SIEMENS

Corporate Technology

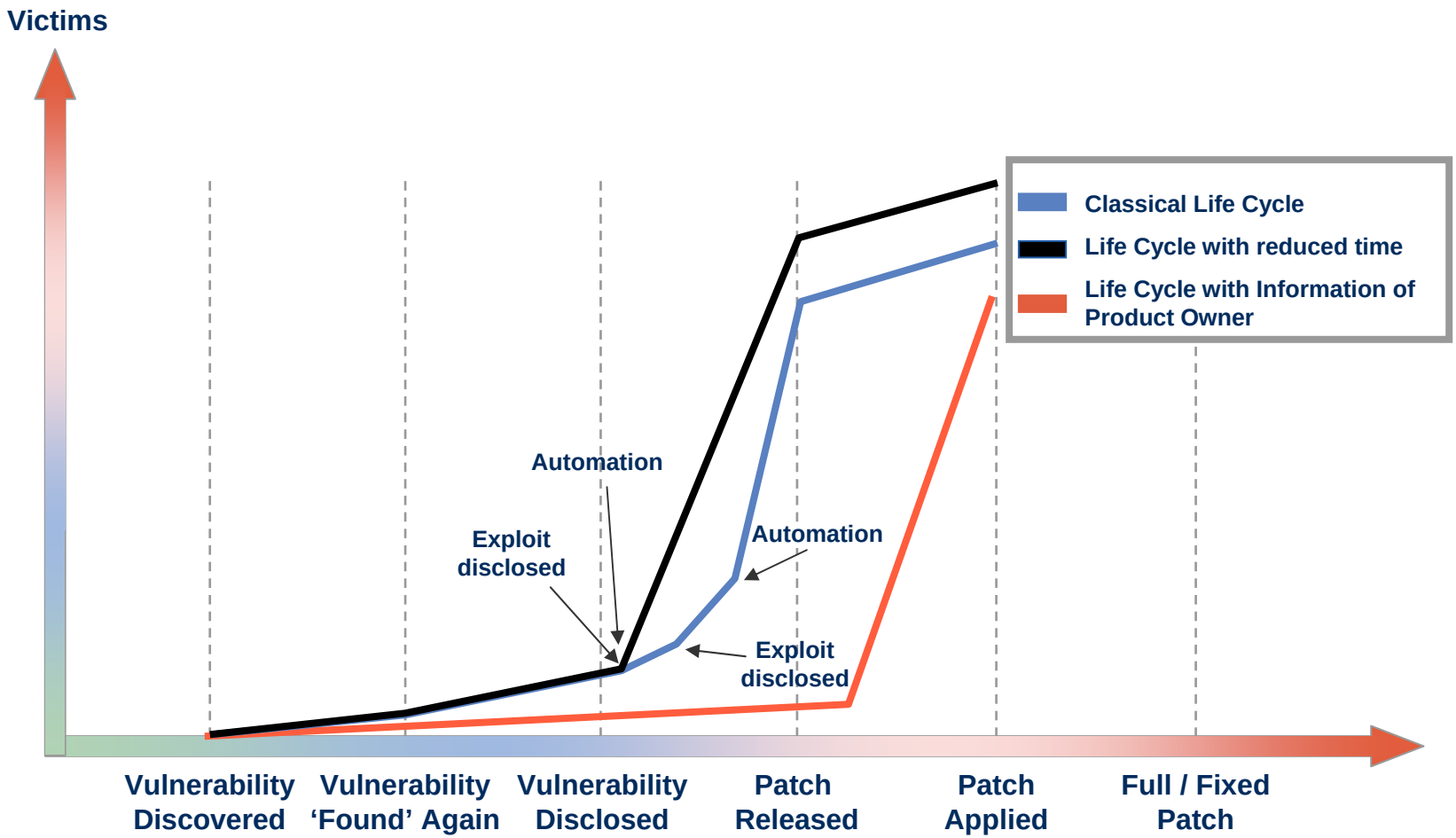
CarmentiS

A Co-Operative Approach Towards Situation Awareness and Early Warning for the Internet

