

Participation à la migration du backend du projet Nespresso Club 2 vers l'architecture ECAPI Split et développement du module "Cart"

Soutenu par:

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Sous la direction de:

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Année universitaire : 2022/2023

Plan de la présentation :

-1-

Contexte général du projet

-2-

Analyse et conception

-3-

Réalisation

-4-

Conclusion et perspectives





Chapitre -1-

Contexte général du projet



Organisme d'accueil :

Présentation de l'entreprise

Crée en 1990

Société de Services et
d'Ingénierie en Informatique

multinationale

**SQLI
DIGITAL
EXPERIENCE**

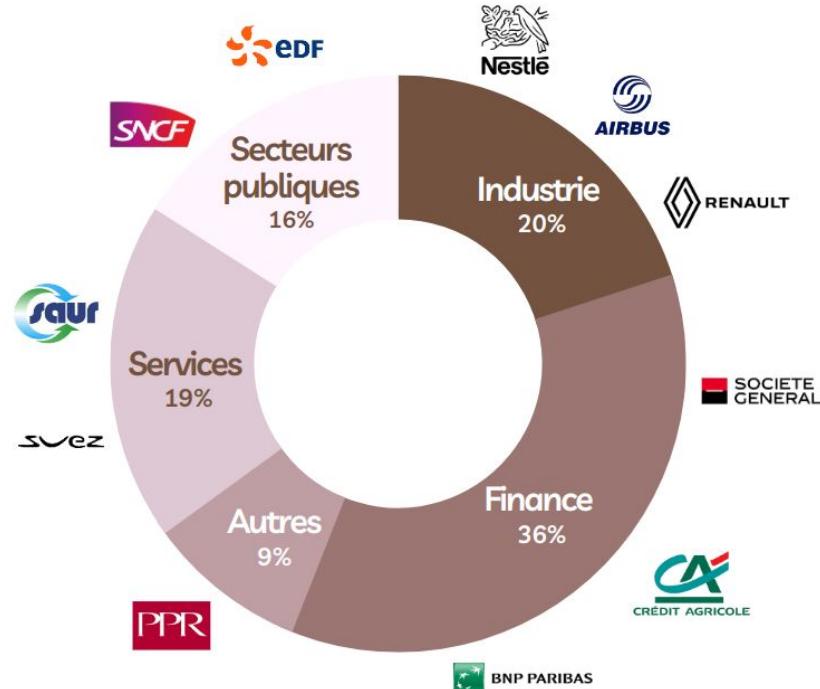
Première à intégrer le CMMI ,
en 2002. Aujourd'hui niveau 5

spécialisée dans l'accompagnement des entreprises
dans l'utilisation des nouvelles technologies.



Organisme d'accueil :

Secteurs d'activité



Organisme d'accueil :

Partenaires



Adobe



Adobe Commerce Cloud

ORACLE®



shopifyplus



commerce cloud

commercetools



Optimizely



OCTOO.



