FOSDEM²³

Mercator Mapping the **Information System**

February, 4th 2023



Mercator?

Mercator is a web application that allows you to manage the mapping of an information system as described in the Information System Mapping Guide from ANSSI.fr

What is a mapping ?

Mapping is a way to represent the information system of an organization as well as its connections with the outside world. The term "mapping" refers to a schematic representation of a set of information.

Mapping <-> Inventory

Who is Mercator?

Mercator is a cartographer. He is the author of the Mercator projection, which is a conformal projection, i.e. it keeps the angles (very useful in sailing in the 16th century).





Why map?

Essential tool to control the information system. It allows you to have knowledge of all the components of the information system and to obtain a better understanding of it by presenting it under different views.

Four challenges of digital security

The control of the information system: the cartography allows to have a common and shared vision of the information system within the organization.

Protection of the information system: mapping makes it possible to identify the most critical and most exposed systems, to anticipate possible attack paths on these systems and to implement adequate measures to ensure their protection.

Defense of the information system: mapping enables a more effective response in the event of an incident or digital attack, to qualify the impacts and predict the consequences of the defensive actions taken

Information system resilience: mapping makes it possible to identifier the organization's key activities to definie a business continuity plan and is an essential tool for crisis management, whether digital or not.





Composition of a map

1. Business

2. Application

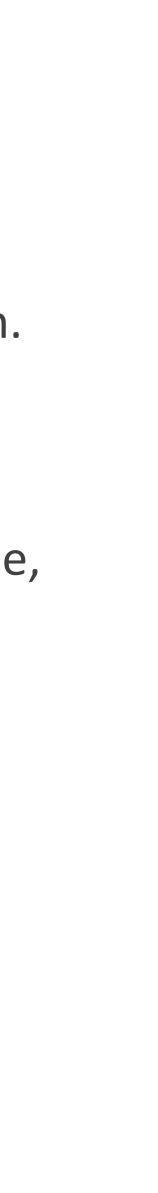
- The application view describes the software components of the information system, the services they provide, and the flow of information between them.

- The administration view lists the scopes and privilege levels of users and administrators.

3. Infrastructure

- The logical infrastructure view illustrates the logical partitioning of networks, including the definition of IP address ranges, VLANs, and filtering and routing functions; - The physical infrastructure view describes the physical equipment that are used by the information system.

- The ecosystem view presents the different entities or systems with which the IS interacts to fulfill its function. - The business view of the information system represents the IS through its main processes and information.





Levels of granularity

Each step has its own level of granularity.

Minimum granularity level 1:

Initial elements essential to digital security operations

Intermediate level 2 granularity:

Digital security oriented mapping. Vital information systems must have a mapping with this minimum level of maturity.

Level 3 fine granularity:

Comprehensive and detailed mapping that incorporates digital security requirements.

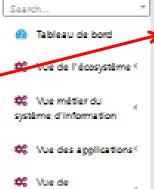
Objets/ Attributs	Démarche de cartographi numé	Démarche globale de cartographie			
concernés	Maturité de niveau 1	Maturité de niveau 2	Maturité de niveau 3		
	Vue de l'	écosystème			
Granularité 1	•	•	•		
Granularité 2			•		
	Vue métie	r du système			
Granularité 1	•	•	•		
Granularité 2		•	•		
Granularité 3			•		
	Vue des	applications			
Granularité 1		•	•		
Granularité 2			•		
	Vue de l'a	dministration			
Granularité 1		•	•		
	Vue des infras	tructures logiques			
Granularité 1	•	•	•		
Granularité 2		•	•		
	Vue des infrast	ructures physiques			
Granularité 1					
Granularité 2			•		



