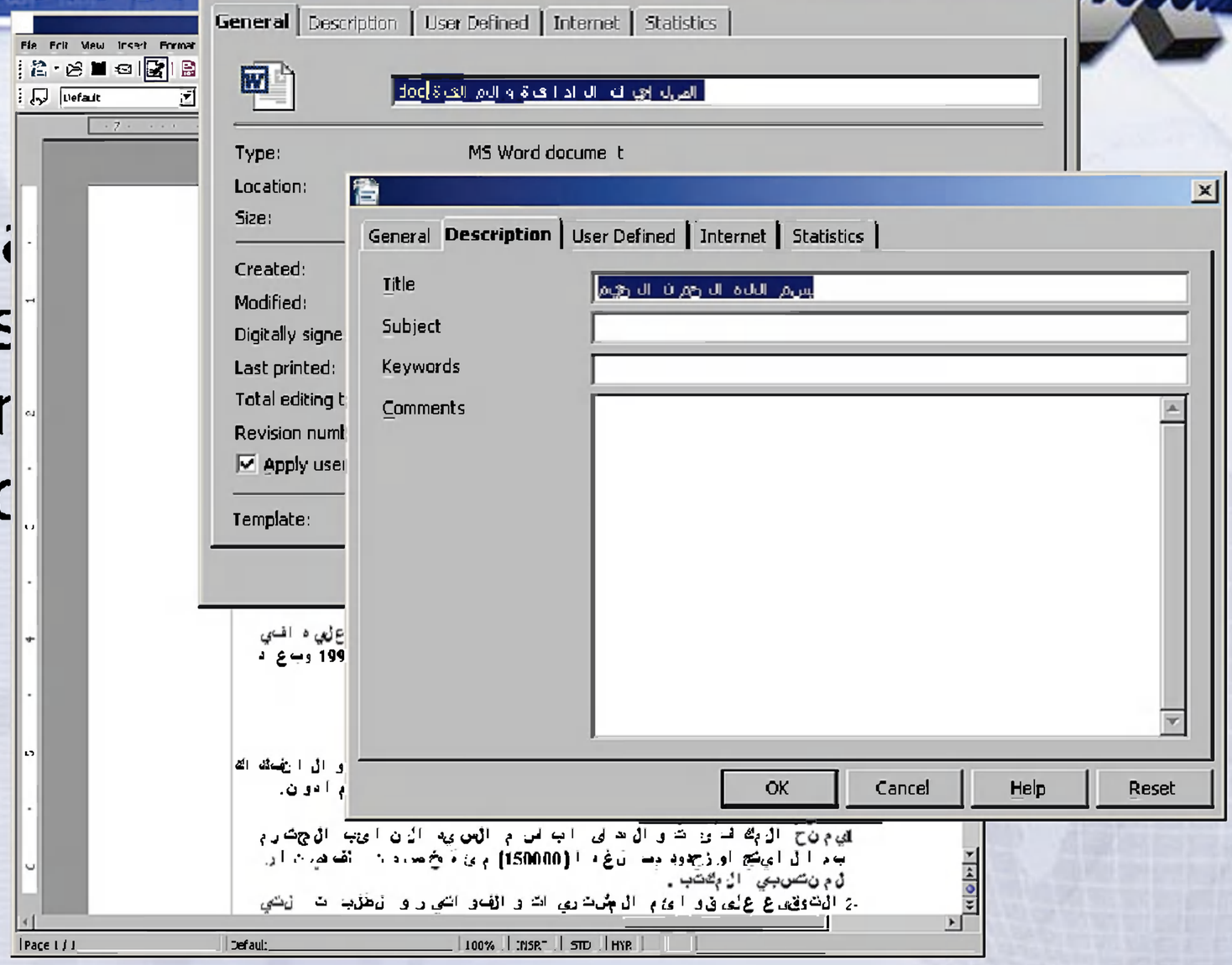
- My target uses G
  locations – can I
  determine his em
  web-searches – c
  suspicious?



- XKEYSCORE extra
  including all web-based searches which can be retrospectively queried
- No strong-selector
- Data volume too high to forward