Présentation du projet

Contexte métier - définition

Commerce

Communication

**Partage des ressources
(Computation)**

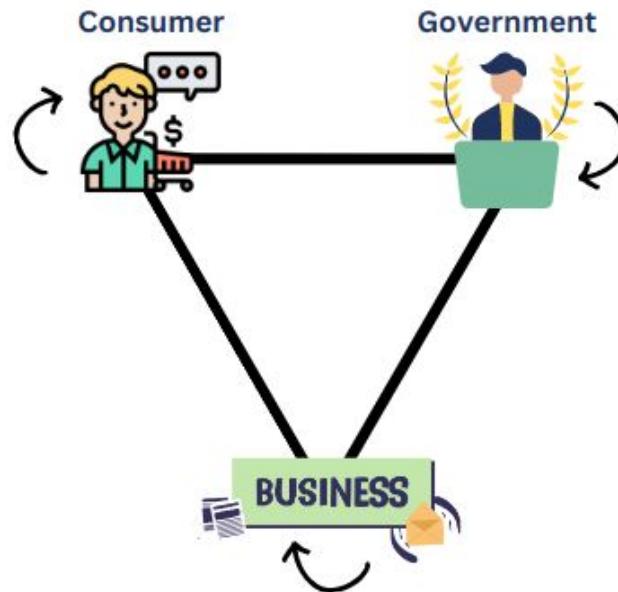
Collaboration

Connexion



Présentation du projet

Contexte métier - types

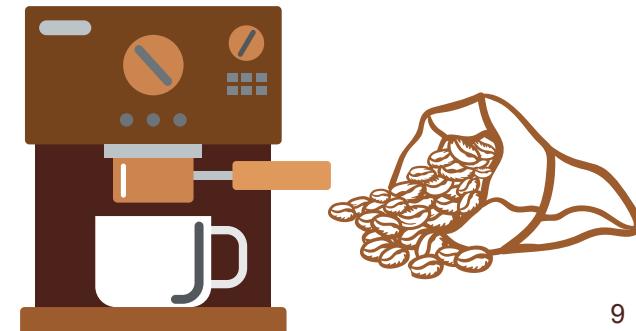


Présentation du client

The screenshot shows the Nespresso website interface. At the top, there's a navigation bar with links for 'LOGIN / REGISTER' and 'YOUR BASKET (0)'. Below the navigation, there are categories: 'Order coffee' (selected), 'Order machines', 'Order accessories', 'Coffee Subscription', 'Offers', 'Sustainability', 'Experience', 'Service', and 'Business Solutions'. A large banner on the left features a Nespresso Vertuo coffee machine and two cups of coffee. In the center, there are sections for 'VERTUO coffee' and 'ORIGINAL coffee', each with a button to 'Order' and a small icon. To the right, there's a promotional box for 'Your favourite coffee' with a link to 'Explore coffees', 'Coffee recipes', and 'Coffee Offers'. Below these sections, there are two promotional offers: one for 'VIEW Espresso Tassen + 10 Kapseln Peru Organic' with code 'ESPRESSO', and another for '2 VERTUO Mug Tassen + 10 Kapseln Melozio' with code 'MUG'. At the bottom, there are two discount banners: '-25 % AUF ALLE' and '-20 % AUF TASSEN'.



NESPRESSO



Problématique

Modifications difficiles à apporter

Panne d'un élément impacte tout le système

Base de données volumineuse

Bugs difficiles à corriger

Temps de réponse considérable

Dépendance des technologies



Objectifs globaux

- Indépendance opérationnelle
- L'équipe est propriétaire d'un service
- Support des pics de charge - Scalabilité infra-granulaire
- Tolérance aux pannes
- Découplage des technologies



