Realization of Security Events Management System via OPENSTF

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Requirements Analysis of Security Event Management

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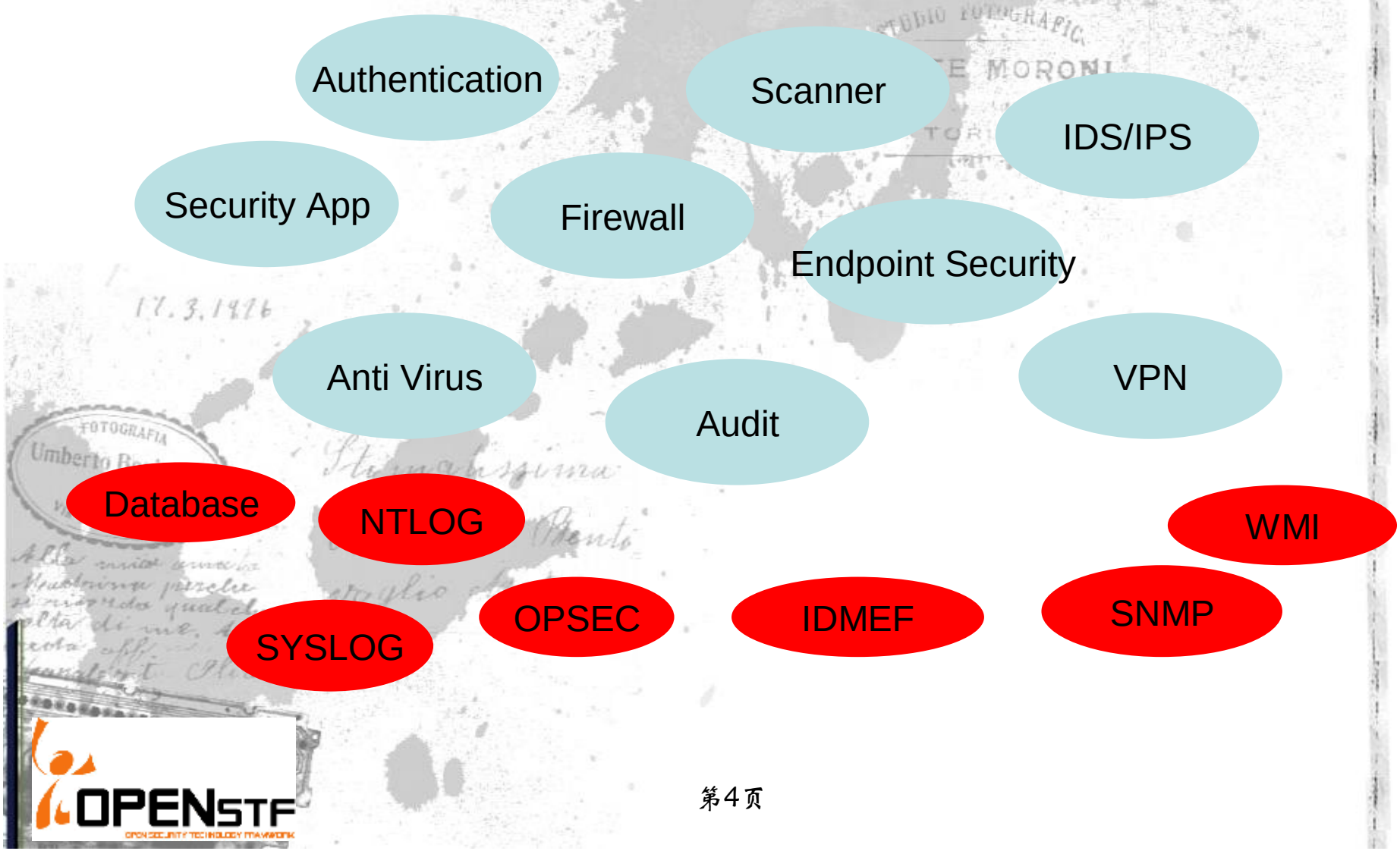
Background of Security Event Management Requirement

- We could not qualify the impact of so many heterogeneous security products
- It is useless to view a mass of security events with a mount of trustless information included
- The policy constitute could not acquire the whole view on security state
- There are no valid correlations with security decision and security application.
- An Open Loop System, which is consisted of Early Warning, Defending, Responding sub-systems, has no strong ability to desist the strikes.