Main screen

- Maturity level
- Breakdown by domain
- Global proportional map





Padministration

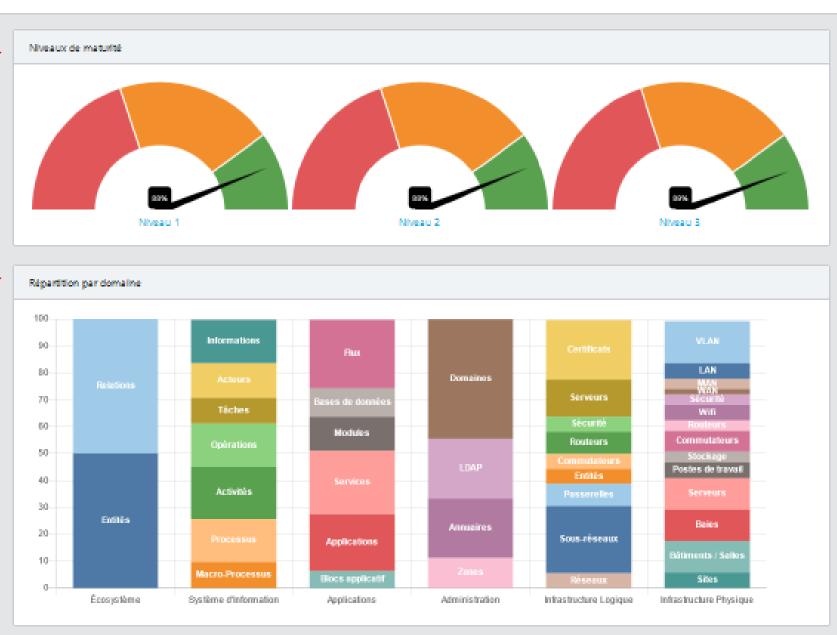
infrastructures logiques

Q: Vue de Primastructur physique

🔹 Gestion des

utilisateurs

B Déconnexion







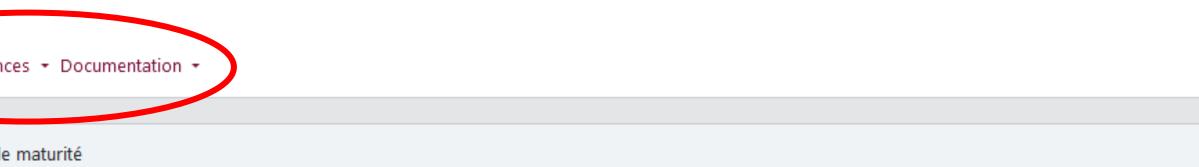
Mercator Top panel

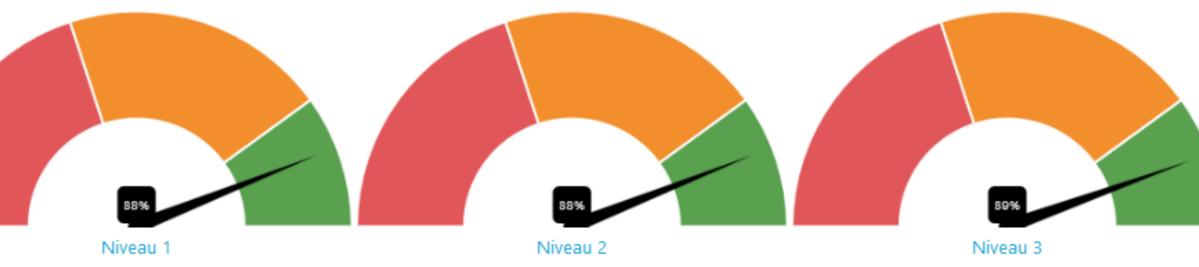
- Views
- Preferences
- Documentation

Left panel

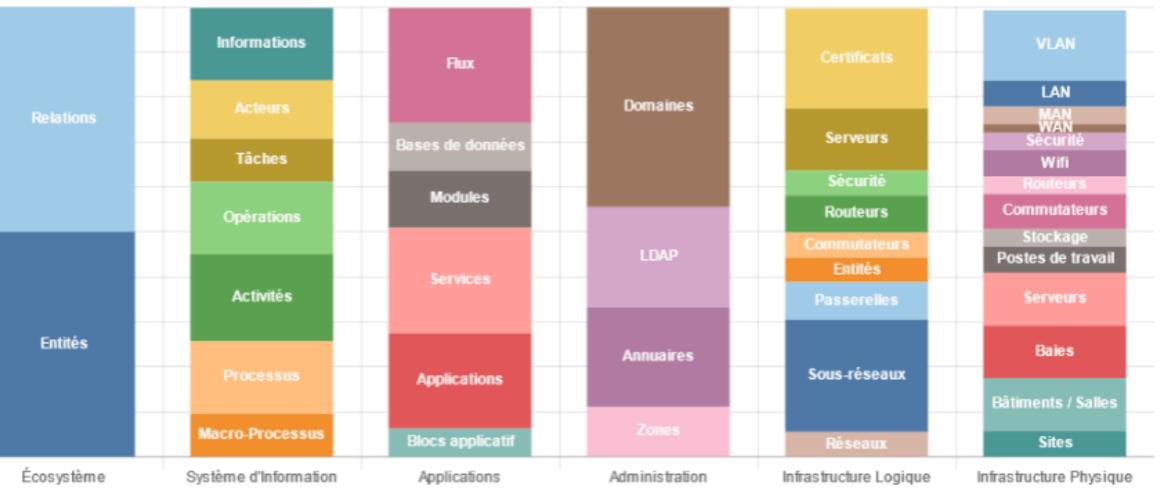
- Data entry

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n par domaine







Computing the maturity level

Presence of information :

- no description
- no responsible
- no type ...

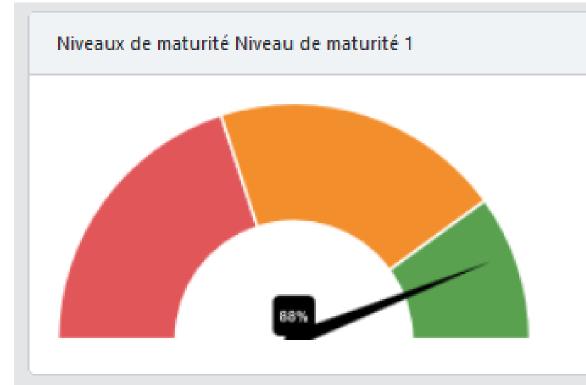
Links between assets :

- entity without relations
- process without operations
- application that does not support any process
- server without applications

Computation :

conforming assets / total number of assets

% represents the effort to be compliant



Granularité minimale de niveau 1 : informations indispensables.