Objectifs spécifiques

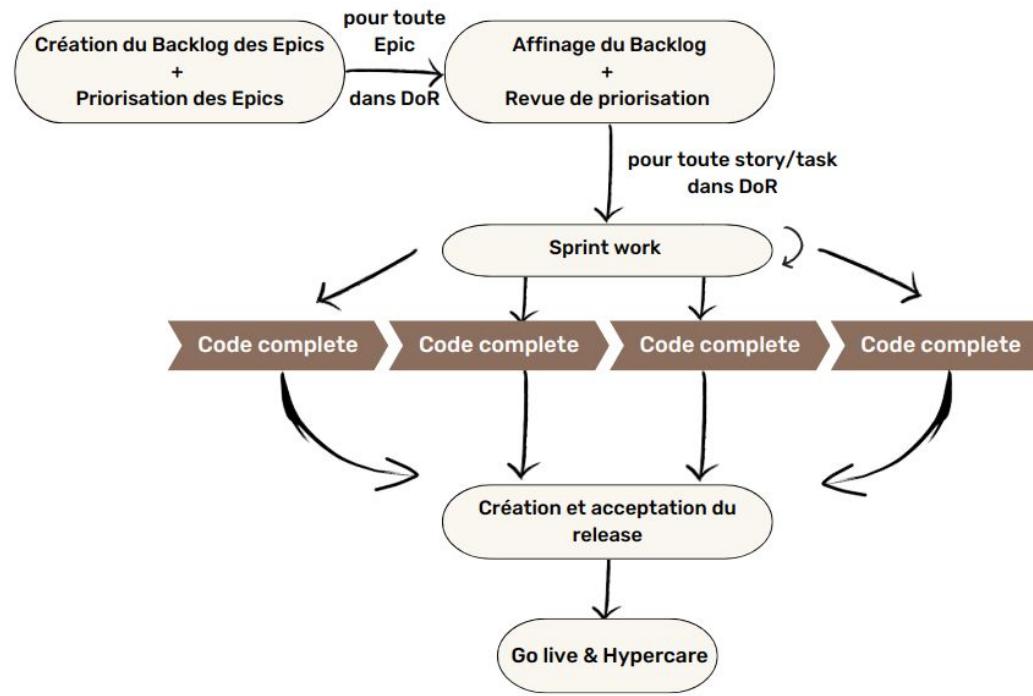


- Analyser l'architecture existante.
- Concevoir et mettre en place une nouvelle architecture pour le module "Cart" du projet Nespresso qui répondra aux objectifs globaux mentionnés précédemment.