Heterogeneous security solution leads to risks



Impossible to handle the mass of security event

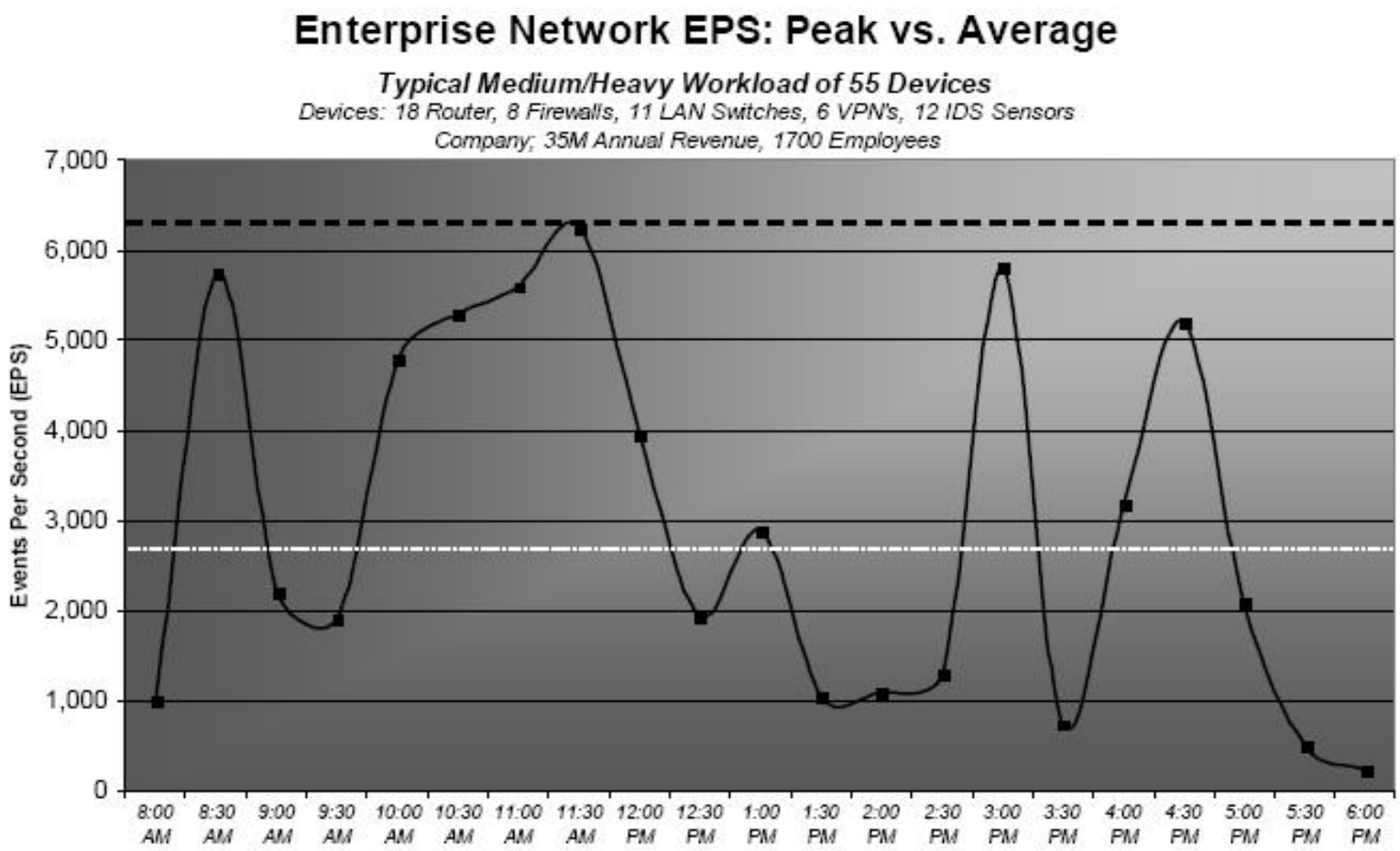


Chart 1: Sample Comparison of Peak and Average EPS Loads

IDS False Positive/False Negative

- Sensibility And Reliability are conflict
- IDS acquirement and analysis of information is limited according to its network level and performance（Context-Free）
- IDS SNR enhancement lies on Efficiency of event management

Security Policy lack of whole view

- Current solution is elementary and partial
- No effective way to show whole security tendency
- Total Risks have to obey “Bucket Principle”
- Lack of practical data when leader or manager making security policy
- Is your security system an closed loop system?

Risk and Asset

- How to dynamic evaluate real asset value in security solution
- How to manage risk assessment in security application
- For users, “Business Application” is the goal, not “Security”
- Find hidden threat in time

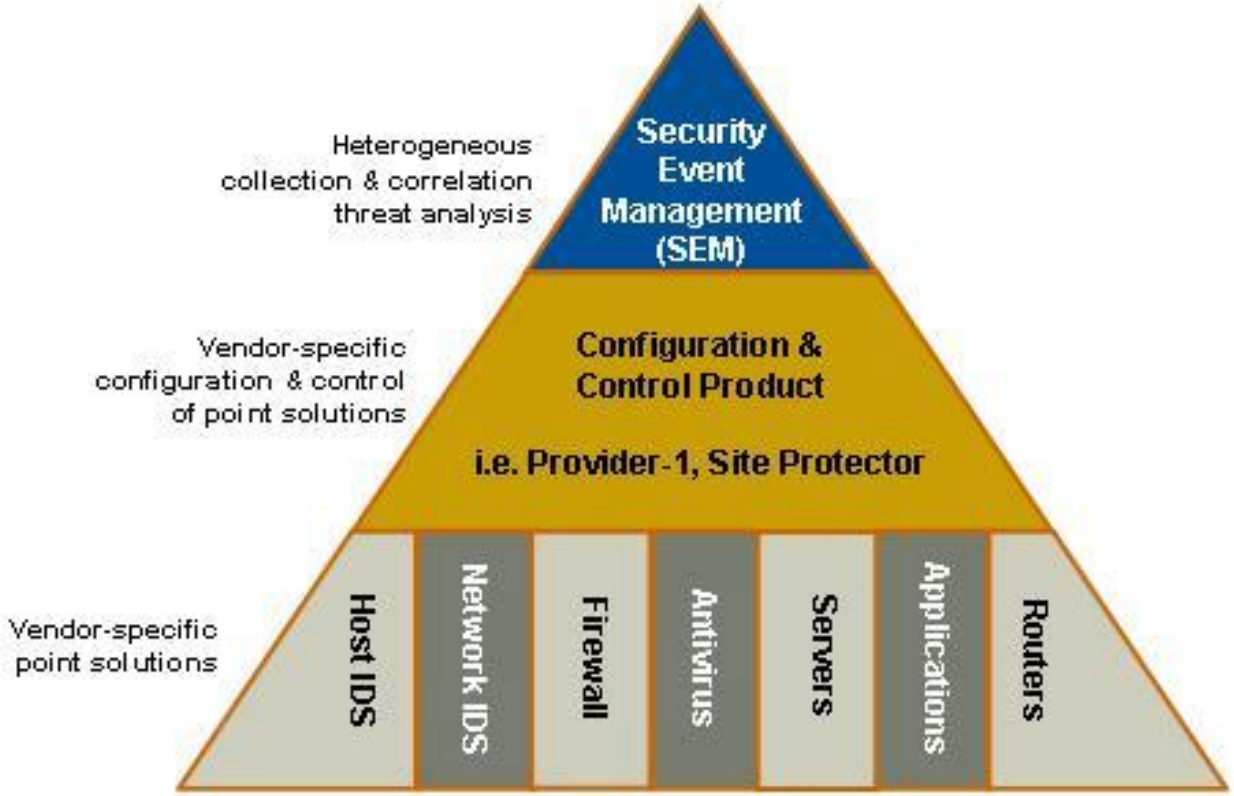
The Definition of the Security Events Management

It is so creative to analyze the security events real time collected from Computer, Network, Storage and Security devices. The SEM helps us to find the true security risk via the correlations on security events with different places, different layers and different types. In fact, we could not only assess the current security state and risk, but also make emergency responding with pre-defined policies automatically.

