

TOP SECRET//COMINT//REL TO USA, AUS, CAN, GBR, NZL



XKEYSCORE

25 Feb 2008

xkeyscore@nsa

TOP SECRET//COMINT//REL TO USA, AUS, CAN, GBR, NZL

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
1. 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

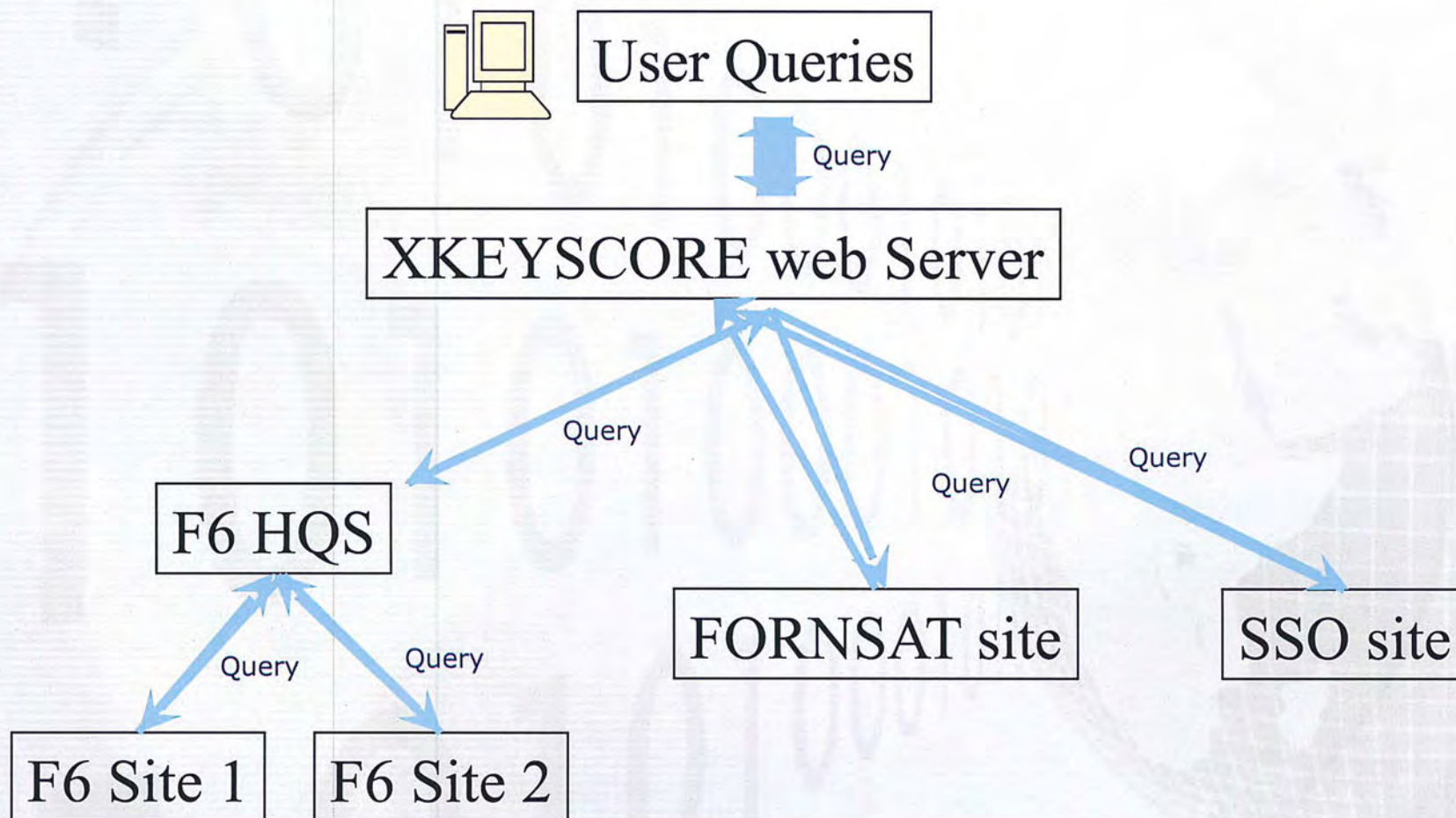
System Details



- 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

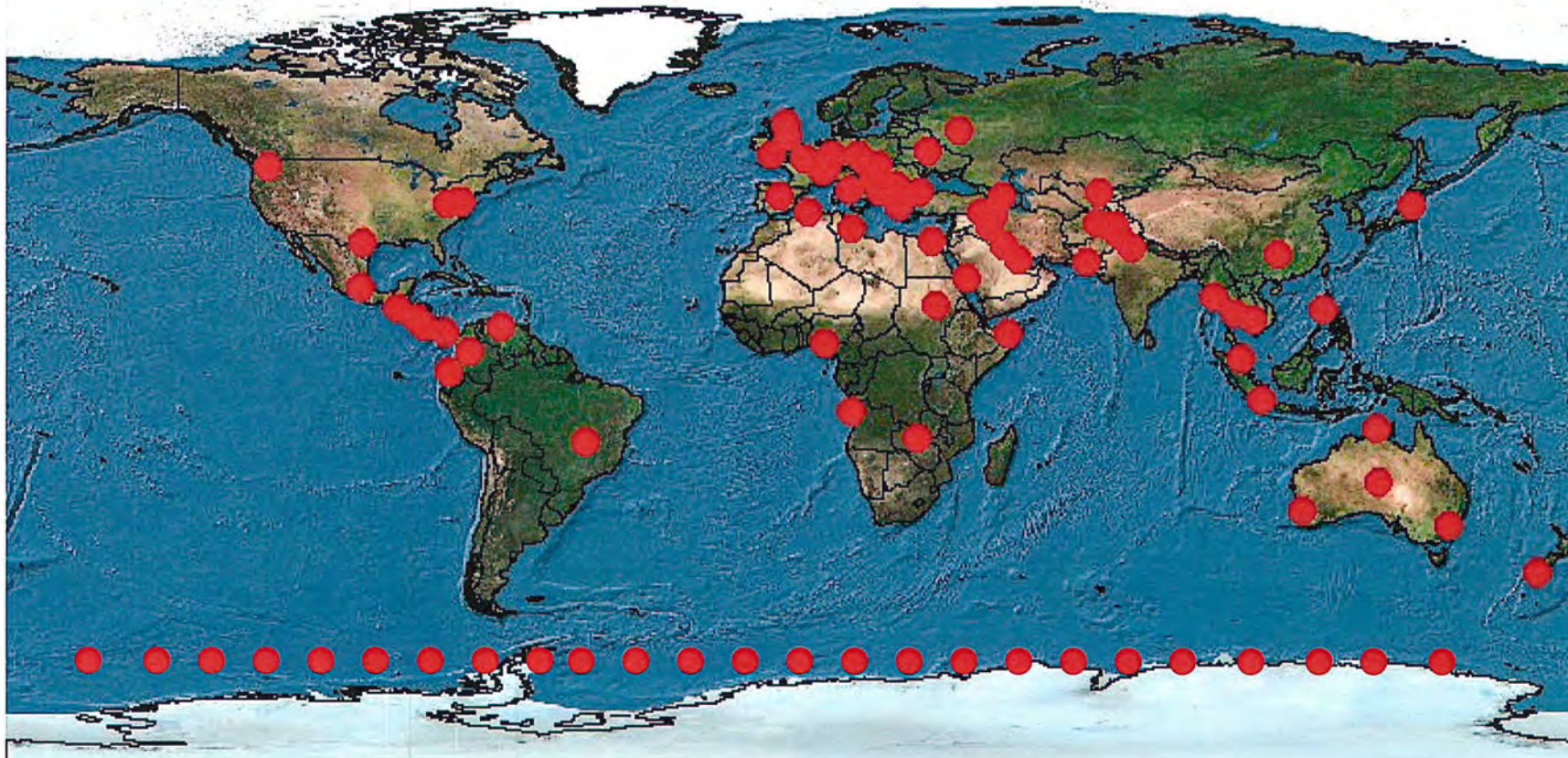


Query Hierarchy





Where is X-KEYSCORE?