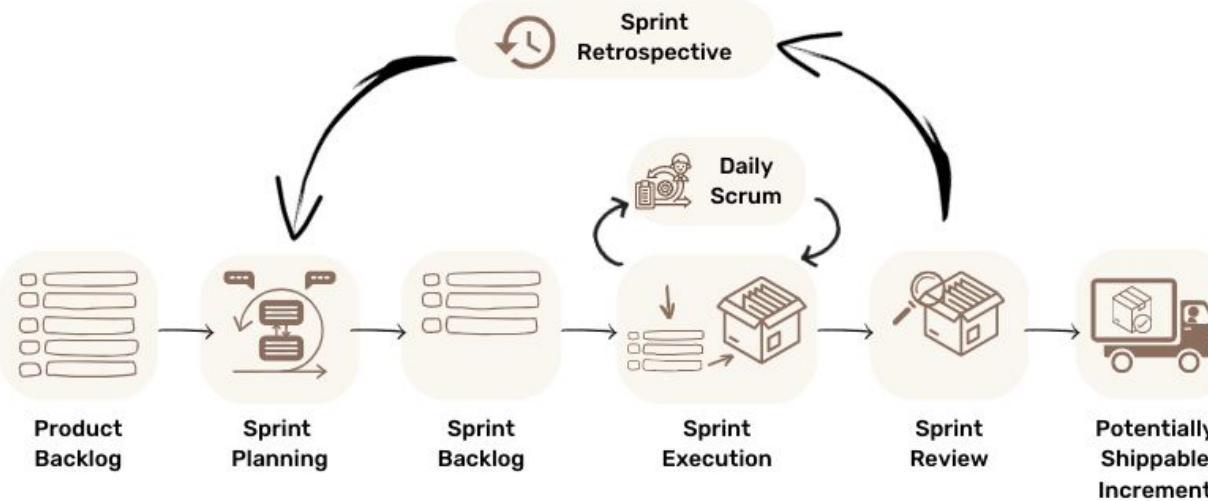
Méthodologie du travail

Software Development Life Cycle 4

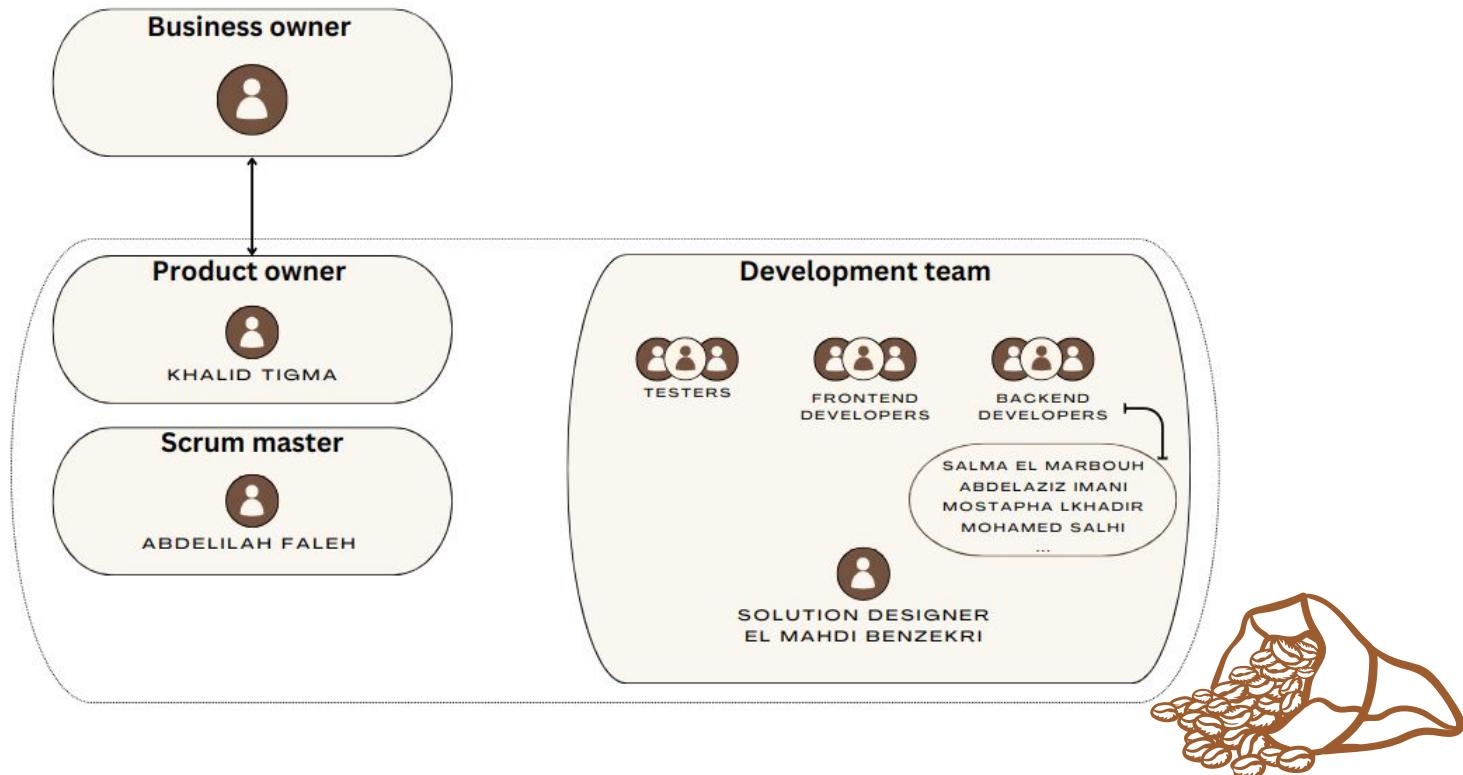


Conduite du projet

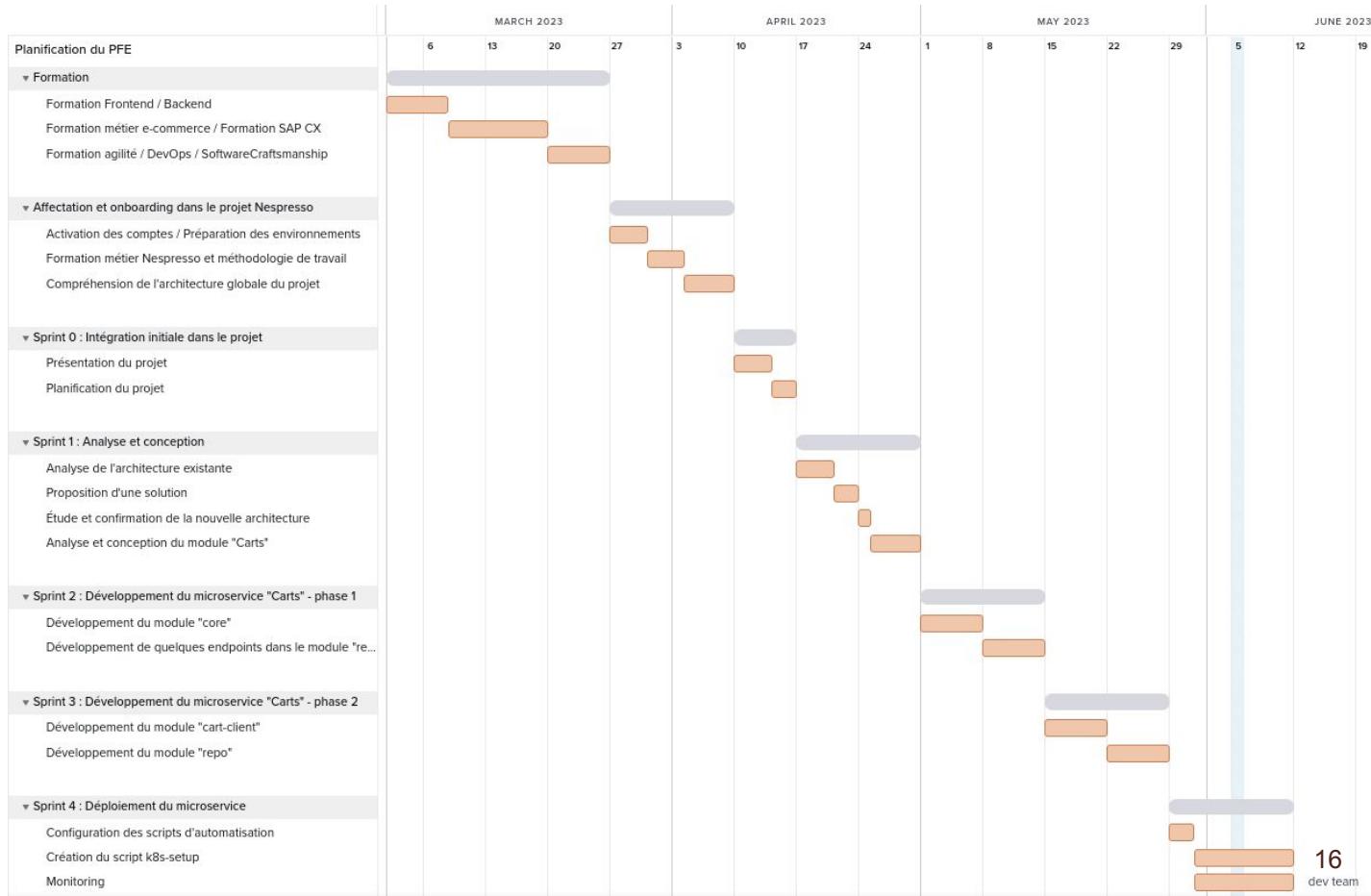
Sprint work



Équipe de travail : Toubkal