Écosystème	#	Mature	79 %
Entités	12	12	100 %
Relations	12	7	58 %
Système d'Information	#	Mature	87 %
Processus	5	5	100%
Opérations	5	4	80%
Informations	5	4	80%
Applications	#	Mature	74%
Applications	10	5	50%
Bases de données	5	5	100%
Flux	12	10	83%



Lists

- Sort on each column
- Search for
- Hide a column
- Show / Modify / Delete
- Copy
- Print
- Export : Excel, PDF, CSV, ...



Description de l'entité six

Very big HAL corporation

support_informatque@entite6.fr Néant

hal@corp.com

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Top security

certification



Supprime

Afficher

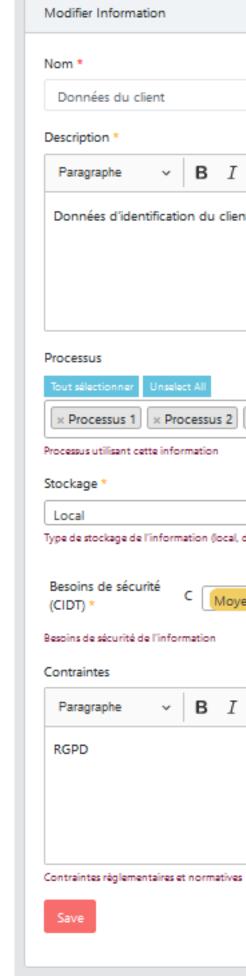
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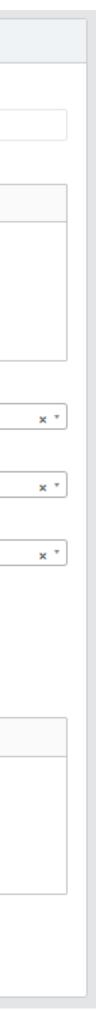


Forms

- RFT Editor
- Drop-down list
- Links between objects
- Security requirements
- Roles management
- History of changes