Approximately 150 sites

Over 700 servers

TOP SECRET//COMINT//REL TO USA, AUS, CAN, GBR, NZL

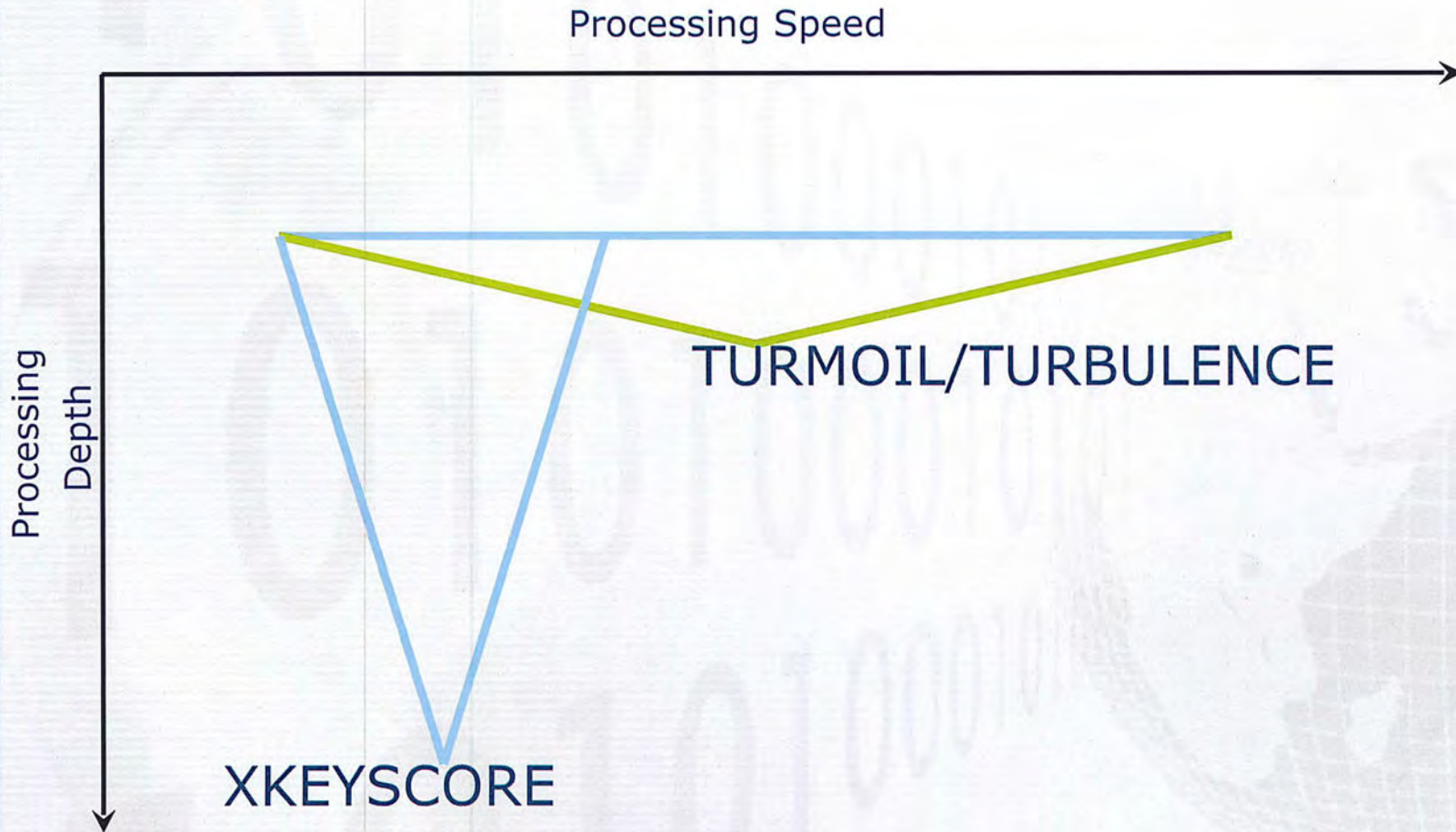


What is unique about
XKEYSCORE?