Dynamic security system Model is the major body of intelligent system

SEM in security system

Security Event Management – SEM
Core of risk management



The goal of SEM

- Correlation and Aggregation of security events
- The risk quantization and visualization
- Closed Loop System, Response in time

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Technologies in security event management

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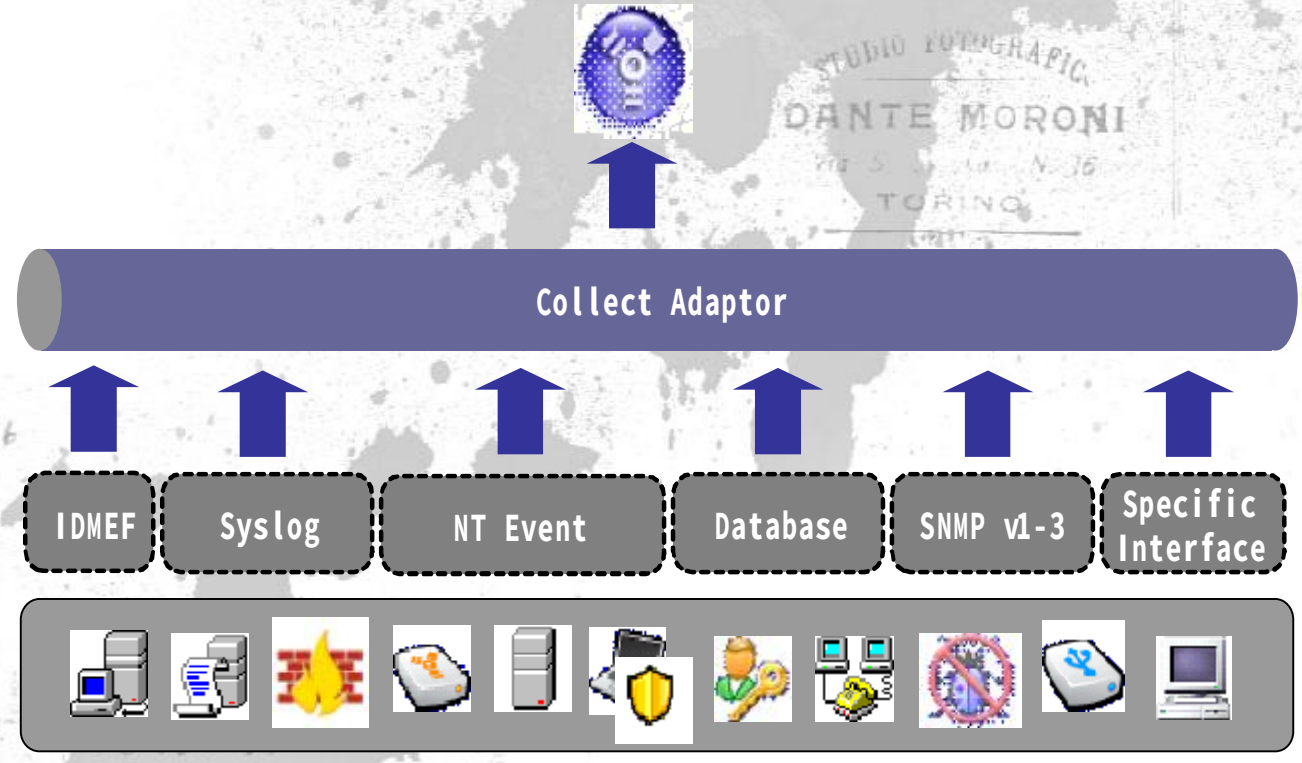
SEM 4lization

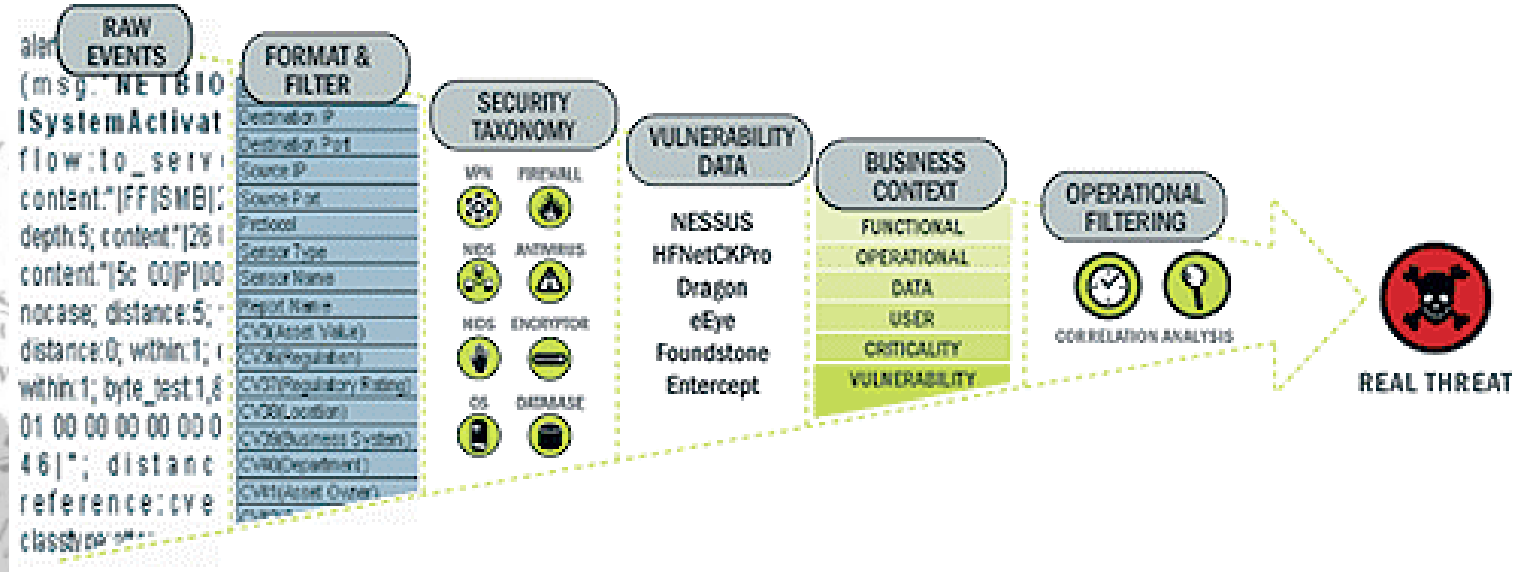
- Normalization
- Aggregation
- Correlation
- Visualization