Contents

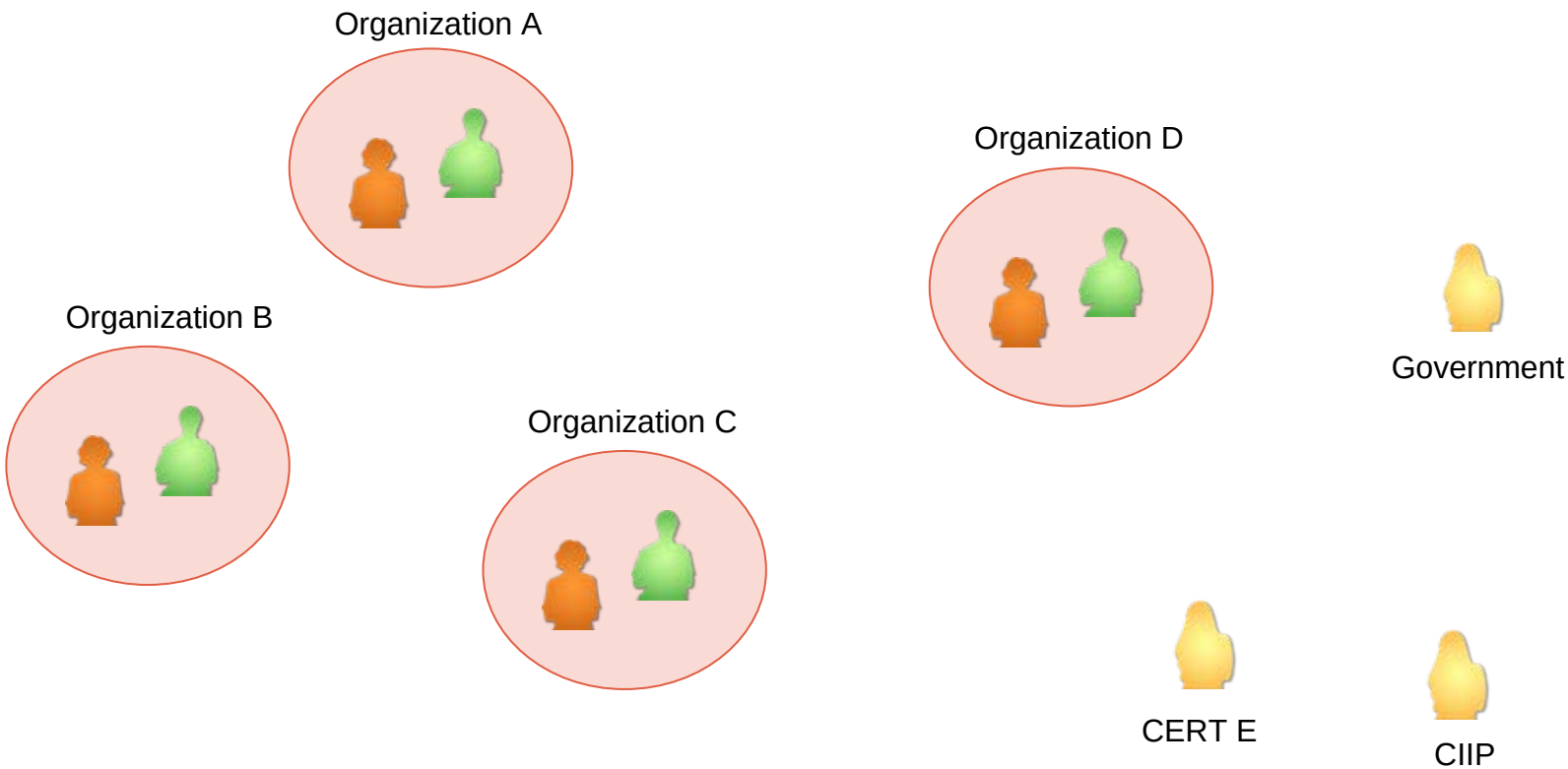
I Motivation

Vulnerability Life Cycle

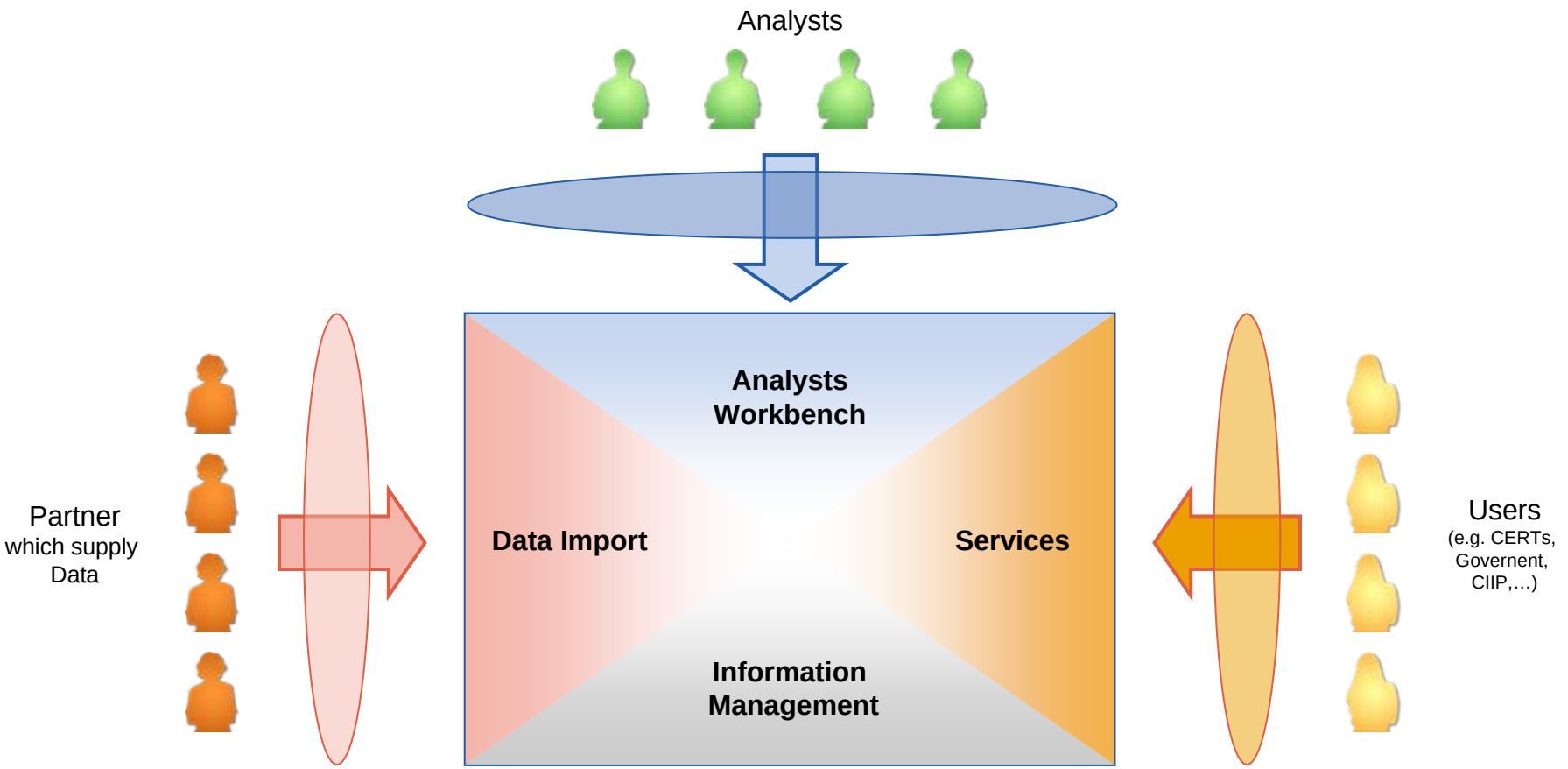


II CarmentiS Approach

