cybertap

The Use of Search Engines for Massively Scalable Forensic Repositories

www.cybertapllc.com/

www.cybertapllc.com

transforming data into knowledge

John H. Ricketson
jricketson@cybertapllc.com
jricketson@dejavutechnologies.com
+1-978-692-7229

Who Is cybertap?

- We provide a **forensic platform for cyber investigations** based on **search engine technology**
  - External Threats & Viruses
  - Hacking
  - Financial Fraud
  - Electronic Warfare
  - Security Event Analysis
- Markets
  - Law Enforcement
  - Cyber Security, for both Government and Commercial Enterprises
  - Banking / Trading
  - Electronic Commerce
  - Call Centers

Forensic Evidence

cybertap

- Documents – Computer Forensics / eDiscovery / "data-at-rest"
  - Disk Scrubbing, Dead Boxes, etc
  - Shared Repositories like Dropbox or Sharepoint
- Archives
  - Email
  - Instant Messaging
- Web
  - Downloaded HTML pages
- Financial Information
  - Invoices, Credit cards, Private Information
  - Electronic Trades
- Log Files from Network Devices
- Cell Phone Call Records

- Real-Time Network Transactions – "data-in-motion"
  - Packet Captures
  - Network Streams

Forensic Data

- Archival in Nature
- Non-Transactional
- Contains Meta-data & Content & Extracted Intelligence
  - Meta-Data
    - Document Attributes
      - Author, Dates, Printers, Macros, Document Edits, File reference
    - Network Attributes
      - Addressing Endpoints, ID's, Domains, Protocol Headers
  - Content
    - Message Content
    - Body Content
    - Media Streams
  - Extracted Intelligence
    - Electronic Persona (epersona)
    - Geo-location
    - Correlations and links among heteorgenous data

Search Engines Provide

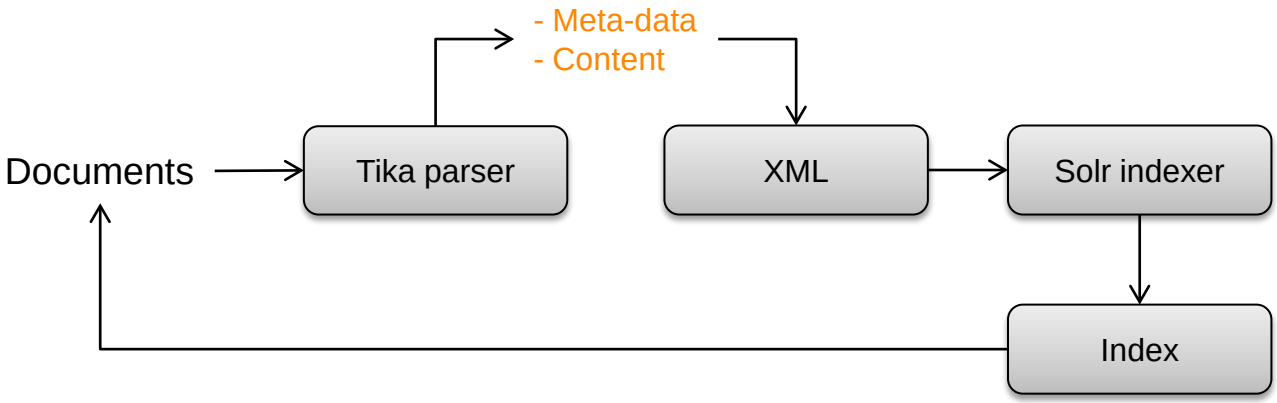
- Non-Transactional repository of archival data
- Meta-data descriptors for network and document attributes
  - Delineating meta-data from content in search queries is crucial
    - Show me all email documents from this.IP address to that.IP
    - Show me all IM messages from this.ID to that.ID containing “nitrate”
- The ability to search in free form any meta-data or content item
- Massively scalable forensic repositories
  - 10+ Billion documents representing Terabytes of data
- Sub-second search times
- Cross reference and correlation of all data with a single search
- Document parsing
- Leverage these **FREE,** rich-functionality, forensic repositories
  - http://lucene.apache.org/solr/
  - http://tika.apache.org/