Normalization

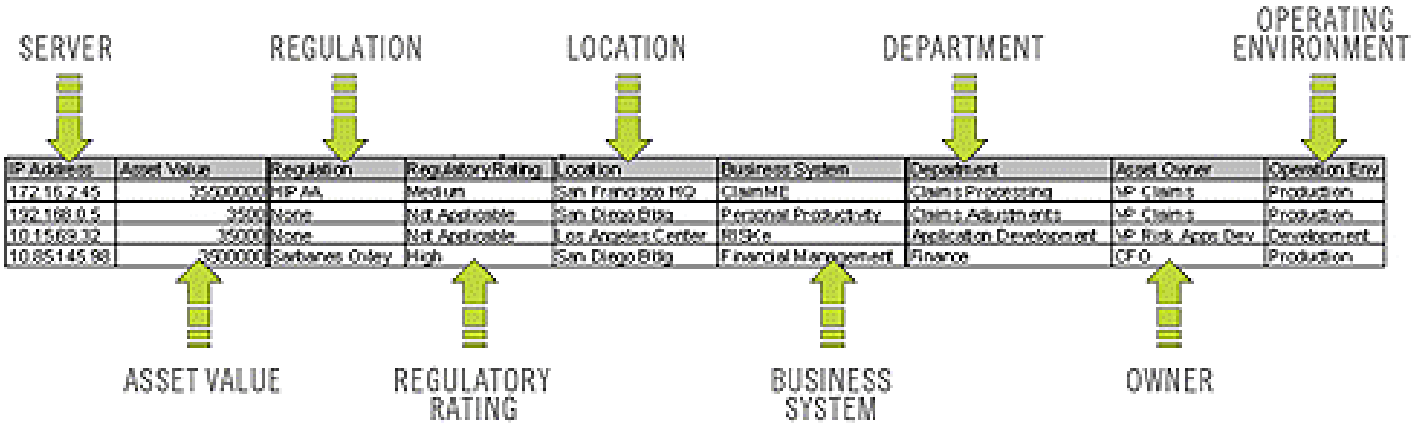


Aggregation

- filtrate
- eliminate the redundant data
- classify
- Bind context



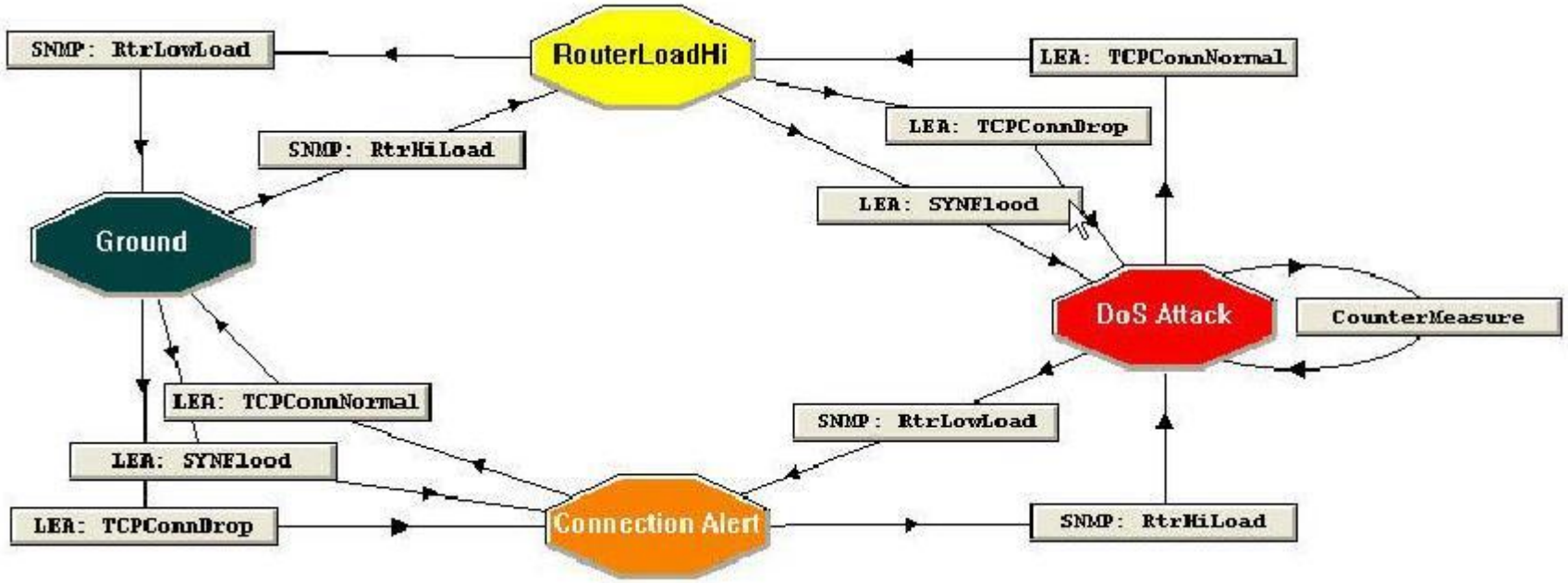
Asset Assessment stimulate event contextualization



Picture above you can see security attributes of asset which will be an important part in real time risk calculation.