Status Quo

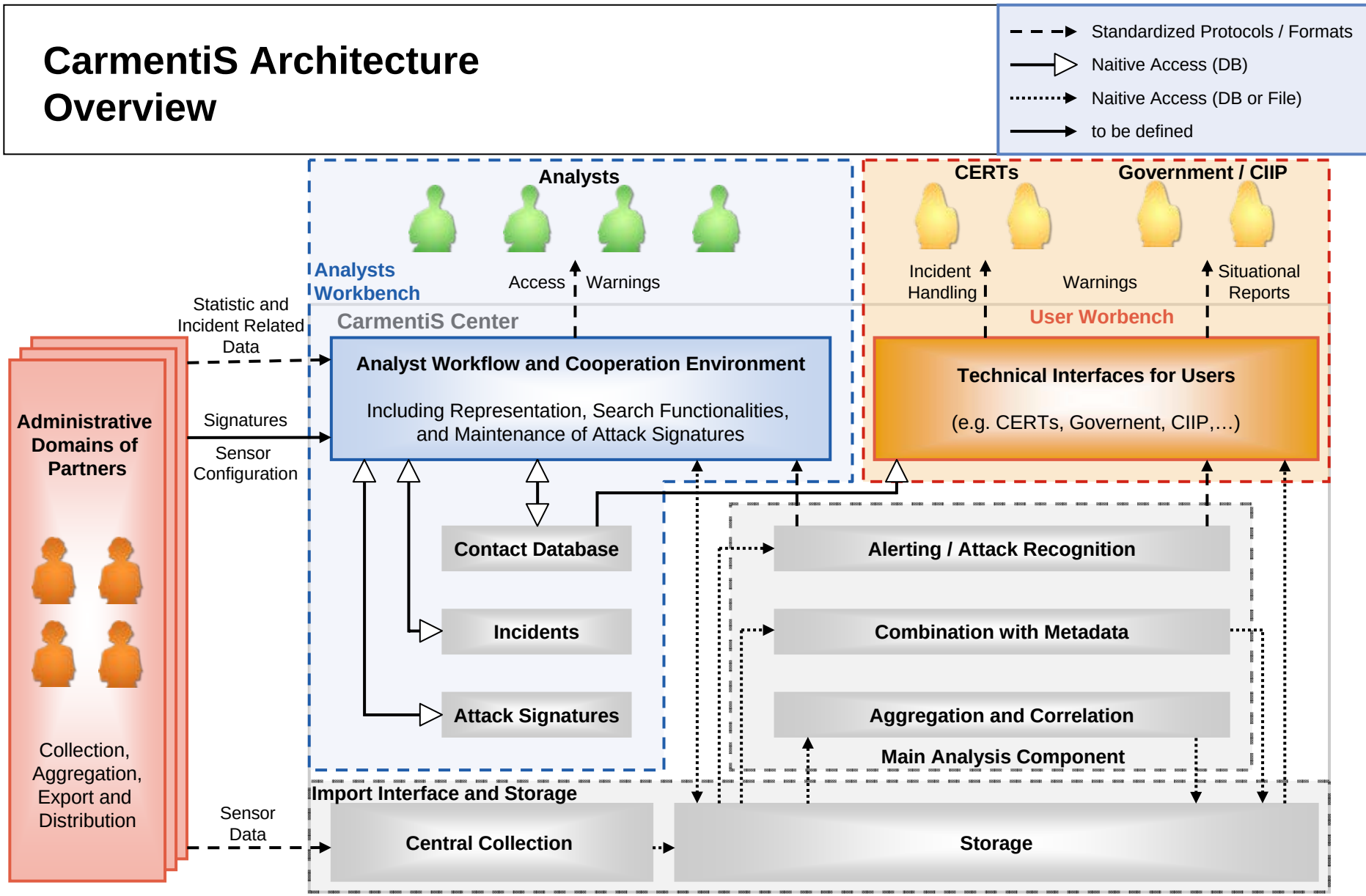

Organization A
Organization B
Organization C
Organization D
Government
CERT E
CIIP