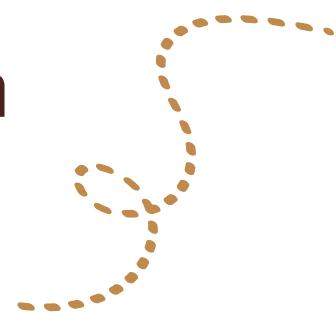


Planification du projet

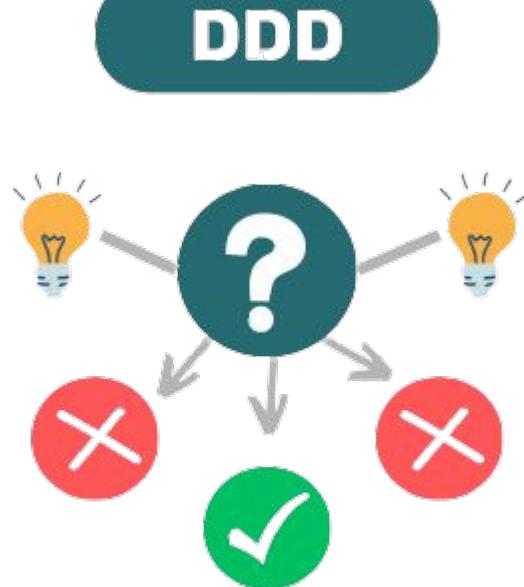


Chapitre -2- Analyse et conception



Concepts de base

Domain Driven Design

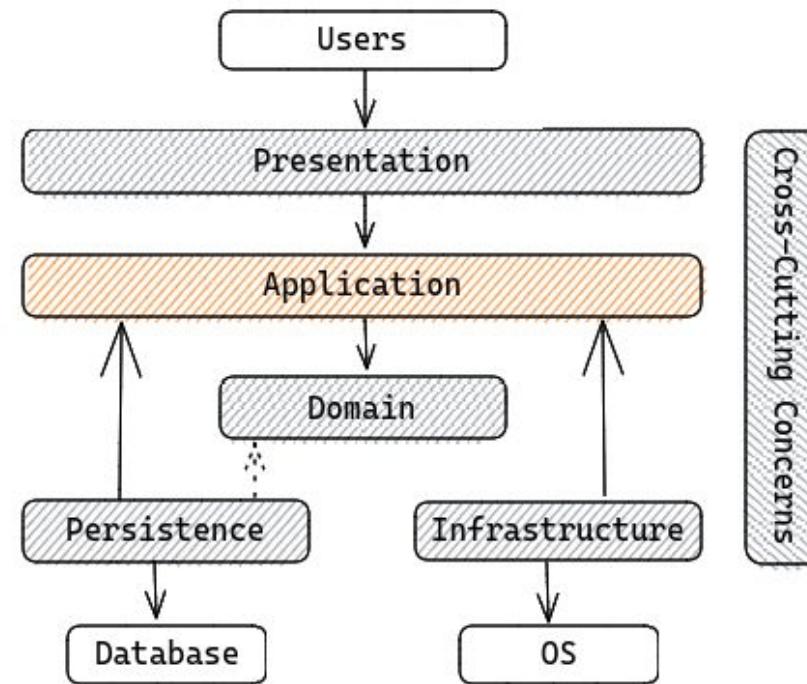


- se concentrer sur le métier et la logique du domaine.
- Baser les conceptions complexes sur des modèles du domaine.
- Collaborer avec les experts du métier pour améliorer le modèle d'application et résoudre tout problème lié au domaine émergent.