Tika Provides

- Meta-data, MIME, Language & Content
  - HyperText Markup Language (html)
  - XML and derived formats
  - Microsoft Office document formats
  - OpenDocument Format
  - Portable Document Format (pdf)
  - Electronic Publication Format
  - Rich Text Format (rtf)
  - Compression and packaging formats (zip, tar, etc.)
  - Text formats
  - Audio formats
  - Image formats
  - Video formats
  - Java class files and archives
  - The mbox format
- Identifies documents by content ONLY
  - File extension ≠ Content

Apache Solr & Tika Open Source Projects

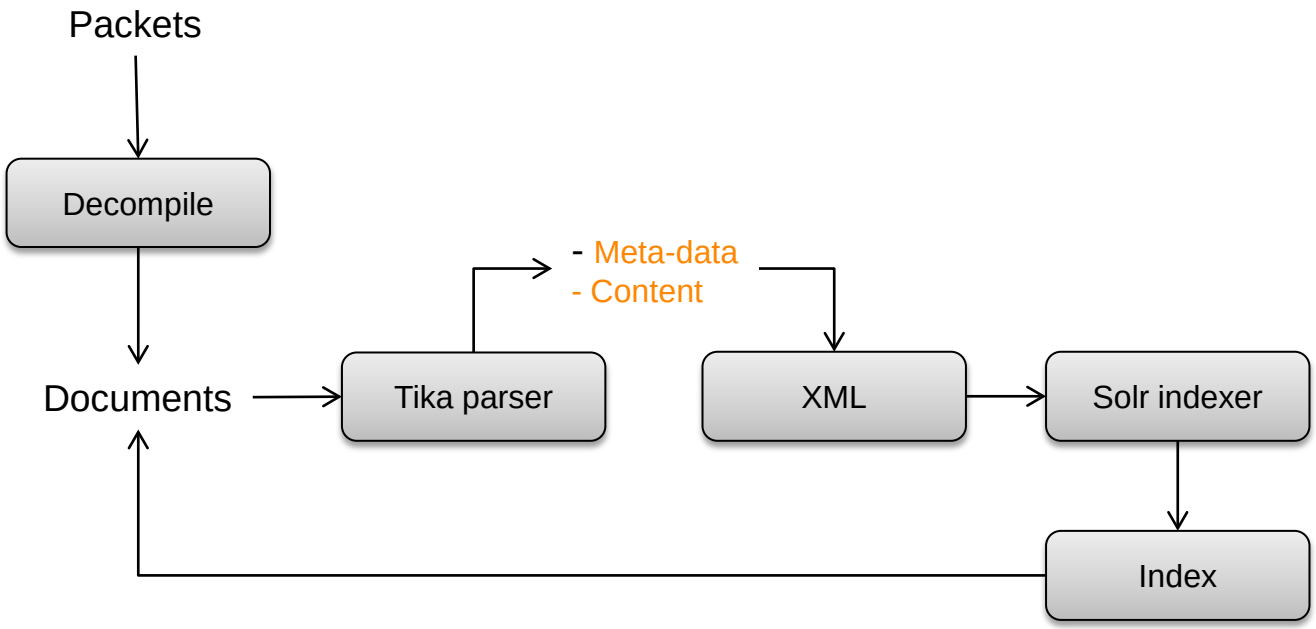
cybertap



Demonstration of Document Searches

- Importing Documents
- Importing E-mail
- Searching both Meta-data & Content

Real-Time Network Packet Ingestion



Open Document Extraction & Enrichment

cybertap

- VoIP telephone call processing – wav
  - Including Speech-to-Text, Voice Identification, Voice Recognition
- Video processing – video, flash
  - Including OCR, Speech-to-Text, closed captioning, and multi-frame analysis.
- Image processing – jpeg, pdf, gif, etc
  - Including OCR, facial recognition, flesh tone detection, etc.
- Natural Language Processing - text
  - Including language translation, text entity extraction, proper name disambiguation, summarize conversations or identify people by writing style.
- Automated Zero-Day Malware/Virus Detection
- Steganographic detection
- Decryption
- *ePersona* Background Checks

Demonstration of Packet Searches

- Importing Packets
- Searching both Meta-data & Content
- IMAP - HTTP - VoIP - Facebook
- Reconstruction
- Content Extraction
- Electronic Persona Identification (epersona)