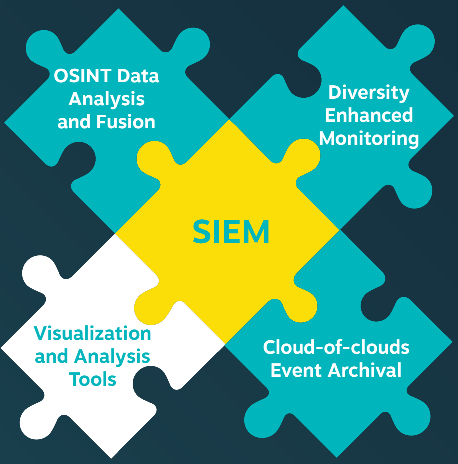
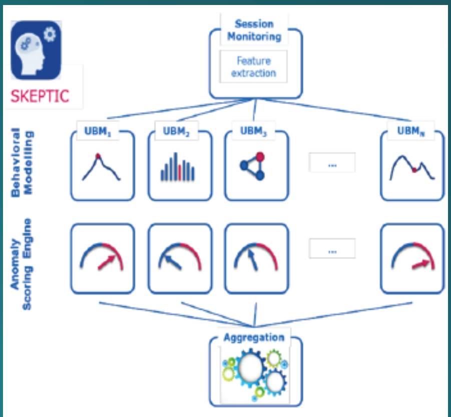
DIVERSITY ENHANCEMENTS FOR SECURITY INFORMATION AND EVENT MANAGEMENT

# Extend organizations' cybersecurity monitoring capabilities and minimize risks

DiSIEM components improve threat awareness and monitoring, provide innovative cybersecurity analytics and visualizations, and allow secure long-term information archival and sharing


OSINT Data Analysis and Fusion
Diversity Enhanced Monitoring
SIEM
Visualization and Analysis Tools
Cloud-of-clouds Event Archival

# Skeptic II Framework



## Key features

- **User and Entity Behavior Analytics (UEBA)**
- **Application-based anomaly detection**
- **Analytical approaches**
- **Supervised and unsupervised machine learning**
- **Rule-based approach**
- **SIEM extension**
- **Indicators of Compromise (IoC)**
- **Data ingestion, normalisation and aggregation**

The Skeptic Framework aims to leverage both rule-based and behavioural anomaly detection models for an early detection of deviations from normal users' behaviour. A combination of detection models is used to improve the robustness and the performance of the anomaly detection. The component is an application-based anomaly detection component, thus it is able to ingest different types of application data.

The framework works as an extension for the existing SIEMs and it is meant to tackle their current limitations. User and Entity Behaviour Analytics (UEBA), which is employed in the Skeptic Framework, can be used as an addition to the SIEM to address these limitations.

UEBA is an analytics-led threat detection technology. It uses machine learning and data science to gain an understanding of how users (humans) typically behave within an environment, then to find risky, anomalous activity, that deviates from their normal behaviour and may be indicative of a threat.

Skeptic is able to leverage UEBA in order to perform user and entity profiling, as well as anomaly detection based on a number of analytical approaches, ranging from basic analytical methods (e.g., rules that leverage signatures, pattern matching and simple statistics) to advanced analytics (e.g., supervised and unsupervised machine learning).

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**http://disiem-project.eu**

## CURRENT CHALLENGES TO SECURITY MANAGEMENT SYSTEMS

Organizations monitor and manage the security of their infrastructures by setting up Security Operation Centres (SOC). A SOC obtains an integrated view of the monitored infrastructure by employing a Security Information and Event Management (SIEM) system. These are complex systems that are able to collect logs and events from multiple sources, correlate them, and produce summarised measurements, trends and different types of visualisations to help system administrators and security professionals. Despite their widespread use and the impressive market growth, current SIEMs still have many limitations:

**1. Their threat intelligence capacity is still in its infancy.** They are unable to automatically recognize new threats that may affect the monitored infrastructure, requiring considerable human intervention to adapt and react to changes in the threat landscape.