Document Tracking

- I ha
has
nur
and

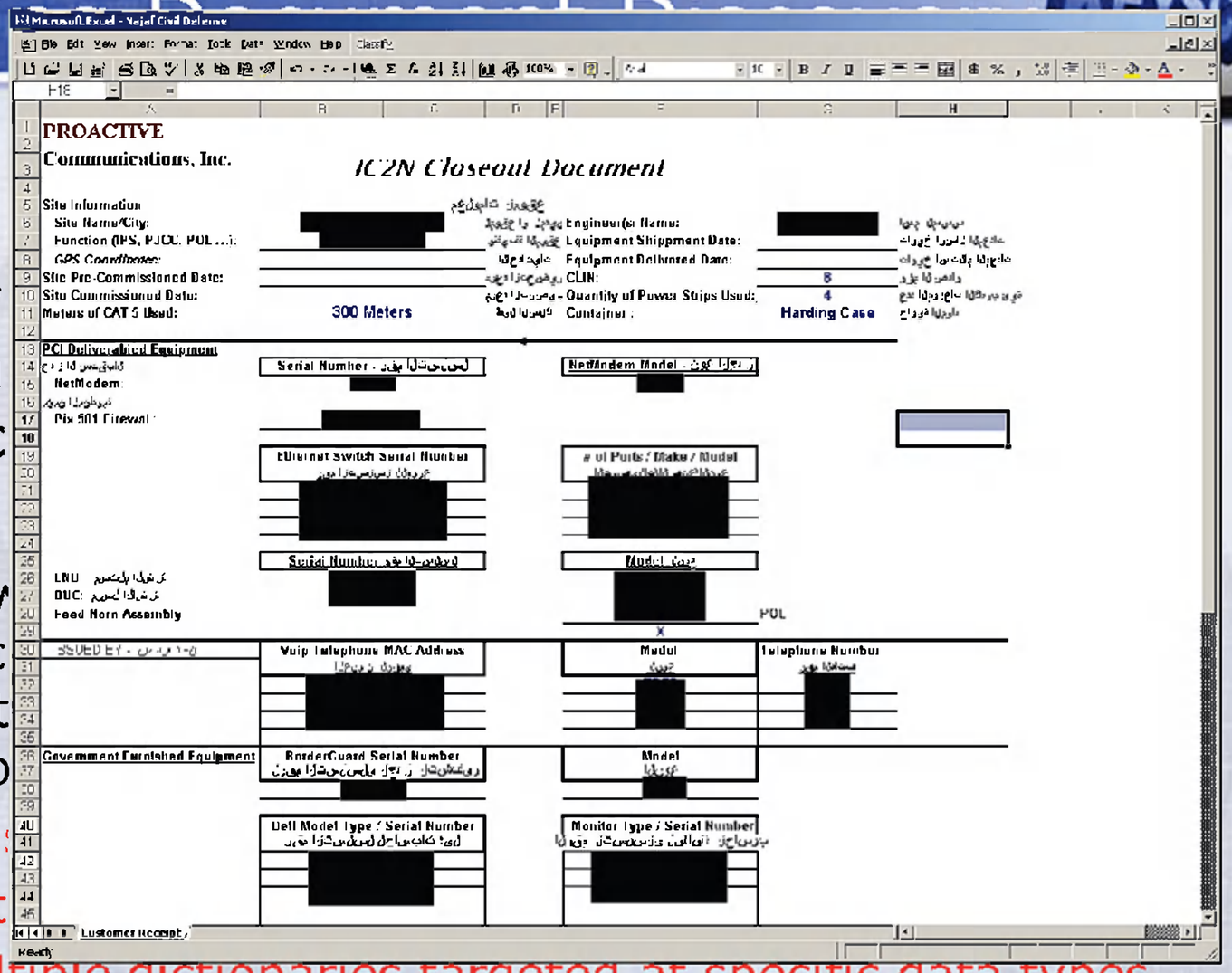


Document Tracking

- All images are hashed in the metadata so that you can search for anyone who has received or transmitted this document.
- This is really useful for company logos.