Approach - Participants

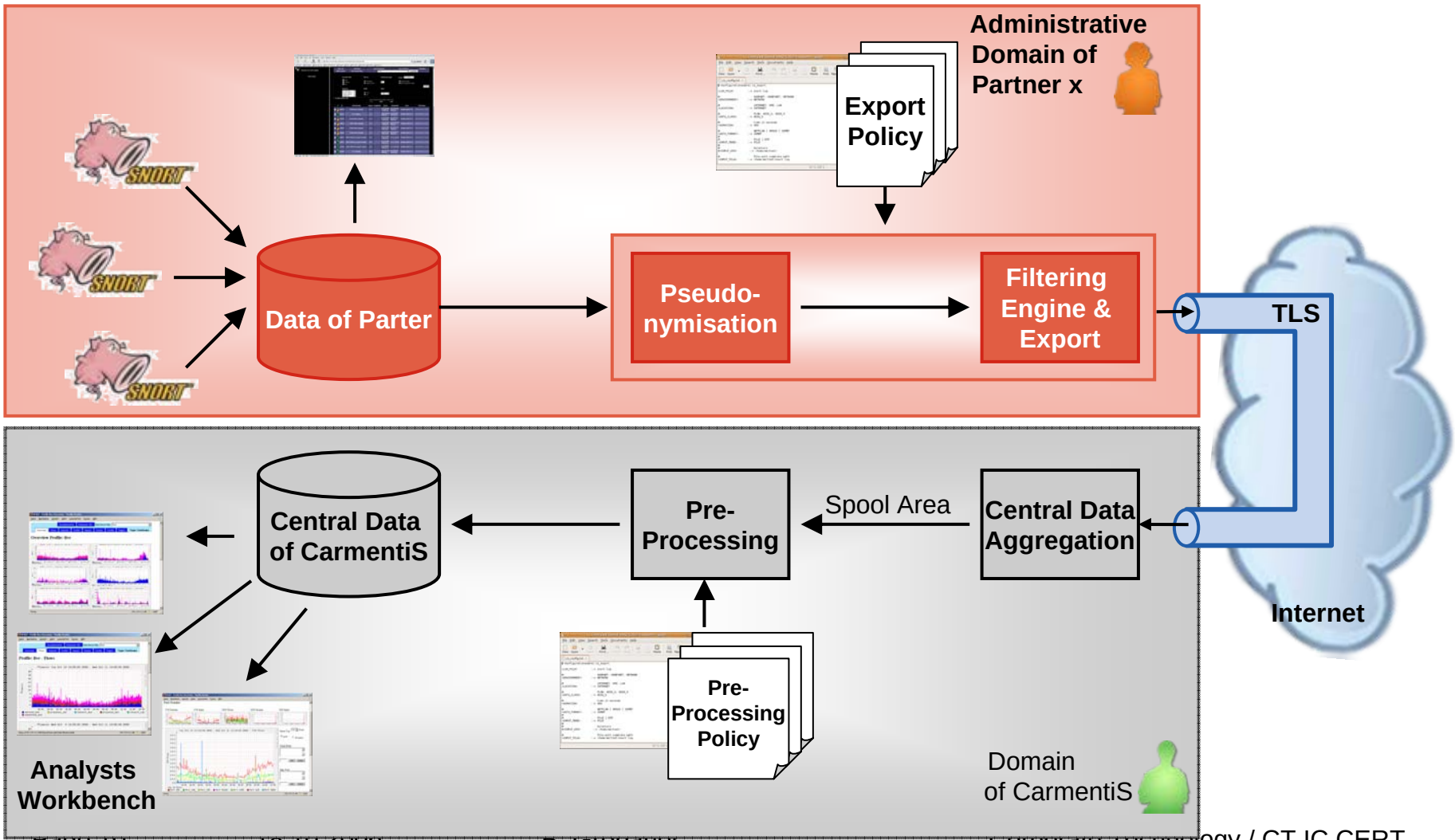


CarmentiS - Architecture

CarmentiS Architecture Overview



Import


Administrative Domain of Partner x
Export Policy
SNORT
SNORT
SNORT
Data of Parter
Pseudo-nymisation
Filtering Engine & Export
TLS
Internet
Central Data of CarmentiS
Pre-Processing
Spool Area
Central Data Aggregation
Pre-Processing Policy
Analysts Workbench
Domain of CarmentiS

CS-Container

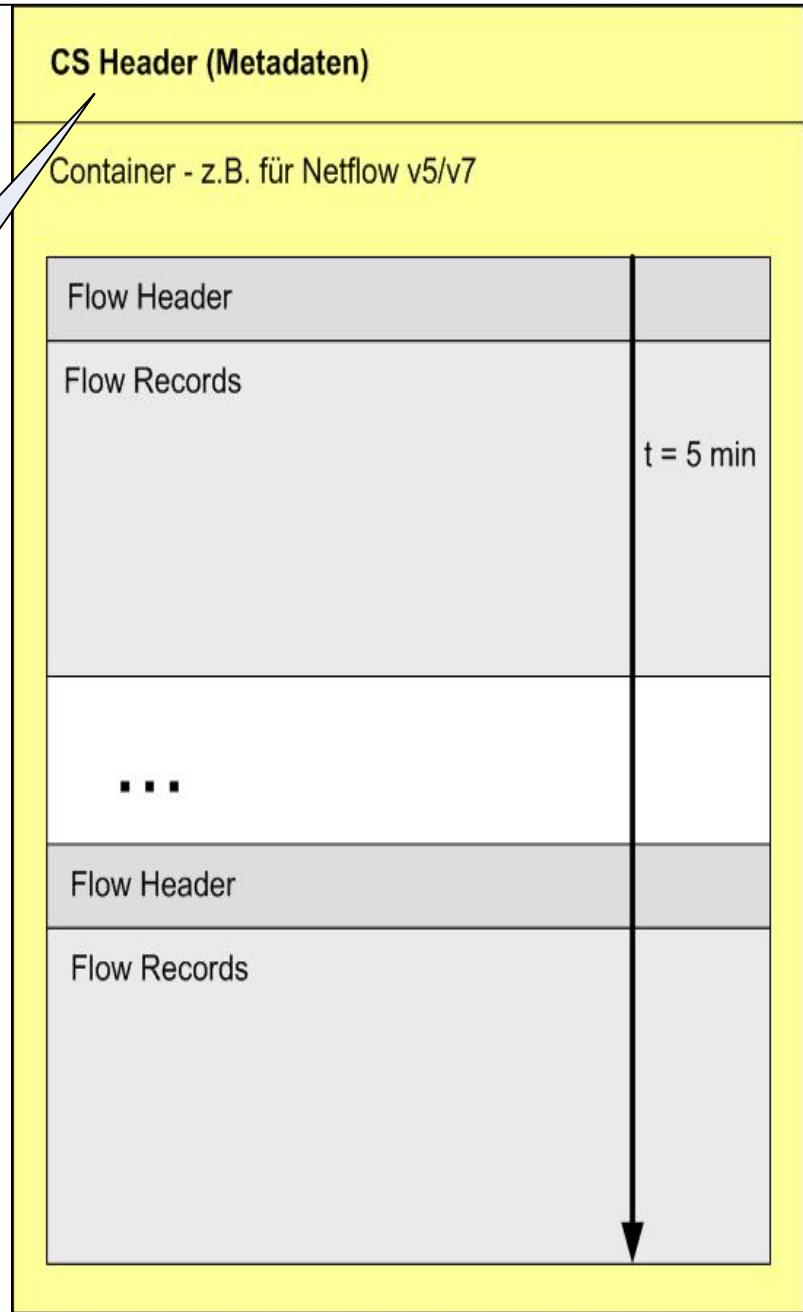
Requirements for the Data Export

- Meta-Data
- Data Compression
- Protection of Sensitive Information
- Capabilities for Configuration th
  Data Export

Developed CS-export mechanism support these features.

Metadata Examples:

- Identity of a Domain
- Environment of Sensor
- Data Format
- Business Sector belonging to Data
- Anonymizing Method



Example Export Policy

```
# Konfigurationsdatei cs_export

<LOG_FILE>          ::= /var/log/cs_export.log

#                       DARKNET, HONEYNET, NETWORK
<ENVIRONMENT>       ::= HONEYNET

#                       INTERNET, DMZ, LAN
<LOCATION>          ::= INTERNET

#                       FLOW, NIDS_S, NIDS_A
<DATA_CLASS>        ::= NIDS_S

#                       time in seconds
<DURATION>          ::= 300

#                       NETFLOW | ARGUS | IDMEF
<DATA_FORMAT>       ::= IDMEF

...
```

Example CS-Container

```
Show cs file: /carmentis/cs_spool/darknet_mon/CS-200610031610-030288

Version:          1
organisation_id: 123217736
environment:      DARKNET
location:         INTERNET
data_class:       FLOW
data_format:      NETFLOWS
src_mode:         PLAIN
dst_mode:         PSEUDO
creation_time:    2006-10-03 13:10:00
duration:         300
flags:            0

 ...
```