Rule-based Correlation

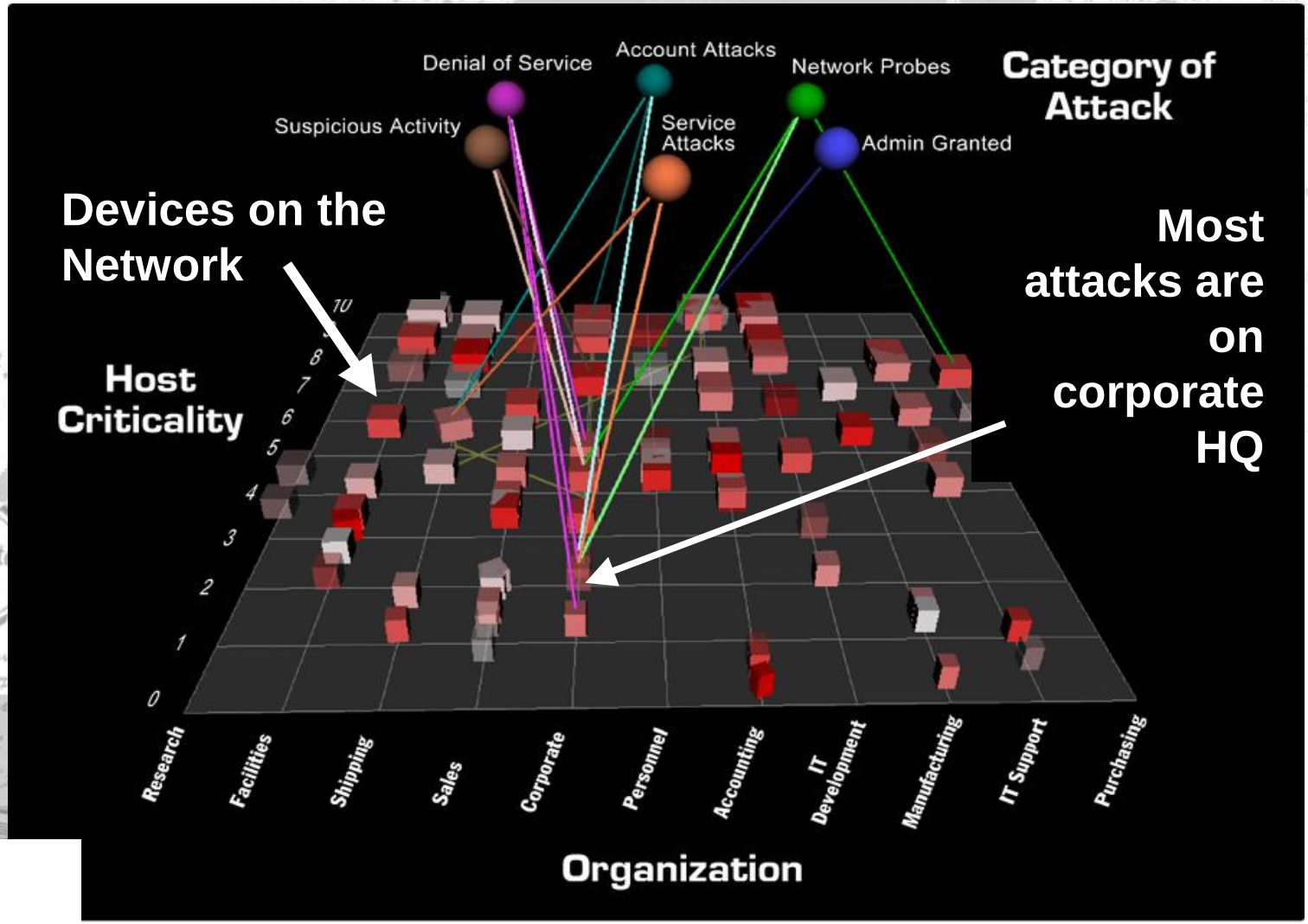
- Correlate event by predefined policy to make accurate security alarm. Strong real-time analysis ability based on small time windows as you should define correlation rule first.



Statistics-based Correlation

- Consolidate a certain time event, refer to a threshold, and make a security tendency estimation finally. Based on large time windows, less real-time analysis ability, not necessary predefined rule, reflect system the whole system security attributes.
- Make major categories first, classify the events then. Evaluate the attack according to the event security level and quantity.

Data Mining - three-dimensional risk visualization



The Problems solved by SEM

- To mitigate the burden of processing security alarms involving human
- To reduce the false positives of security events
- To avoid the potential risk under the mass volume of events
- To quicken the response of incidents
- To Manage events from IDS, Firewall, OS, Antivirus, Web server, Database

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Implementing of SEM with OpenSTF

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The Characteristic of Implementing SEM/SIM

- Not only the technical problems, but also the people and operation
- A extendable basic system plus different modules and solutions for different application environment
- Usually need 2nd development to form the final management system
- From the view of design & development method, it's similar to ERP system for enterprise management

Build Software System vs. Build SIM/SEM

Fred Brooks – Father of IBM 360 System

"The Mythical Man-Month", he brought us 4 root causes of the difficulty in software system development:

- complexity
- conformity
- changability
- invisibility

No Silver Bullet !?

Same in SIM/SEM development!

The evolution of software development vs. info-sec system development

- Software Engineering(RUP、XP、CMM …)
- OO(MDA、UML、Design Pattern …)
- Platform(software platform, business application platform)
- Middleware

