Technical Overview

❺ File Upload, Text Extraction

Users can upload files in 1000+ supported formats from the SCRAMS web interface, including images. SCRAMS extracts the text (incl. from images, using OCR), and indexes the extracted text to allow full-text searching from within the SCRAMS web UI.

❻ Export Result & Save/Load Queries

Users can export results (in table form) into Excel/PDF/Word. Users can also save current search results (both results snapshots of current results, and queries).

❼ Fine-Grained Access Control & SSO

The SCRAMS app interacts with SCRAMS's externalized attribute-based access control (ABAC) system, which is based on our innovative OpenPMF security policy automation product, openpmf.com). SCRAMS obtains fine-grained permission information via OpenPMF's ClientSDK feature, which control access at a fine granularity (individual Web UI menus and buttons etc.). In other words, users in different groups get different menus and buttons on their web UI. Furthermore, SCRAMS supports industry-standard single sign-on (SSO) using OpenID Connect via Tomcat.

❽ Architecture

Our fully functioning, robust SCRAMS application prototype is a Java web application running on a web application server (Tomcat), that provides users access from web browsers.
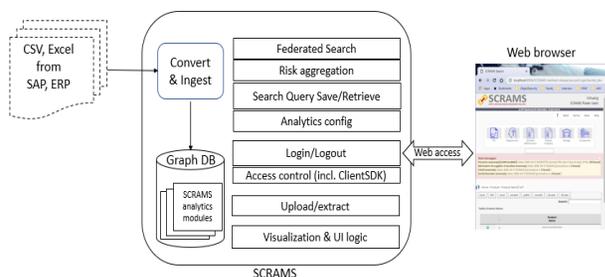
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ObjectSecurity's mission is to simplify, improve and automate security for the complex, interconnected IT landscapes most organizations have to deal with today.

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(v2)

SCRAMS

Supply Chain Risk Analysis Management System

Stop supply chain security breaches.

✓ **identify supply chain risk indicators across your procurement data**

✓ **convenient searching and automated analysis**

✓ **ingest your procurement data from SAP (e.g. Navy ERP) + more**

✓ **customizable platform**

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SCRAMS

Solution Overview

SCRAMS provides organizations with visibility into their supply chain to determine supply chain risks (SCR). Commercial SCR analysis & management (SCRAM) tools/approaches mostly focus on financial risks (e.g. loss of production), while our SCRAMS solution also focuses on malicious fault injection by adversaries, granular access control, and atypical suppliers/items.

SCRAMS ingests procurement data (SAP & more) into a graph database and enriches the data with other sources (e.g. internet-based, for example CAGE lookup). It then runs automated analytics over the data to identify risk indicators, such as particular ICT product price anomalies indicating a high probability that a product is counterfeit or refurbished (and thus riskier). SCRAMS also allows users to do convenient drill-down searches into the data.

SCRAMS currently tackles the following main challenges:

1. data discovery across large/deep and role-restricted commercial supply chain from many sources (incl. the SAP-based ERP)
2. intuitively aggregating and mapping/visualizing the supply chain with all its relationships;
3. analyzing the commercial supply chain and automatically identifying potential SCRs (predictive analytics), and
4. generating/exporting reports.

Successful Evaluation by Navy

The full SCRAMS testbed was evaluated by Navy SPAWAR in Feb. 2019 using SPAWAR's own procurement data. The testbed comprised six interconnected machines, mimicking a production setup

AFWERX Challenge Finalist

SCRAMS was selected finalist at the AFWERX Microelectronics Supply Chain Provenance Challenge in May 2019, and development to extend and enhance SCRAMS are ongoing.

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Technical Overview

❶ Drill-Down Search

SCRAMS allows users to drill-down search the data using a text input field and search buttons automatically determined by the graph structure. For example, a user can search for a product by typing text in the field and selecting the 'Product Name' button to search the DB. The result is displayed in a table with buttons to save, export and print. Users can narrow down displayed search results through a provided text input field on top of the result table. Further drill-down searching is available from each search step result: The left column of the result table usually contains checkboxes that allow the user to select particular rows for deeper search. Once the selection is made, users can select a button from the button menu and SCRAMS will search and return those drill-down search results, again in tables containing data relationships and information.


❸ Visualization

Users can also visualize search results graphically in 2D, 3D, and in virtual reality (see *objectsecurity.com/vr* for proof-of-concept feature).
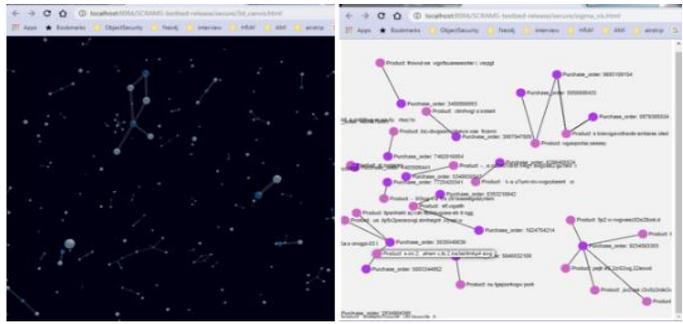
❷ Automated Risk Analysis

SCRAMS supports automatic algorithmic analysis of the data, which identifies and aggregates "risk indicator" results based on requirements provided by Navy's SCRM Lead, such as product pricing anomalies, vendor location mismatch, CAGE code anomalies, component serial number anomalies, etc. The results are SCRM "risk indicators", not conclusive risk determinations, because surrounding factors are analyzed, rather than the actual ICT parts. The analyses are automatically executed periodically. Risk indicator information is automatically displayed on the landing page when the user logs in. The SCRAMS app can also push (e.g. email) risk indicator reports to notify designated users.
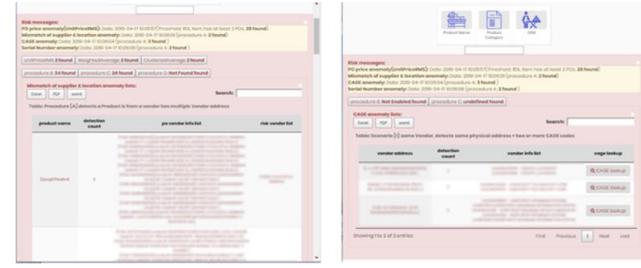
❹ Data Ingestion

The SCRAMS application ingests a data dump from SAP ERP (incl. SAP-based installations such as Navy ERP) etc. The data is processed, converted, and ingested into a graph database (Neo4j) to build a node/relationship-based data graph that is used intensively by SCRAMS's search and analytics features (see Figure below). SCRAMS enriches the graph with data from additional data sources (such as CAGE info from SAM, location from Google Maps, etc.).