Pseudonymization (1/2)

```
Time      Prot      SRC IP           Port      DST IP           Port      Pks    Bytes
---

13:07:54 TCP      219. 27.152. 26:1603 -> 159.157.137.218:135      1        40
13:08:02 TCP       70. 52.131.111:3075 -> 159.157.107.247:139      2        96
13:08:04 TCP       62.178. 39.234:1517 -> 159.157. 86.163:445      4       305
13:08:06 ICMP     219. 27.152. 26:0    -> 159.157.137.218:771      1        56
13:08:06 TCP       70. 52.131.111:3077 -> 159.157.107.244:139      2        96
13:08:07 TCP       62.178. 39.234:1520 -> 159.157. 86.174:445      4       305
13:08:10 TCP      219. 27.152. 26:1603 -> 159.157.137.218:135      4      1936
13:08:10 TCP      195.174. 71. 95:4020 -> 134. 51.211.229:445      1        40
13:08:10 TCP      219. 27.152. 26:2159 -> 159.157.137.218:4444     7       356
13:08:11 TCP       70. 52.131.111:3079 -> 159.157.107.246:139      2        96
13:08:12 TCP      195.174. 71. 95:4020 -> 134. 51.211.229:5000     4       168
13:08:12 TCP       72. 20. 33. 75:3773 -> 134. 49.  5. 67:135      6      1928
13:08:12 TCP      195.174. 71. 95:4020 -> 134. 51.211.229:139      2        88
13:08:13 TCP       72. 20. 33. 75:3773 -> 134. 49.  5. 67:33568   32     30056
13:08:14 TCP       62.178. 39.234:1522 -> 159.157. 86.172:445      4       305
13:08:16 UDP      219. 27.152. 26:69   -> 159.157.137.218:37355   13      6592
13:08:18 ICMP     219. 27.152. 26:0    -> 159.157.137.218:771      1        56
---
```

Pseudonymization (2/2)
Example Cryptography-based Prefix-preserving Anonymization

Time	Prot	SRC IP	Port	DST IP			
13:07:54	TCP	219. 27.152. 26:1603	->	200.118.139.			
13:08:02	TCP	70. 52.131.111:3075	->	200.118.227.2			
13:08:04	TCP	62.178. 39.234:1517	->	200.118.193.			
13:08:06	ICMP	219. 27.152. 26:0	->	200.118.139. 27			
13:08:06	TCP	70. 52.131.111:3077	->	200.118.227.230:1		2	96
13:08:07	TCP	62.178. 39.234:1520	->	200.118.193. 85:	45	4	305
13:08:10	TCP	219. 27.152. 26:1603	->	200.118.139. 27:135		4	1936
13:08:10	TCP	195.174. 71. 95:4020	->	222. 63.132. 43:445		1	40
13:08:10	TCP	219. 27.152. 26:2159	->	200.118.139. 27:4444		7	356
13:08:11	TCP	70. 52.131.111:3079	->	200.118.227.229:139		2	96
13:08:12	TCP	195.174. 71. 95:4020	->	222. 63.132. 43:5000		4	168
13:08:12	TCP	72. 20. 33. 75:3773	->	222. 61.185. 34:135		6	1928
13:08:12	TCP	195.174. 71. 95:4020	->	222. 63.132. 43:139		2	88
13:08:13	TCP	72. 20. 33. 75:3773	->	222. 61.185. 34:33568		32	30056
13:08:14	TCP	62.178. 39.234:1522	->	200.118.193. 87:445		4	305
13:08:16	UDP	219. 27.152. 26:69	->	200.118.139. 27:37355		13	6592
13:08:18	ICMP	219. 27.152. 26:0	->	200.118.139. 27:771		1	56

Problem:

Partner uses different Key for Pseudonymization

Correlation of IP-Addresses between Partner is impossible!