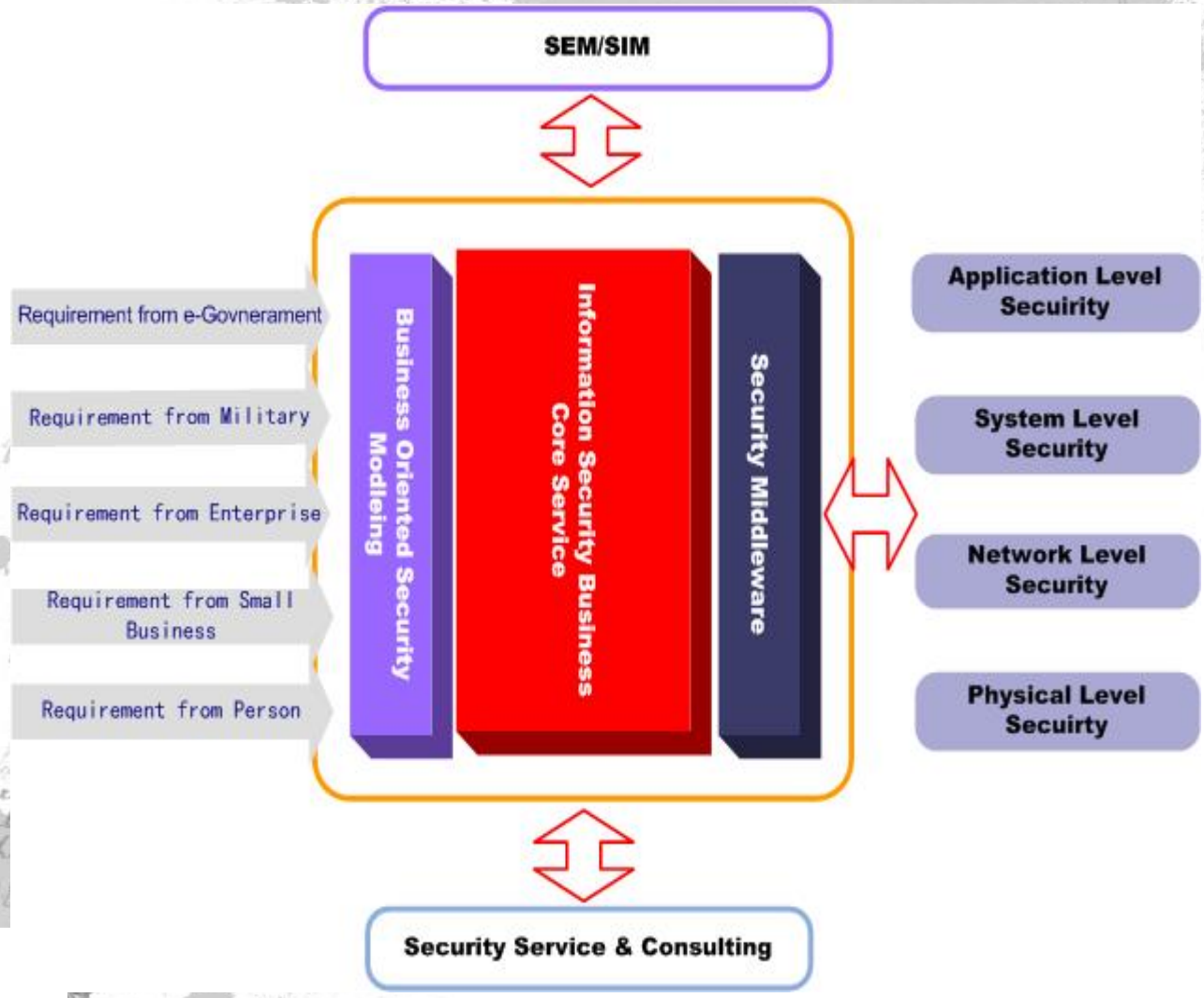
- Info-sec engineering (ISSE/SSE-CMM)
- Standard of Security Managment （ISO17799/BSI7799)
- IATF
- PKI/PMI
- Security Middleware
- Info Sec Application Oriented Platform

Global Goal

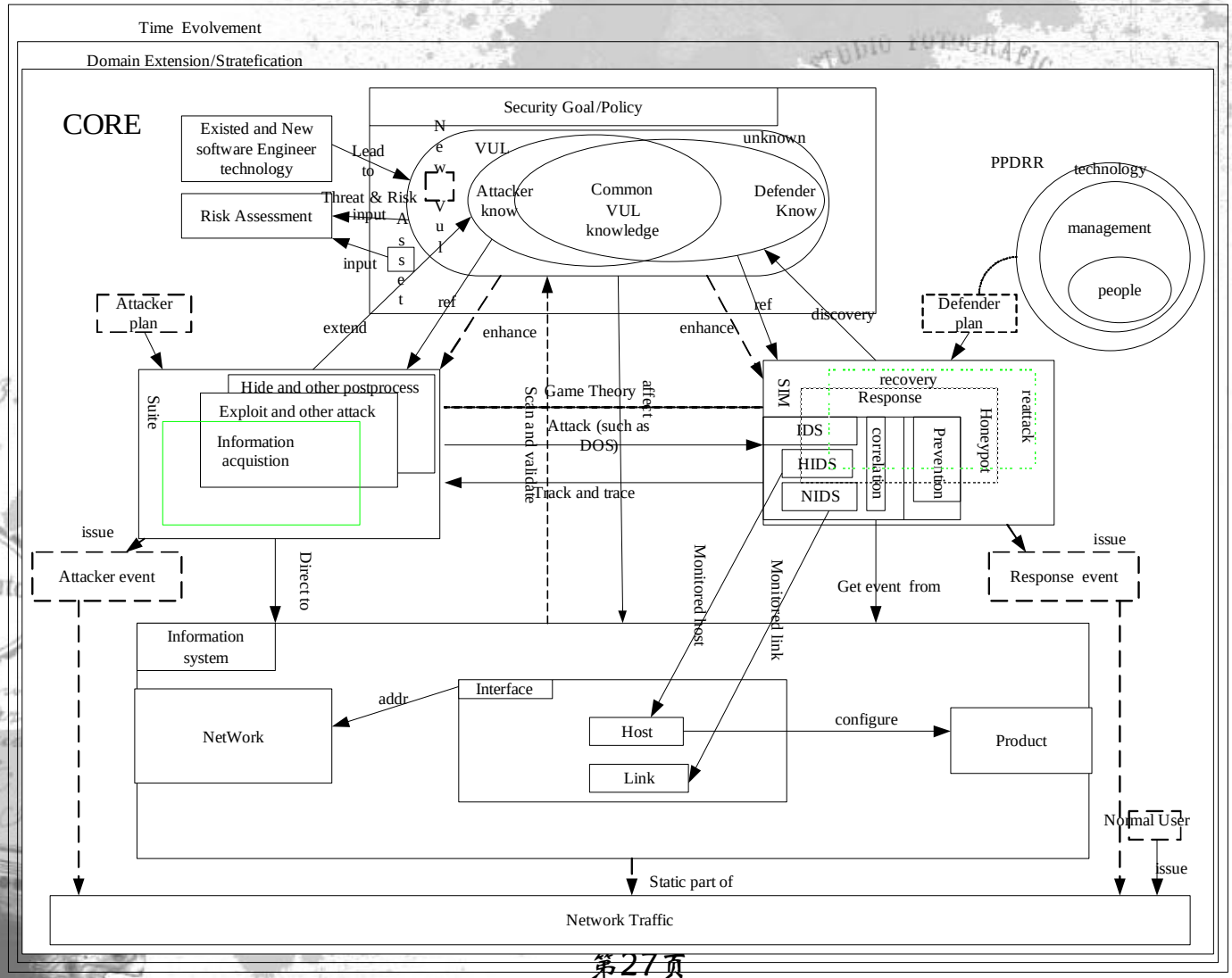
Security Application Oriented Platform

Business application oriented, to solve the problems of integration, interaction, extension, management of different security sub system, to reduce the total cost of own finally!