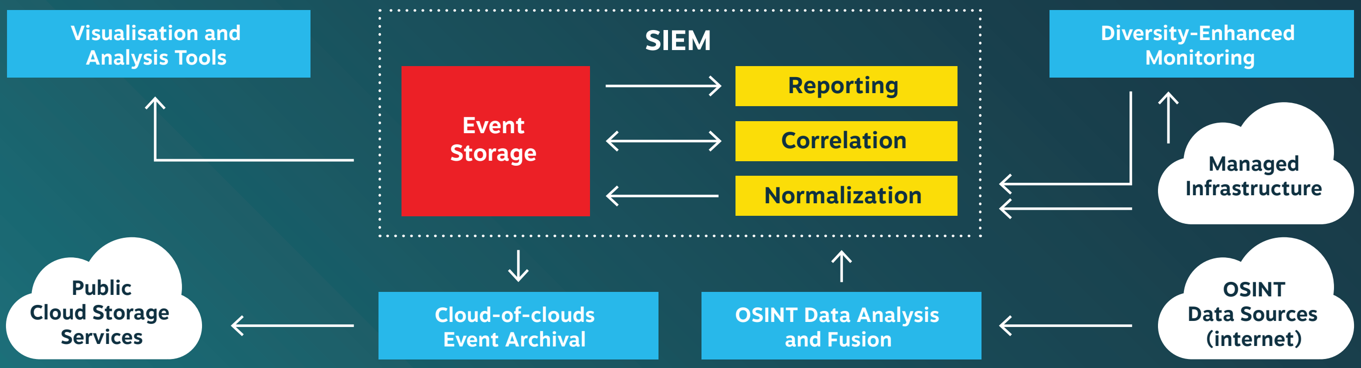
**2. They can show any “low-level” data related to the events received, but have little “intelligence” to process this data and extract high-level information** and metrics for senior C-level managers.

**3. The data visualisation techniques are limited and rudimentary.** This can seriously impact the ability of SOCs to deal with incidents as they happen.

**4. The event correlation capabilities are as good as the quality of the events fed to it.** Imprecise events and alarms generated by imperfect monitoring devices are taken as correct by the SIEM, and the uncertainties associated with these events are never reported.

**5. They are incapable of retaining the collected events for an extended period.** This limits their use in conducting forensic investigations in the long run.

The DiSIEM project addresses these limitations by complementing existing SIEMs with a set of components for accessing diverse data sources, feeding enhanced events to the SIEM and generating improved reports and metrics to better support the security operation centres.


Visualisation and Analysis Tools
SIEM
Event Storage
Reporting
Correlation
Normalization
Diversity-Enhanced Monitoring
Managed Infrastructure
Public Cloud Storage Services
Cloud-of-clouds Event Archival
OSINT Data Analysis and Fusion
OSINT Data Sources (internet)

## EXPECTED RESULTS

The main results of DiSIEM will be the design and implementation of the several components illustrated in the figure:

- **A framework for deploying diverse and redundant sensors** (part of the “Diversity-Enhanced Monitoring” box).
- **A novel application-based anomaly detector** for complementing other sensors and detect frauds in application servers (part of the “Diversity-Enhanced Monitoring” box).
- A set of **OSINT-based components** to improve threat detection and awareness (the “OSINT Data Analysis and Fusion” box).
- A rich set of **enhanced interactive visualizations** to improve the quality of the decision support of security analysts (the “Visualisation and Analysis Tools” box).
- **Techniques and tools for analysing, evaluating and guiding the optimal deployment of diverse security mechanisms** in the managed infrastructure, including multi-level risk-based metrics (employed in all blue boxes in the figure).

### CONSORTIUM

The DiSIEM consortium brings together a unique combination of academic and industrial experts in diverse fields to realize the vision of the project.

Ciências ULisboa · CITY · edp · amadeus · Fraunhofer IAIS · DigitalMR · Atos

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