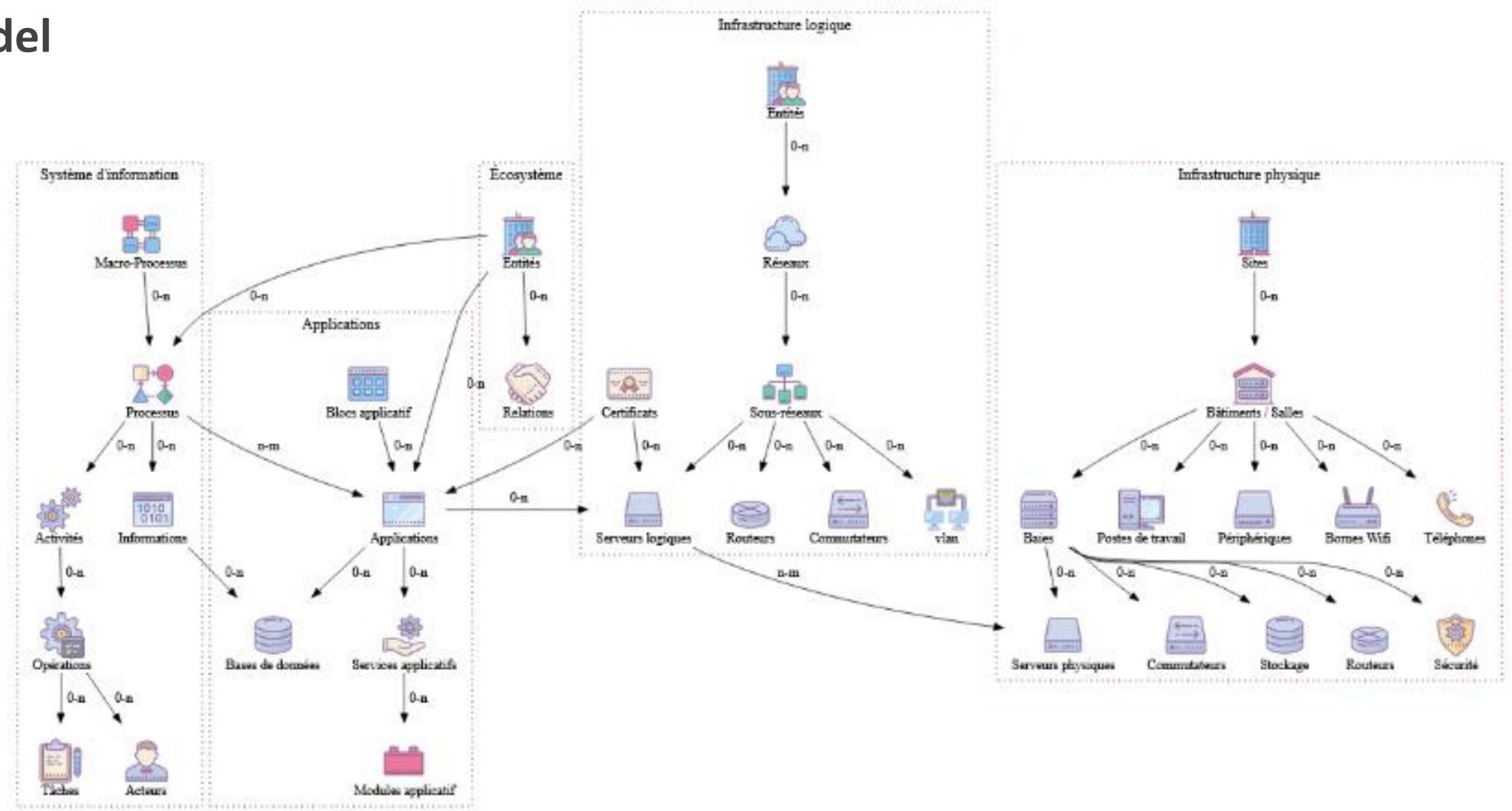


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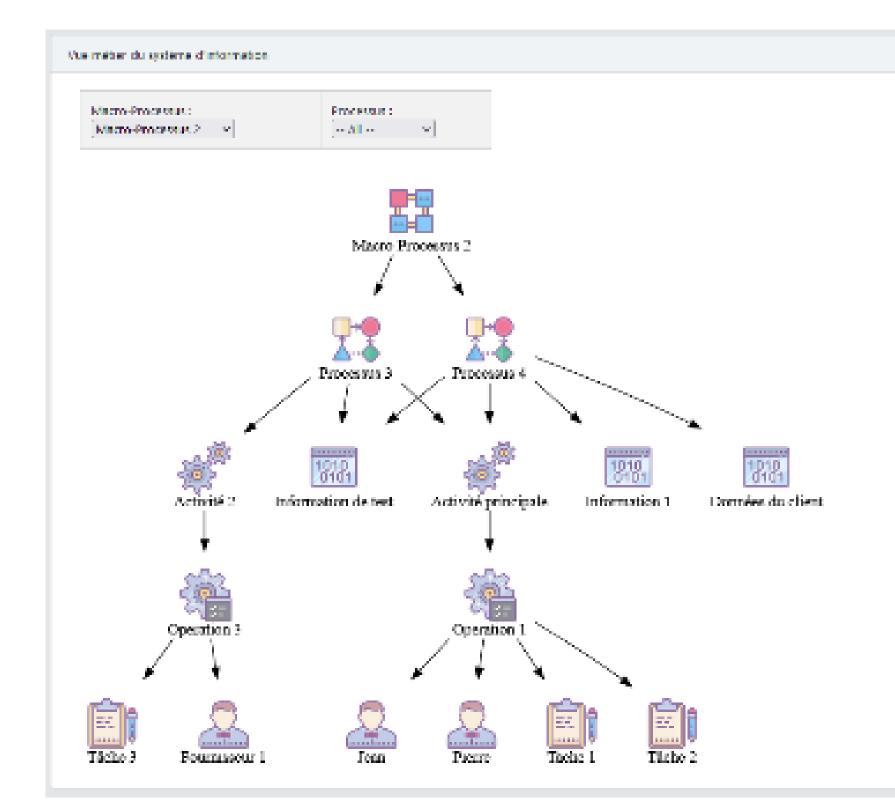