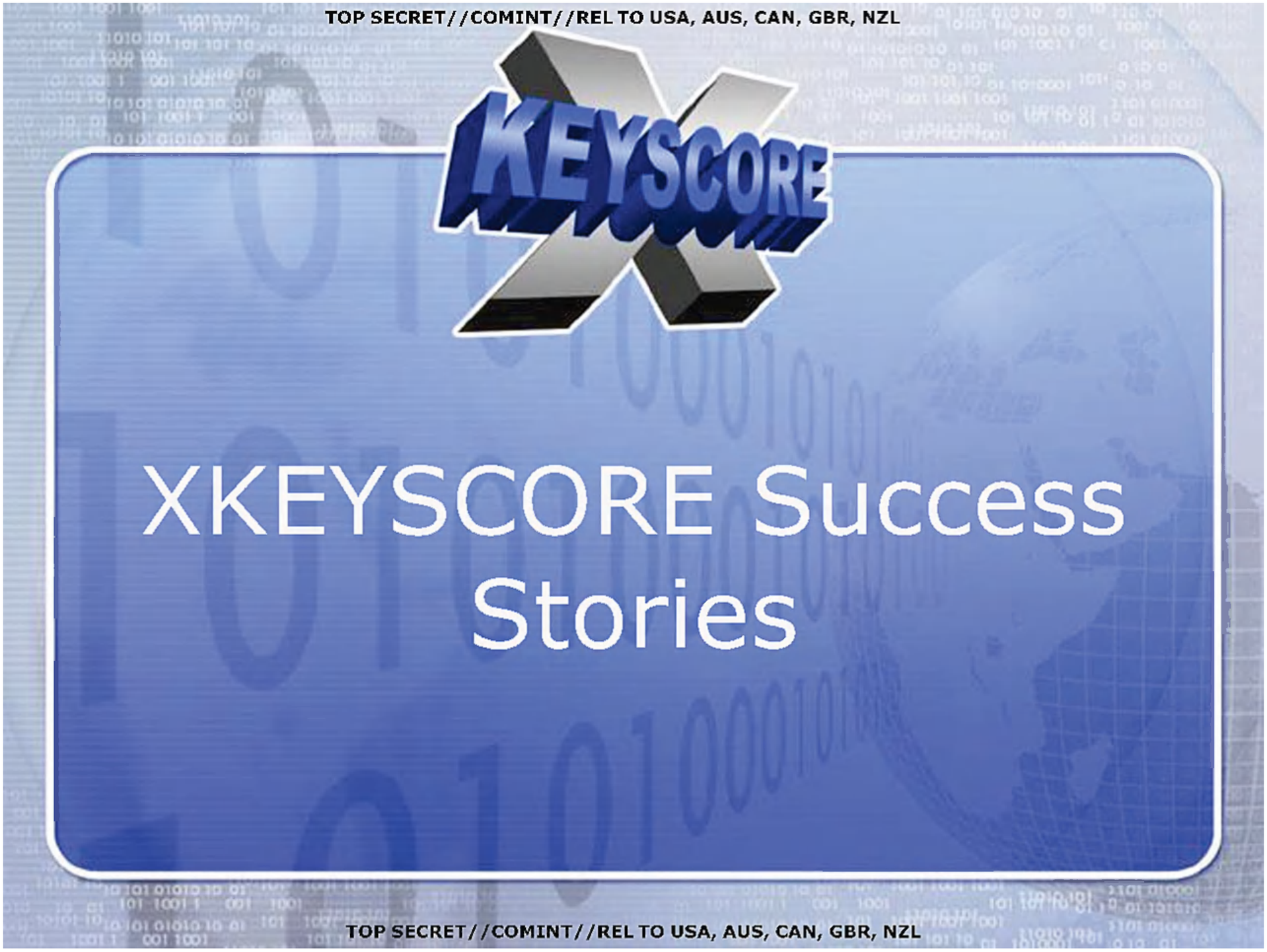
Interesti

- Show
  conta
  so I c
- New
  doc
  dict
  info
- No
- Dat
- Multiple dictionaries targeted at specific data types



TAO

- Show me all the exploitable machines in country X
  - Fingerprints from TAO are loaded into XKEYSCORE's application/fingerprintID engine
  - Data is tagged and databased
  - No strong-selector
  - Complex boolean tasking and regular expressions required


XKEYSCORE
XKEYSCORE Success Stories


XKEYSCORE
Over 300 terrorists captured using intelligence generated from XKEYSCORE

XKEYSCORE and TRAFFICTHIEF

- Customer: CounterTerrorism (CT)
- Provides near real-time tips to TRAFFICTHIEF server in operations in coordination with coalition forces in Iraq 24 hours a day
- Currently producing hundreds of confirmed alerts per day on over 3000 user accounts

Afternoon of [redacted] 2004 – coalition detained individuals below:

[redacted]

[redacted]

XKEYSCORE Success

May 2006, WealthyCluster2 and X-KEYSCORE Installed at [redacted]

- **Connected to Moonshine**
- **Enabled processing of wireless collection**
- **Enabled near-real-time tipping**
- **Enabled full-take SIGDEV**

Un-locatable cafés were geolocated:

- **[redacted] – "A Goldmine"**
- **Four Other Cafés Being Developed**

Acquired important targets:

- **NSA/Georgia Tips With Precise Locations**
- **JSOC Tools In New [redacted]**
- **Reacquired [redacted] Lost When Zarkanet Went Down**

Terrorists were captured:

- **Members of the [redacted]**
- **Members of the [redacted]**

Innovation

- High Speed Selection
- Toolbar
- Integration with Marina
- GPRS, WLAN integration
- SSO CRDB
- Workflows
- Multi-level Dictionaries

Future

- High speeds yet again (algorithmic and Cell Processor (R4))
- Better presentation
- Entity Extraction
- VoIP
- More networking protocols
- Additional metadata
  - Expand on google-earth capability
  - EXIF tags
  - Integration of all CES-AppProcs
- Easier to install/maintain/upgrade