TOP SECRET//COMINT//REL TO USA, AUS, CAN, GBR, NZL



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

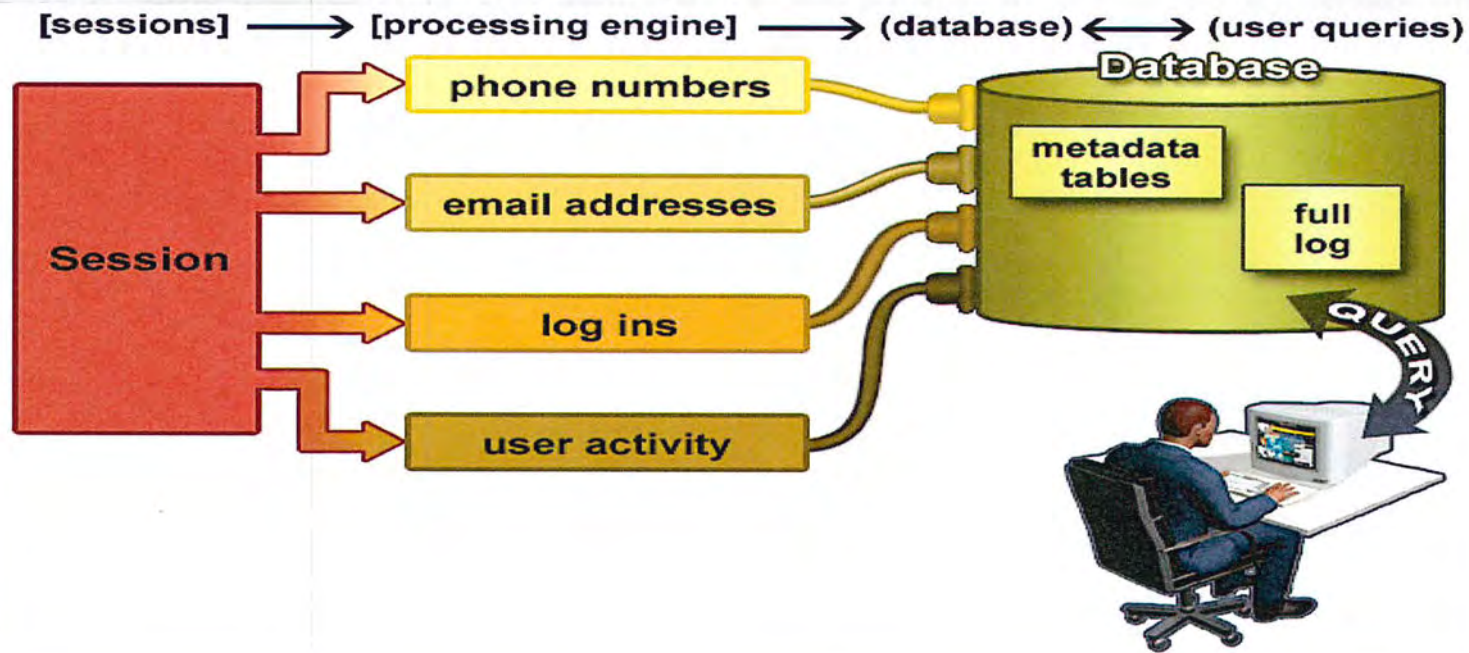


- Strong Selection itself give us only a very limited capability
- A large amount of time spent on the web is performing actions that are anonymous
- We can use this traffic to detect anomalies which can lead us to intelligence by itself, or strong selectors for traditional tasking



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-tuple (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 58.65.157.5 TO IP 64.233.161.147

GET /search?hl=en&q=islamabad&meta= HTTP/1.0

Accept: image/gif, image/x-bitmap, image/jpeg, image/pjpeg, application/vnd.ms-application/msword, application/x-shockwave-flash, */*

Referer: http://www.google.com.pk/

No username/strong selector

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.bnu.govt.net.pk:8080 (squid/2.5.STABLE13)

X-Forwarded-For: 58.65.157.136

Cache-Control: max-age=259200

Connection: keep-alive

TOP SECRET//COMINT//REL TO USA, AUS, CAN, GBR, NZL



What can you do with
XKEYSCORE?

TOP SECRET//COMINT//REL TO USA, AUS, CAN, GBR, NZL



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 the encrypted word documents from Iran
- Show me all PGP usage in Iran
 - Once again – **data volume too high** so forwarding these back is not possible
 - **No strong-selector**
 - Can perform this kind of retrospective query, then simply pull content of interest 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 Google Maps to scope target locations – can I use this information to determine his email address? What about the web-searches – do any stand out and look suspicious?
 - XKEYSCORE extracts and databases these events including all web-based searches which can be **retrospectively** queried
 - **No strong-selector**
 - **Data volume too high to forward**



Document Tracking

- I have a Jihadist document that has been passed around through numerous people, who wrote this and where were they?