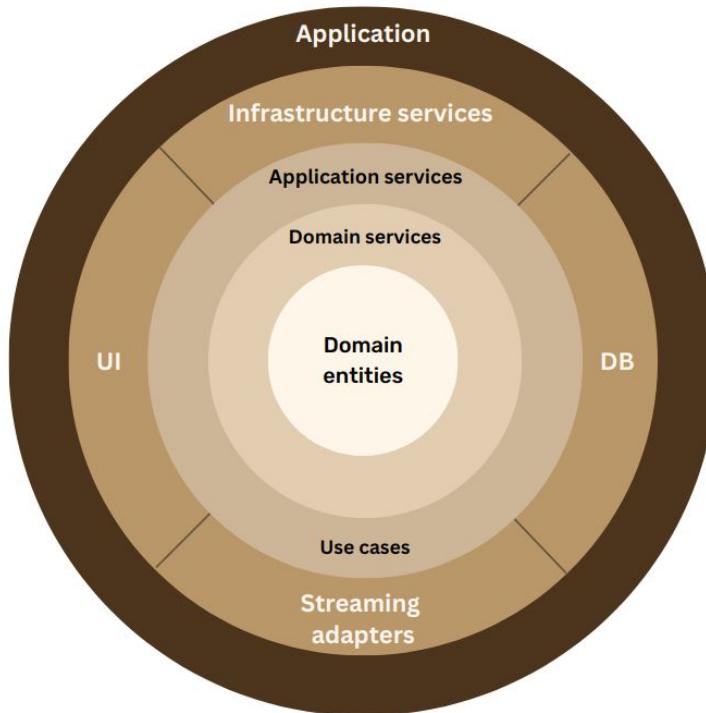
Concepts de base

Clean Architecture



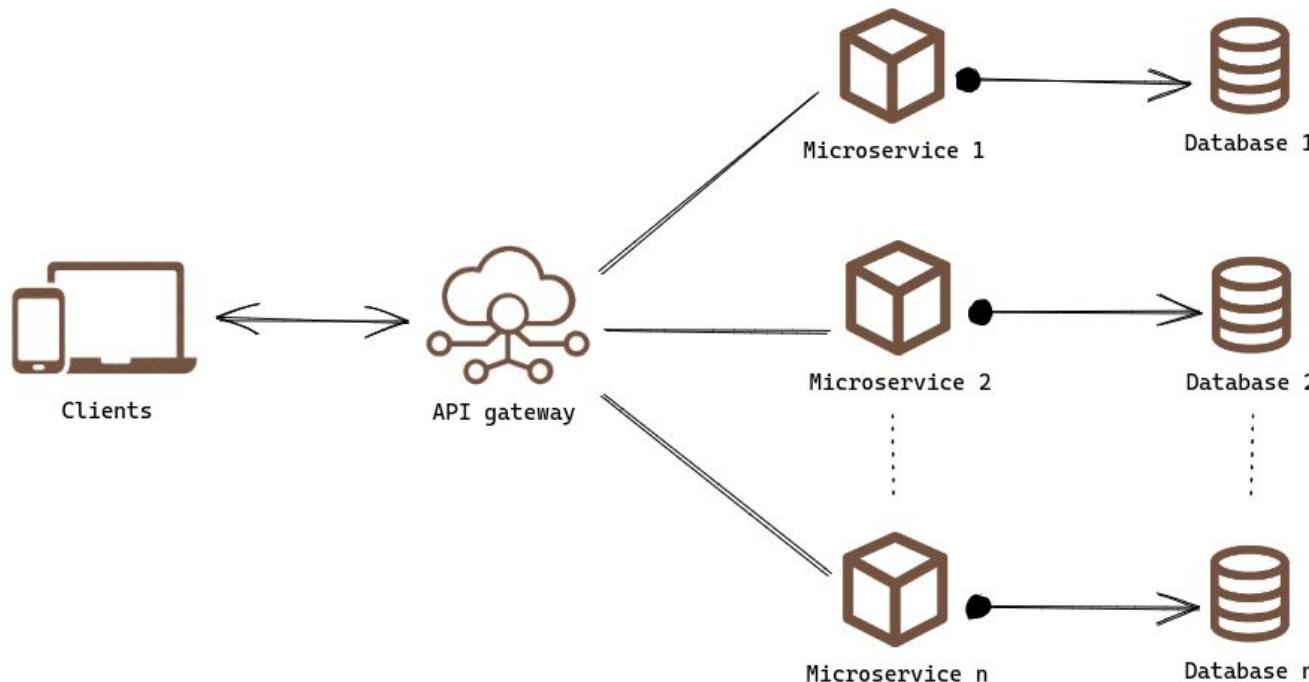
Concepts de base

Onion Architecture



Concepts de base

Architecture Microservices



Concepts de base

Architecture Microservices - patrons

Décomposition par capacité métier

Décomposition par sous domaine

Base de données par service

Base de données partagée

Saga

Domain event

Event sourcing

Circuit breaker

API gateway