Security Application Oriented Platform



Attack-Defender Security Model



Attack-Defender Security Model

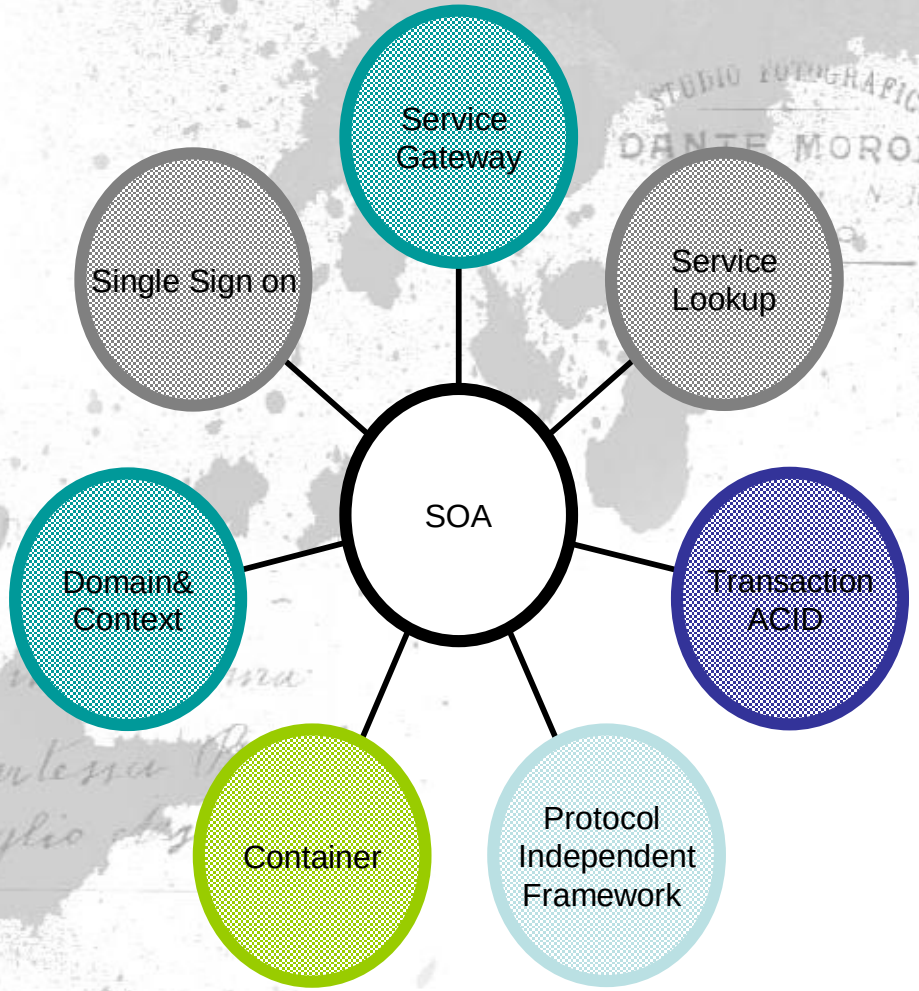
- Information System/ Asset
- Attacker
- Defender
- Security Goal/ Policy & Vulnerability

Distributed Programming in SOA

- Service Oriented Design Model is a revolution after OOD, which born in context of distributed computing
- Service Oriented Programming（SOP）is based on OOP

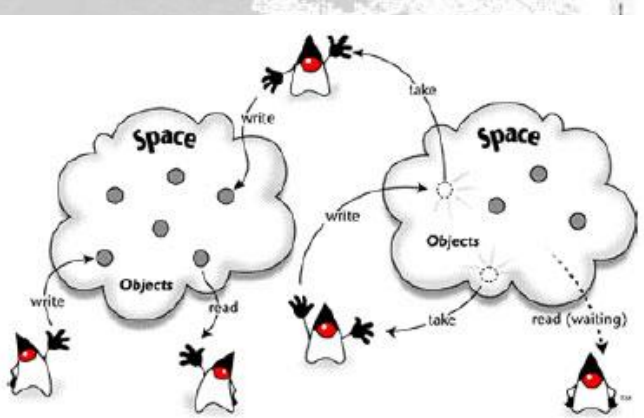
Service is a predefined contract implemented by component and used by other components. The providing and using of the service are connected by contract which is interface in computer programming knowledge scope.

Concepts in Service Oriented Architecture



OpenSTF Core's Service

- Component Service
- Domain Service (Context)
- Policy Service
- Message and Transaction Se
- Internal Security Service (Authentication & Authorization)
- Universal UI Framework（GUIStarter）



The Definition of Middleware in General

- Middleware is a kind of reusable software
- Middleware's goal is resource sharing in distributed system
- Middleware not only implements connection but also inter-operation
- Middleware's application must be based on platform

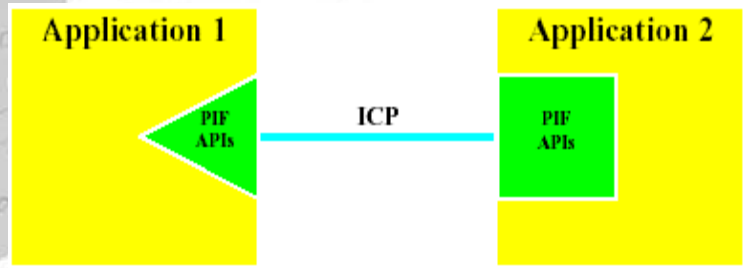
The Concept of Security Middleware in OpenSTF

- Middleware is the collection of components which implement a certain type security function through collaboration
- The collaboration between them and other middleware assured and supported by services of OpenSTF core
- Middleware is the format of distribution, which has many properties: uuid, vendor, version, features, list of compontes
- The management of middleware and inside components is reached by OpenSTF core's Component Service