Interesting Document Discovery

- Show me all the Microsoft Excel spreadsheets containing MAC addresses coming out of Iraq so I can perform network mapping
 - New extractor allows different dictionaries to run on document/email bodies – these more complex dictionaries can generate and database this information
 - **No strong-selector**
 - **Data volume is high**
 - **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



Discovery of new target web services

- New web services every day
- Scanning content for the userid rather than performing strong selection means we may detect activity for applications we previously had no idea about



Entity Extraction

- Have technology (thanks to R6) – for English, Arabic and Chinese
- Allow queries like:
- Show me all the word documents with references to IAEO
- Show me all documents that reference Osama Bin Laden
- Will allow a 'show me more like this' capability

TOP SECRET//COMINT//REL TO USA, AUS, CAN, GBR, NZL



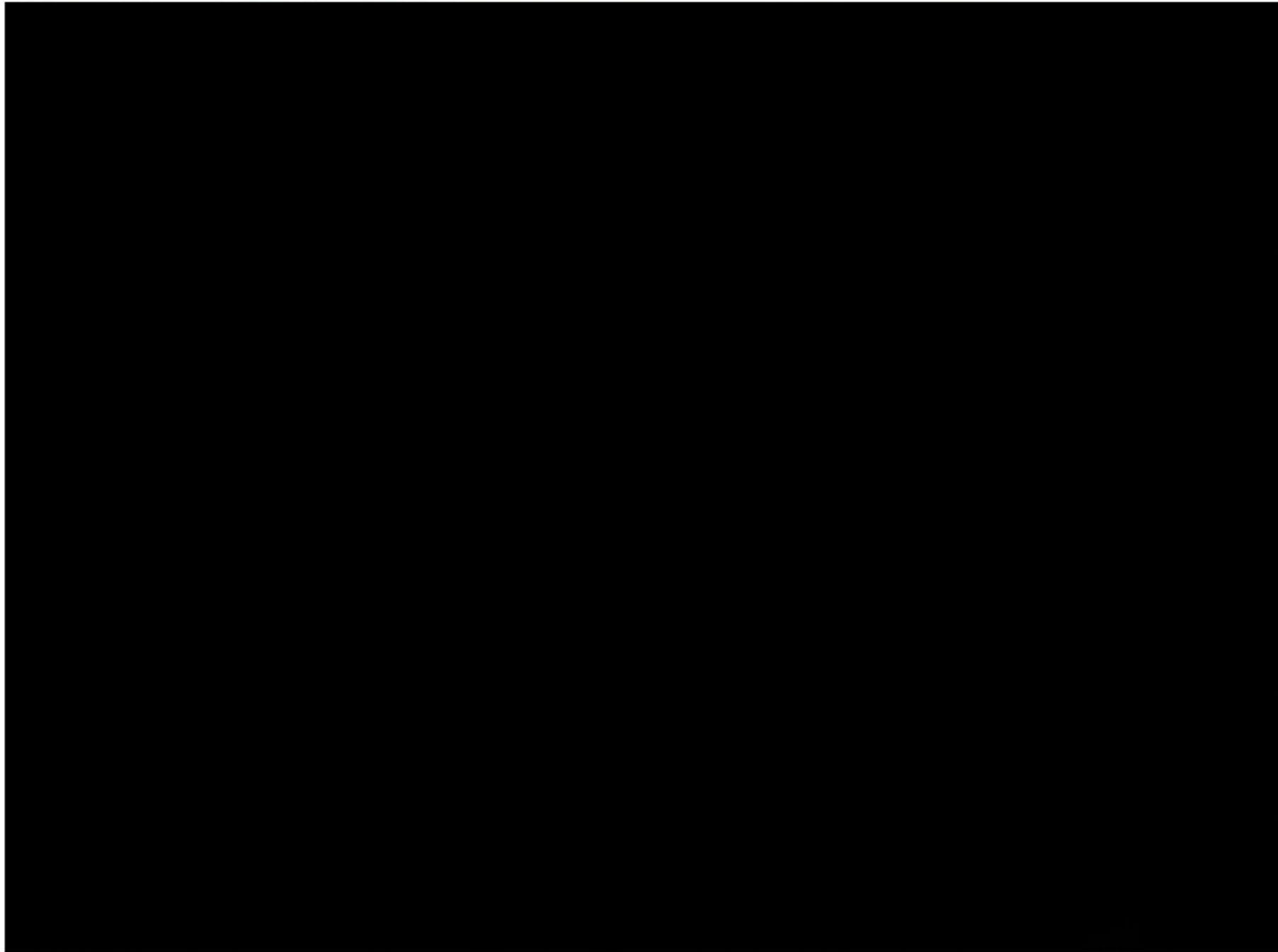
XKEYSCORE Success Stories

TOP SECRET//COMINT//REL TO USA, AUS, CAN, GBR, NZL



Over 300 terrorists
captured using
intelligence generated
from XKEYSCORE







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