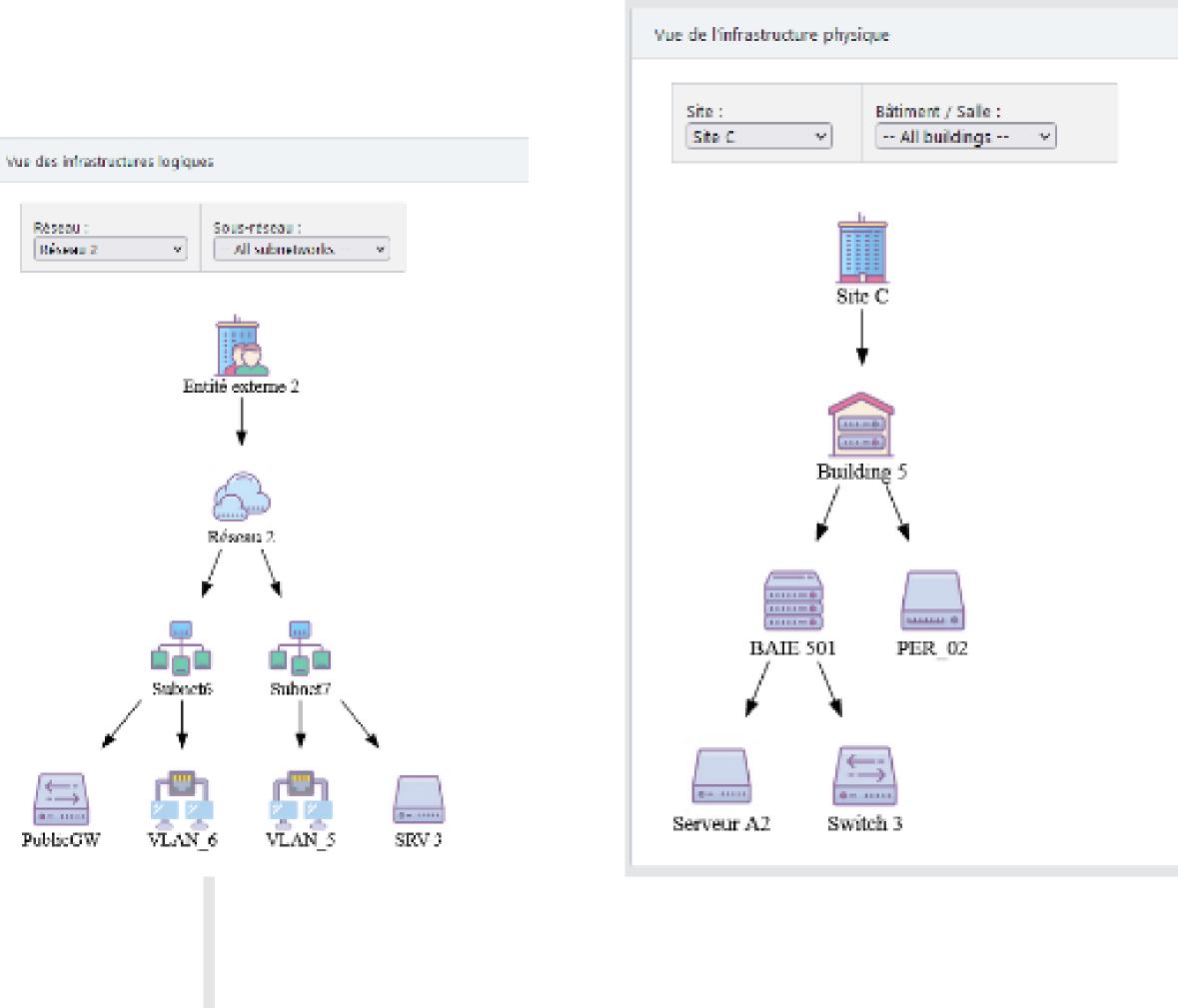
Data Model





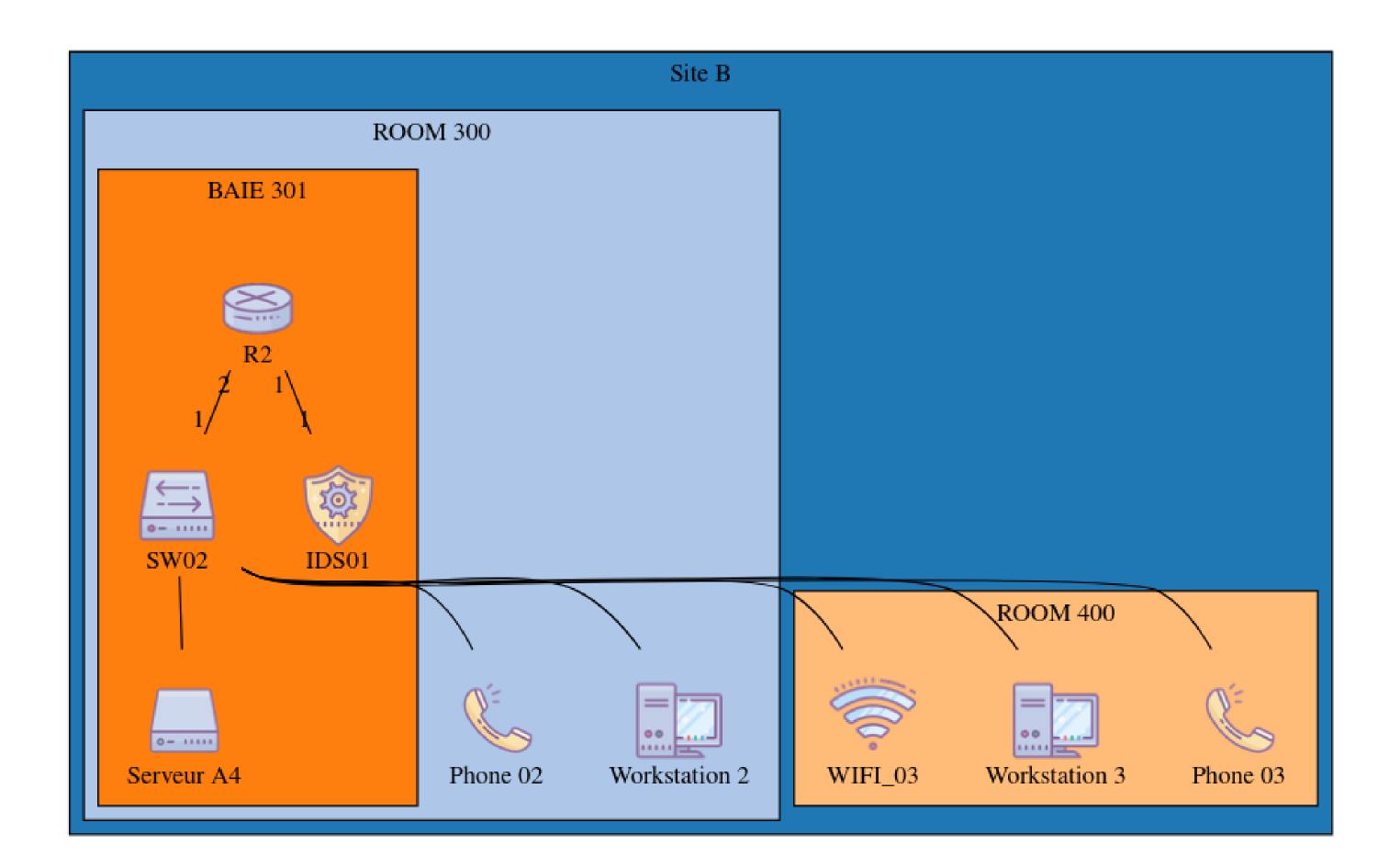
Links between objects







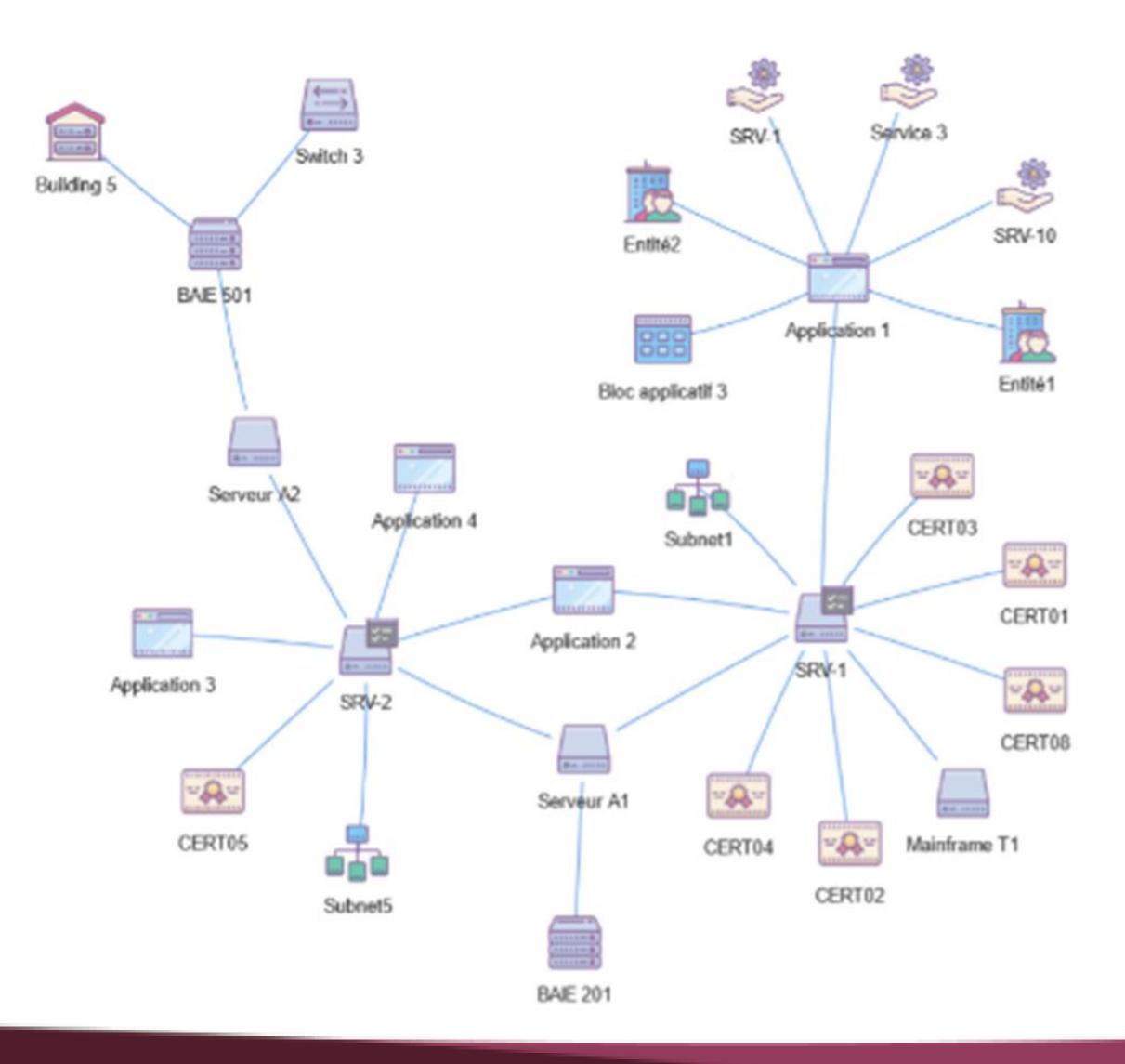
Physical network schema





13

Explore cartography





Reports

Information System Mapping Report

Lists

Supported entities and applications List of information system entities and their supported applications

Applications by application group List of applications by application group

Logical servers List of logical servers by applications and managers

Analysis of security needs List of security needs between macro-processes, processes, applications, database and information.