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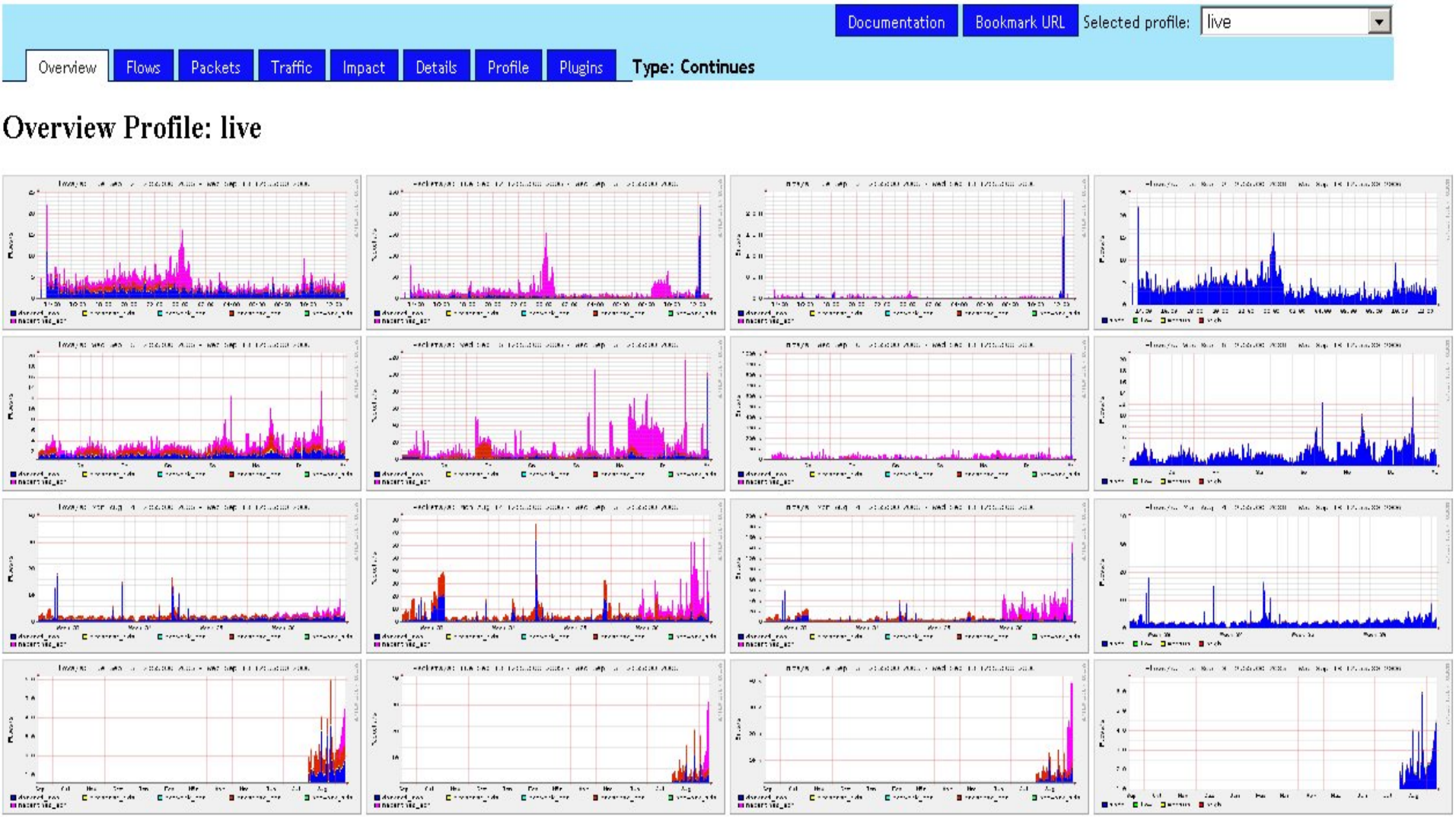
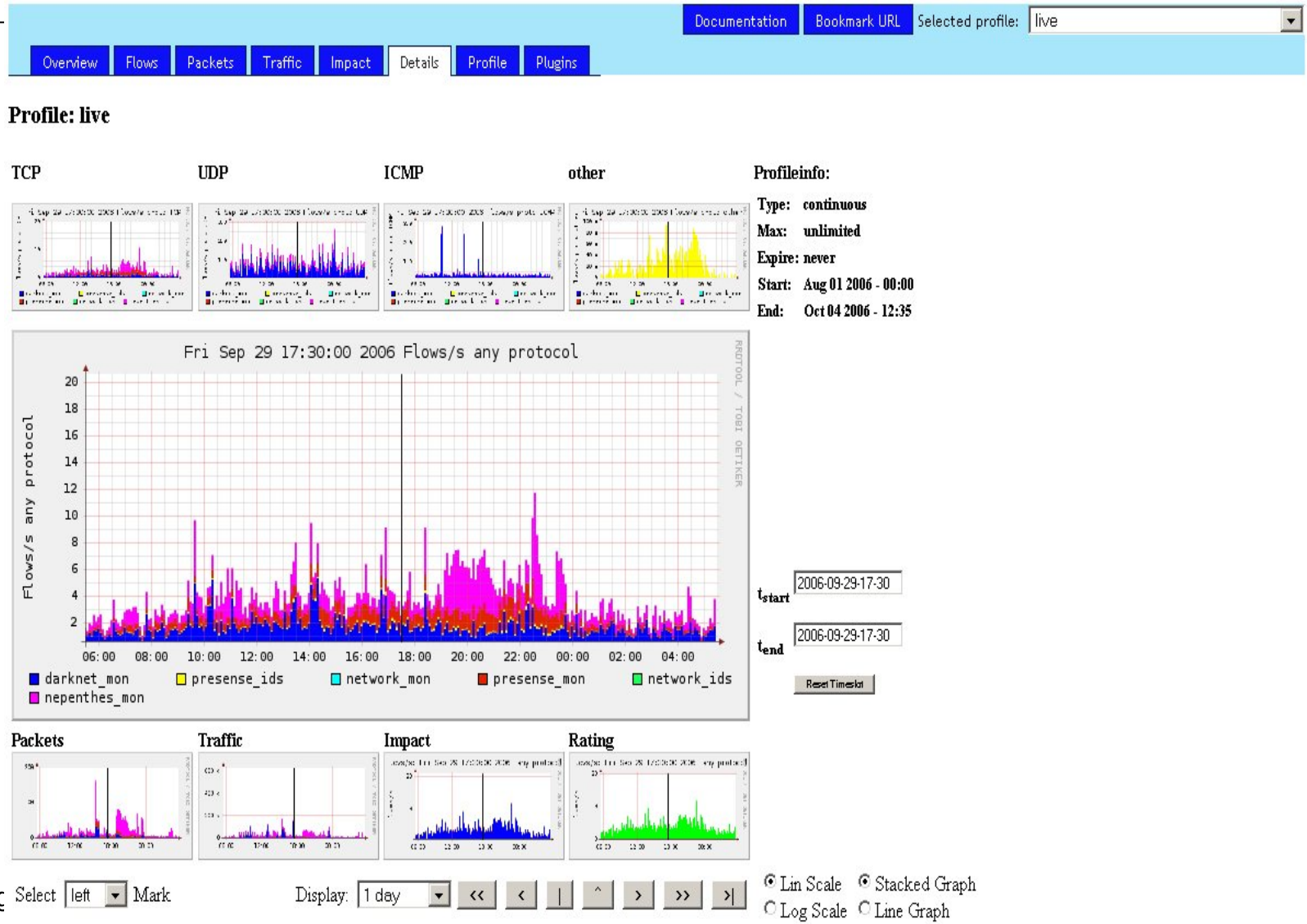
CarmentiS System

CarmentiS Analysts Workbench Overview



CarmentiS Analysts Workbench View with Details



CarmentiS Analysts Workbench
Creating Individual Queries

Statistics Timeslot Sep 29 2006 - 17:30

Source:	Flows:	Packets:					Traffic:					Impact:				
		all:	tcp:	udp:	icmp:	other:	all:	tcp:	udp:	icmp:	other:	all:	tcp:	udp:	icmp:	other:
☑ darknet_mon	2.0 /s	17.5 /s	1.5 /s	15.7 /s	0.3 /s	0 /s	144.4 Kb/s	601.1 b/s	143.6 Kb/s	163.4 b/s	0 b/s	0 /s	0 /s	0 /s	0 /s	0 /s
☑ presense_ids	0.1 /s	0.1 /s	0.0 /s	0 /s	0 /s	0.0 /s	0.4 b/s	0.3 b/s	0 b/s	0 b/s	0.1 b/s	0 /s	0 /s	0.0 /s	0 /s	0 /s
☑ network_mon	0 /s	0 /s	0 /s	0 /s	0 /s	0 /s	0 b/s	0 b/s	0 b/s	0 b/s	0 b/s	0 /s	0 /s	0 /s	0 /s	0 /s
☑ presense_mon	1.0 /s	2.8 /s	2.7 /s	0.1 /s	0 /s	0 /s	2.5 Kb/s	2.5 Kb/s	44.2 b/s	0 b/s	0 b/s	0 /s	0 /s	0 /s	0 /s	0 /s
☑ network_ids	0 /s	0 /s	0 /s	0 /s	0 /s	0 /s	0 b/s	0 b/s	0 b/s	0 b/s	0 b/s	0 /s	0 /s	0 /s	0 /s	0 /s
☑ nepenthes_mon	0.5 /s	0.8 /s	0.5 /s	0.3 /s	0.0 /s	0 /s	1.3 Kb/s	185.8 b/s	1.1 Kb/s	3.0 b/s	0 b/s	0 /s	0 /s	0 /s	0 /s	0 /s