Data Exchange in SEM

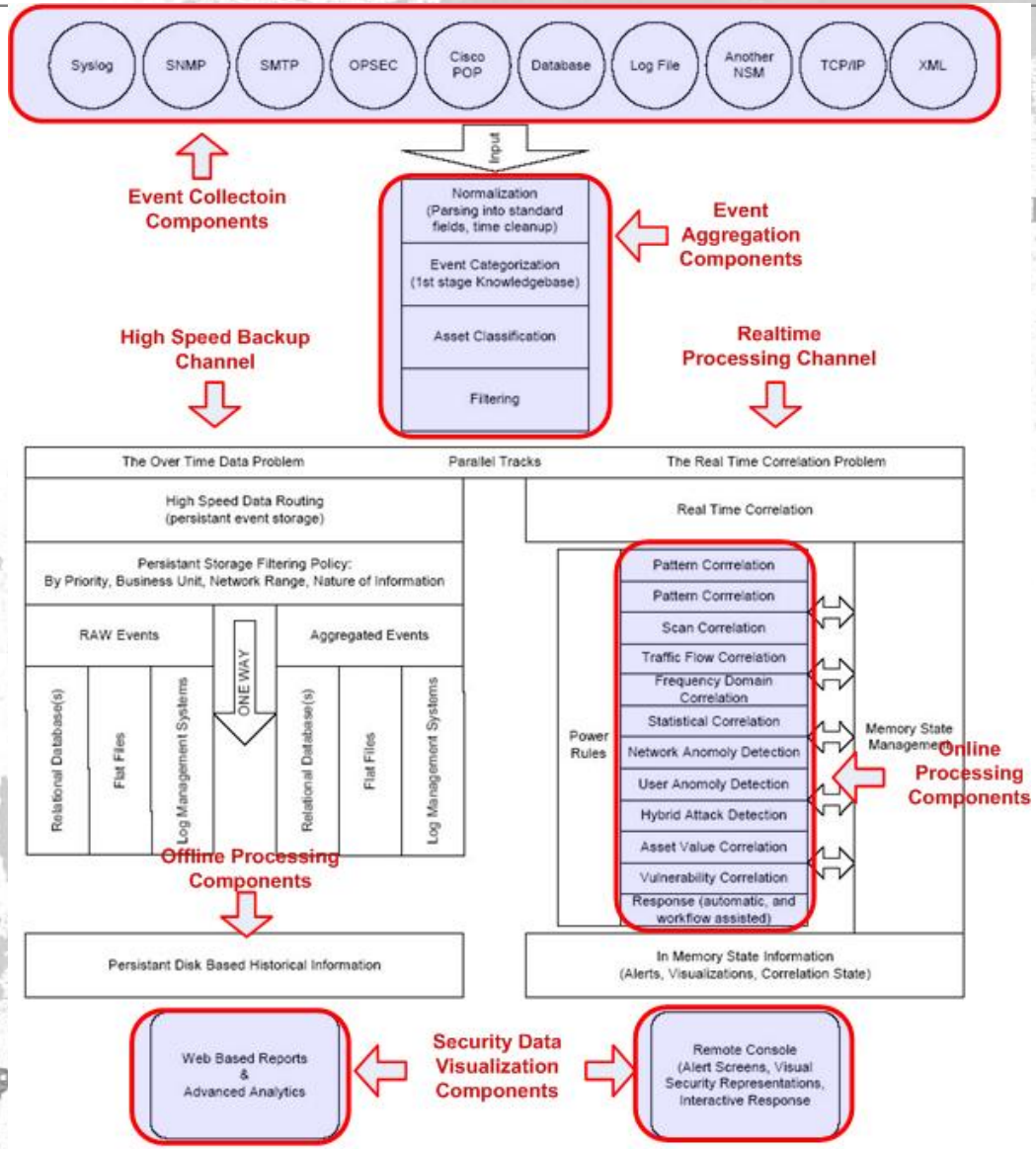
- To solve the problem of multi-protocol in event collection with PIF provided by OpenSTF Core

SNMP、SYSLOG、NTLOG、OPSEC、Database、XML



Protocol Independent Framework—PIF

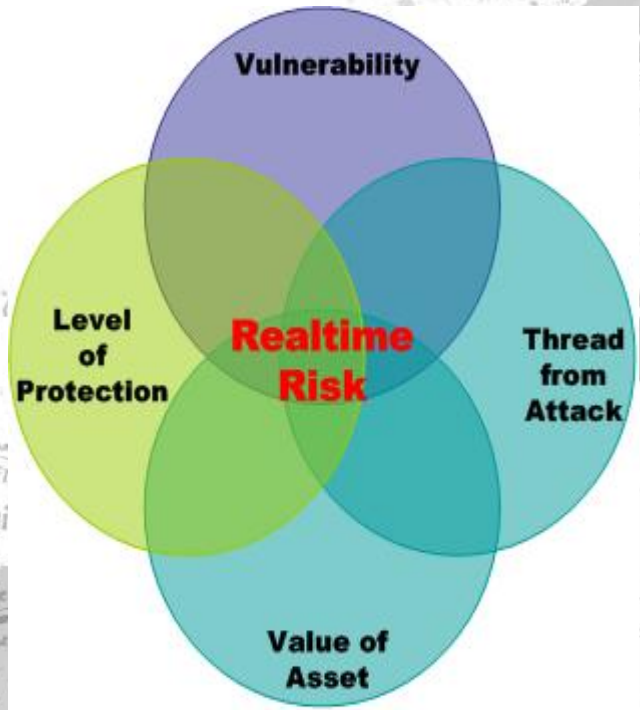
Components in Event Processing Flow



The concept of Components in SEM

- Dynamic loading event collecting component according to event source's protocol
- Dynamic deploying online event processing component according to the event routing and processing policy
- Dynamic distributing visualization or UI component according the type of console

Realtime Risk Evaluation with Attack-Defender Security Model



- Value of Asset, which is static, imported from asset evaluation by service & consulting
- Vulnerability found by scanner or penetration tester
- Thread presented by security events
- Protection refer to the level of countermeasures

Incident Response

- Collaboration between SEM and 3rd-party System or Device through Message Service provided by OpenSTF core
- Collaboration among peoples with role based workflow which begins with Transaction Service provided by OpenSTF Core

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