Logical servers configuration List of logical servers configuration

Inventory of the physical infrastructure List of equipment by site/location

Audit

Maturity levels

Lists the maturity levels reached by the different objects of the mapping

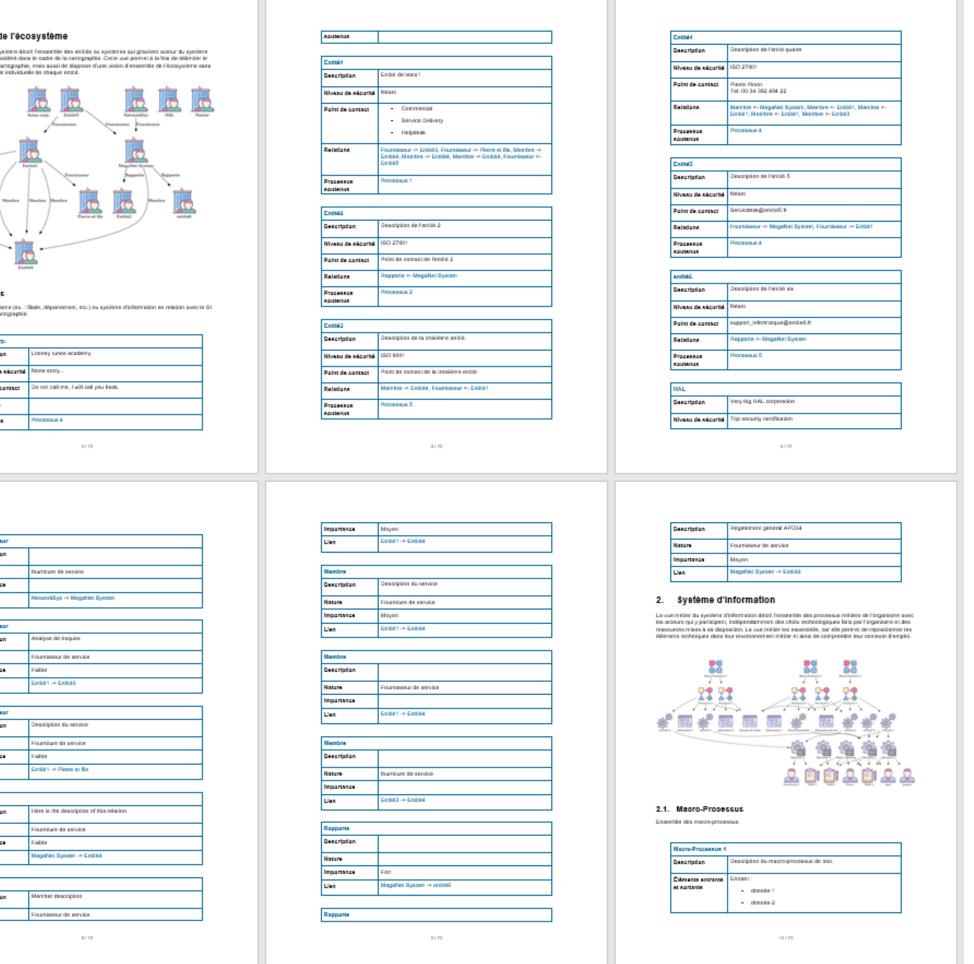
Update / changes

Traces the changes made to the map in the last 12 months



Information System Mapping Report

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Physical inventory

	Α	В	С	D	E	F	G
1	Site	Room	Bay	Asset	Name	Туре	Description
2	Site A	Building 0		Workstation	Workstation 1	ThinThink 460	Station de travail compta
3	Site A	Building 0	BAIE 101	Server	Mainframe 01	Type 404	Central accounting system
4	Site A	Building 0		Workstation	Workstation 1	ThinThink 460	Station de travail compta
5	Site A	Building 0	BAIE 101	Switch	Switch 2	Alcatel 430	Description switch 2
6	Site A	Building 0	BAIE 101	Router	R1	Fortinet	Routeur prncipal
7	Site A	Building 0	BAIE 101	Sécurité	Magic Gate	Gate	BIG Magic Gate
8	Site A	Building 1		Phone	Phone 01	MOTOROAL 3110	Téléphone de test
9	Site A	Building 1		Wifi	WIFI_02	ALCALSYS 3001	Borne Wifi 2
10	Site A	Building 1	BAIE 102	Storage	Oracle Server	Oracle Server	Main oracle server
11	Site A	Building 1		Phone	Phone 01	MOTOROAL 3110	Téléphone de test
12	Site A	Building 1		Wifi	WIFI_02	ALCALSYS 3001	Borne Wifi 2
13	Site A	Building 1	BAIE 103	Server	Serveur A3	System 840	Serveur mobile
14	Site A	Building 1	BAIE 103	Storage	DiskServer 1	DiskServer 1	Description du serveur d stockage 1
15	Site A	Building 1		Phone	Phone 01	MOTOROAL 3110	Téléphone de test
16	Site A	Building 1		Wifi	WIFI_02	ALCALSYS 3001	Borne Wifi 2
17	Site A	Building 2		Peripheral	PER_01	IBM 3400	important peripheral
18	Site A	Building 2		Wifi	WIFI_01	Alcatel 3500	Borne wifi 01
19	Site A	Building 2	BAIE 201	Server	Mainframe T1	HAL 340	Mainframe de test
20	Site A	Building 2	BAIE 201	Server	Serveur A1	System 840	Description du serveur A1
21	Site A	Building 2	BAIE 201	Switch	Switch de test	Nortel A39	Master test switch.
22	Site A	Building 2		Wifi	WIFI_01	Alcatel 3500	Borne wifi 01
23	Site B	Building 3		Workstation	Workstation 2	ThinThink 410	Station de travail accueil
24	Site B	Building 3		Phone	Phone 02	IPhone 2	Description phone 02
25	Site B	Building 3		Sécurité	Sensor-1	Sensor	Temperature sensor
26	Site B	Building 3	BAIE 301	Server	Serveur A4	Mini 900/2	Departmental server
27	Site B	Building 3		Workstation	Workstation 2	ThinThink 410	Station de travail accueil
28	Site B	Building 3		Phone	Phone 02	IPhone 2	Description phone 02
29	Site B	Building 3	BAIE 301	Switch	Switch 1	Nortel 2300	Desription du premier switch.
30	Site B	Building 3	BAIE 301	Router	R2	CISCO	Routeur secondaire
31	Site B	Building 3	BAIE 301	Sécurité	Magic Firewall	Firewall	The magic firewall - PT3743
32	Site B	Building 4		Workstation	Workstation 3	ThinThink 420	Station de travail back-office
33	Site B	Building 4		Peripheral	PER_03	HAL 8100	Space device
34	Site B	Building 4		Phone	Phone 03	Top secret red phne	Special AA phone
35	Site B	Building 4		Wifi	WIFI_03	SYSTEL 3310	Borne Wifi 3