All None

Display: ○ Sum ◉ Rate

Details

Source:
darknet_mon
presense_ids
network_mon
presense_mon
network_ids
nepenthes_mon

Filter:
host 200.118.193.80

and <none>

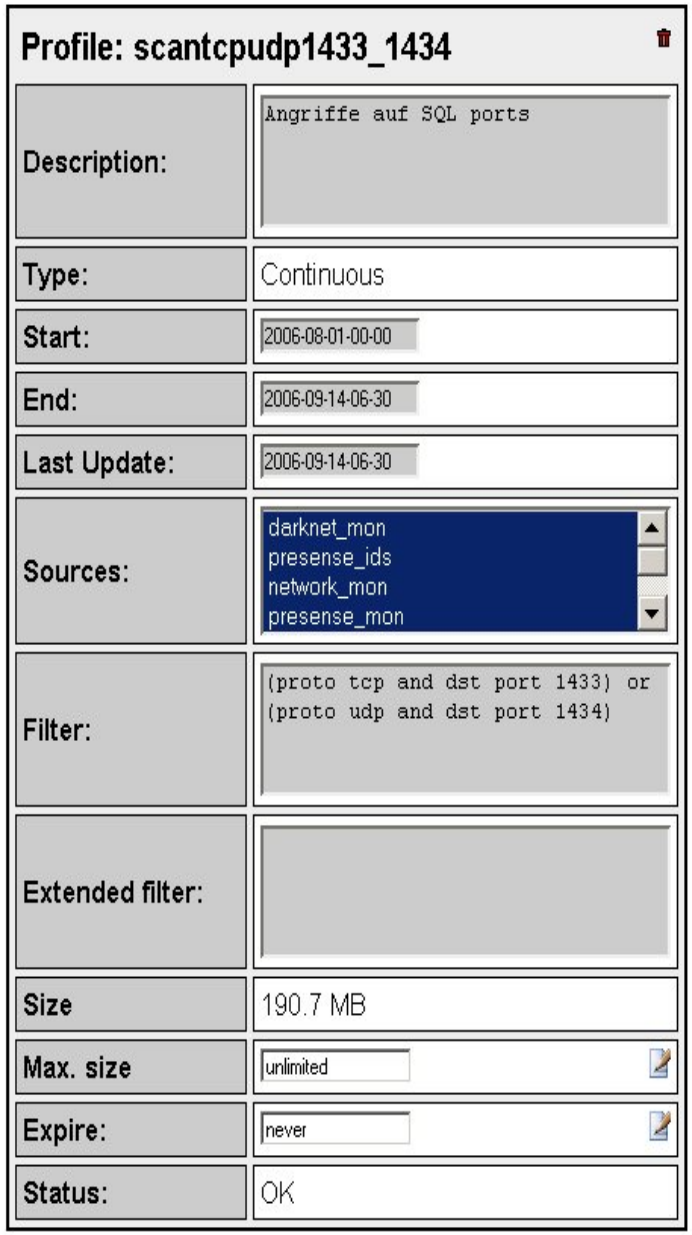
Show:

List: First 1000 Flows
☐ aggregated.
☐ sort desc.
Output format ◉ line ○ long ○ extended
Refresh

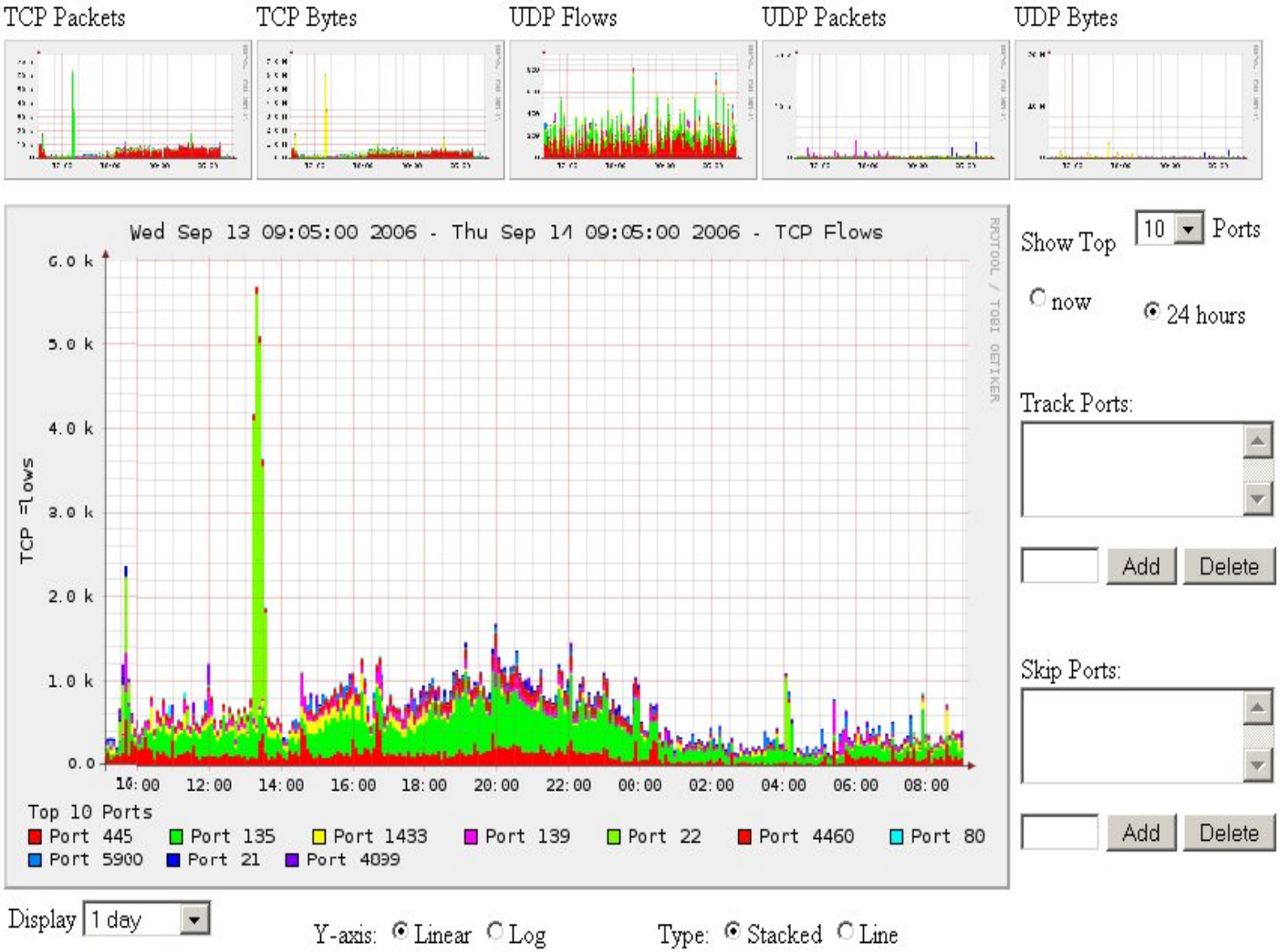
Stat: Top 50
☐ Limit Packets > 0 -
☐ Flow sorted flows
Output format ◉ line ○ long ○ extended

☐ DST Port sorted flows
Refresh

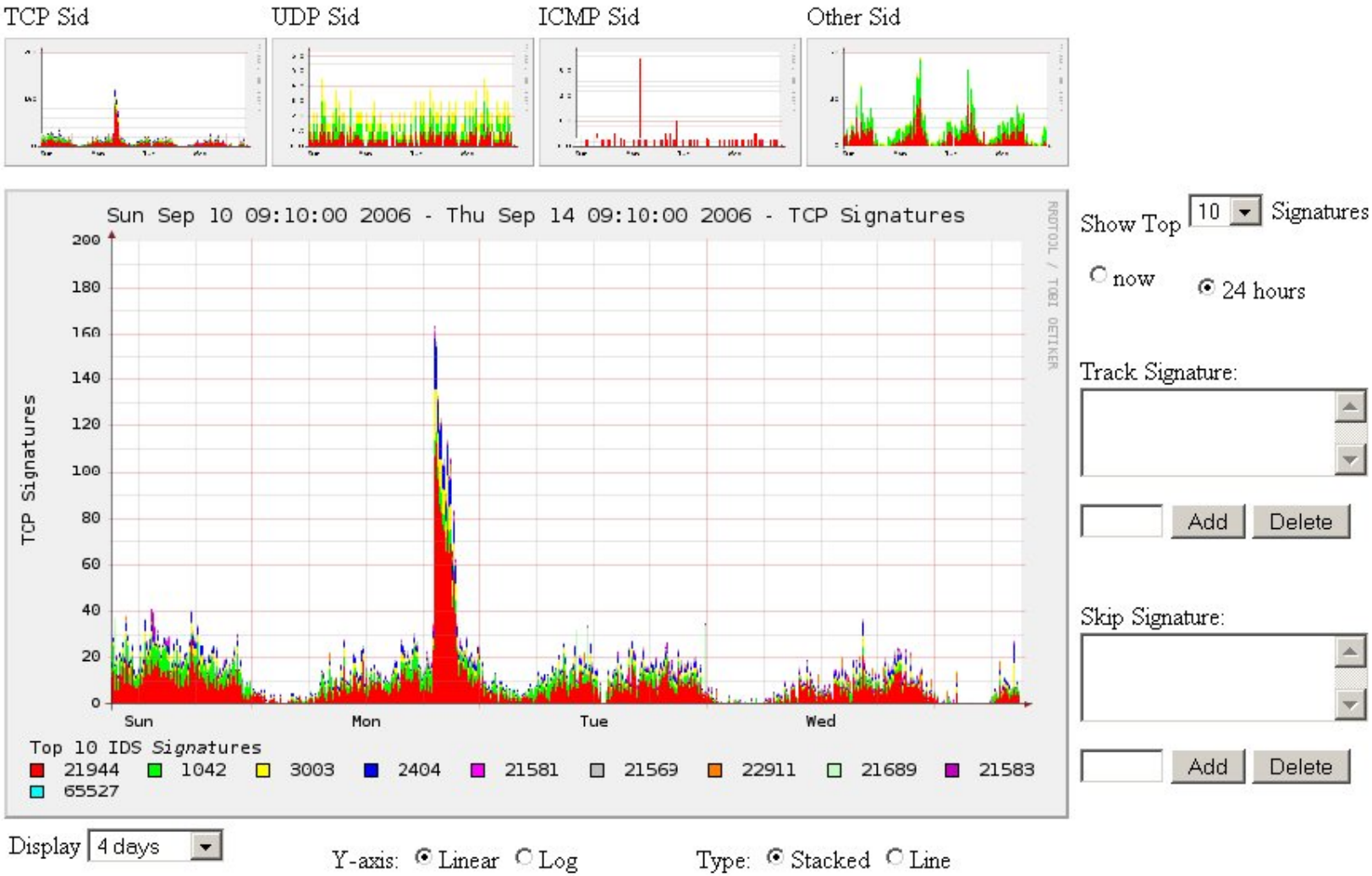
CarmentiS Analysts Workbench
Editing Profiles for CarmentiS



CarmentiS Analysts Workbench Extensions with PlugIns: Port Statistic



CarmentiS Analysts Workbench
Extensions with PlugIns: TOP IDS Signatures



Outlook

Conclusion and Outlook – Experimenting with Correlation and Co-Operative Analysis

In conclusion CarmentiS provides a co-operative approach towards situation awareness and early warning in the Internet.

Further experiments in collecting sensor data from several institutions, correlating and co-operatively analyzing this data can begin.

Further research topics may be:

- Analyzing Consequences of Pseudonymization
- Analyzing the proper use of Sensor Meta Data

Contact

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