36	Site C	Building 5		Peripheral	PER_02	IBM 5600	Description
37	Site C	Building 5	BAIE 501	Server	Serveur A2	System 840	Description du serveur A2
38	Site C	Building 5	BAIE 501	Switch	Switch 3	Alcatel 3500	Desciption du switch 3
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Analysis of the security needs

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2	Macro-Processus 1	4 3 2 1 Pro	ocessus 1	32	3 1	Application 1	1111					
3	Macro-Processus 1	4 3 2 1 Pro	ocessus 1	32	31	Application 2	2222	Database 2	1 1	11	information 2	2111
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9	Macro-Processus 2	1 2 3 4 Pro	ocessus 3	32	31	Application 4	2232	Data Warehouse	2 2	2 2	information 3	4 4 3 4
10	Macro-Processus 2	1 2 3 4 Pro	ocessus 3	32	3 1	Application 4	2232	DB Compta	2 2	2 2	Données du client	2222
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12	Macro-Processus 2	1 2 3 4 Pro	ocessus 3	32	31	Queue Manager	4444	Database 1	1 2	3 4	Information 1	1322
13	Macro-Processus 2	1 2 3 4 Pro	ocessus 3	32	31	Queue Manager	4444	Database 1	1 2	3 4	information 2	2111
14	Macro-Processus 2	1 2 3 4 Pro	ocessus 3	3 2	3 1	Queue Manager	4444	Database 1	1 2	3 4	information 3	4 4 3 4
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Analysis of the security needs

Denormalize the links between macroprocesses, processes, applications, databases and information

Analyze the differences in requirements between each object.





Cartography updates

1ObjetAction05/202107/202108/202109/202110/202111/202ÉcosystèmeIndependent <td< th=""><th></th></td<>	
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18 deleted 19 Opérations created 20 updated	
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21 deleted	
22 Tâches created	
23 updated	
24 deleted	
25 Acteurs created	
26 updated	
27 deleted	
28 Informations created 2	
29 updated 18 1	
30 deleted	
31 Applications	
32 Blocs applicatif created	
33 updated	
34 deleted	
35 Applications created 1 8 2 1 2	9
36 updated 6 2 14 51 5 15 39	56
37 deleted 1 1 14	
38 Services applicatifs created 5 3	
39 updated 4 1	
40 deleted 5	
41 Modules applicatif created	
42 updated	
43 deleted	
44 Bases de données created 4	14
45 updated 25 14	13
46 deleted 1 2	3
47 Flux created 3	55



Track the changes made to the mapping over the last 12 months

Track the updating of the map

Demonstrate that the mapping is updated regularly



Links with ISO 27001:2013

Section	Titre
A8.1.1	Inventory of assets
A.8.1.2	Ownership of assets
A.8.2.1	Labelling of information
A.11.2.1	Location and protection of assets
A.12.1.2	Change management
A.12.1.3	Capacity management
A.12.6.1	Vulnerability management
A.13.1.3	Segregation of networks
A.15.1.2	Security in supplier agreements
A.16.1.4	Assessment of information security events
A.17.2.1	Availability of information processing resources



Application available on GitHub https://github.com/dbarzin/mercator under Open Source License

Usage

3 hospitals in Luxembourg 10 hospitals in France 3 administrations of French municipalities

Contributions 10 contributors

Roadmap Treatment registry (GDPR), crisis directory, link with Monarc