Backends for frontends

Strangler application

Anti-corruption layer

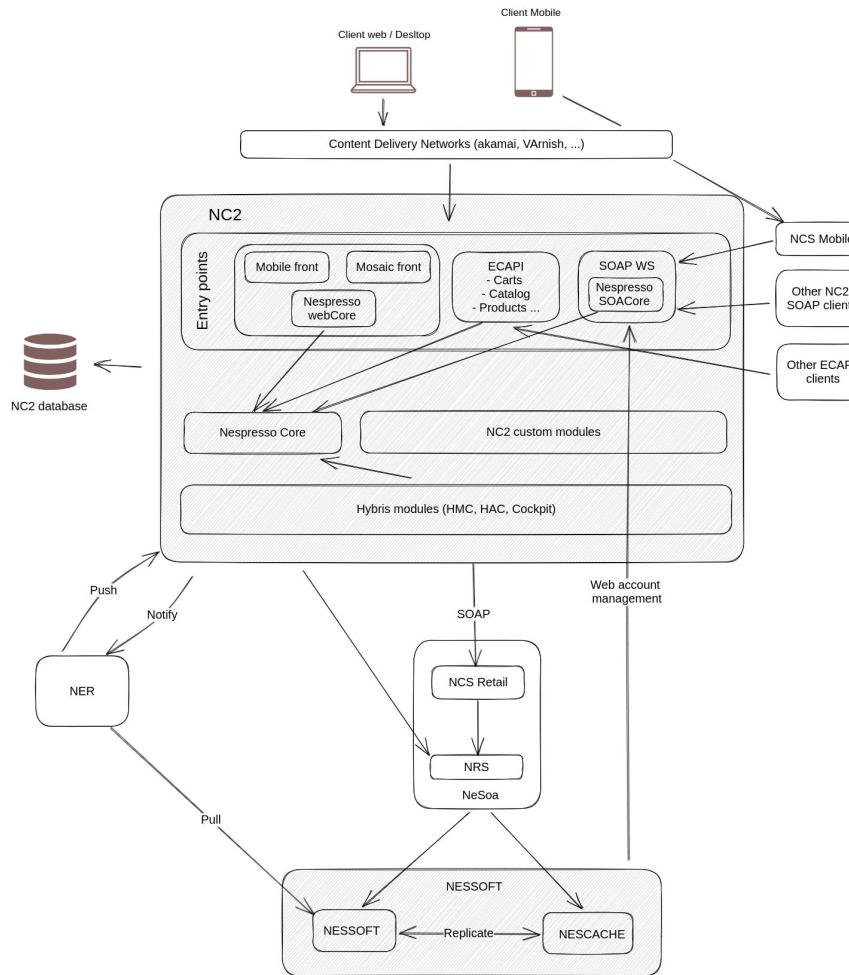
Instance per VM

Instance per container



Analyse

Architecture existante



Analyse

Problèmes de l'existant

Dépendance des technologies

Difficulté d'évolution

Moins de performance et de flexibilité



Analyse

Choix des patrons

Base de données par service

Décomposition par sous domaine

Circuit breaker

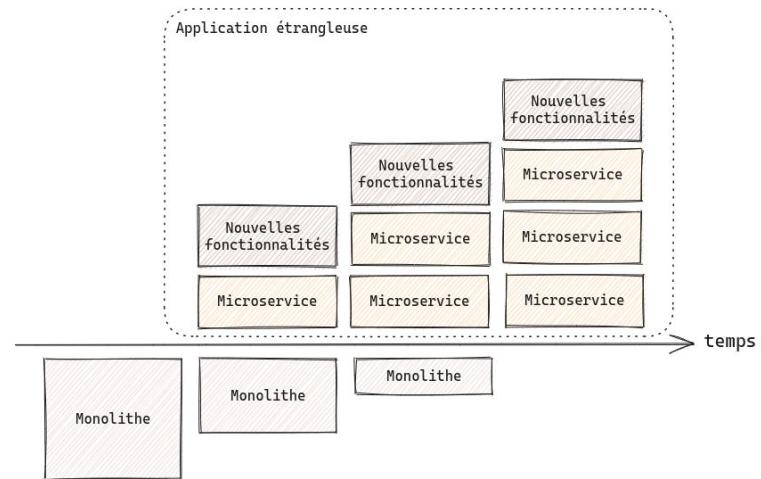
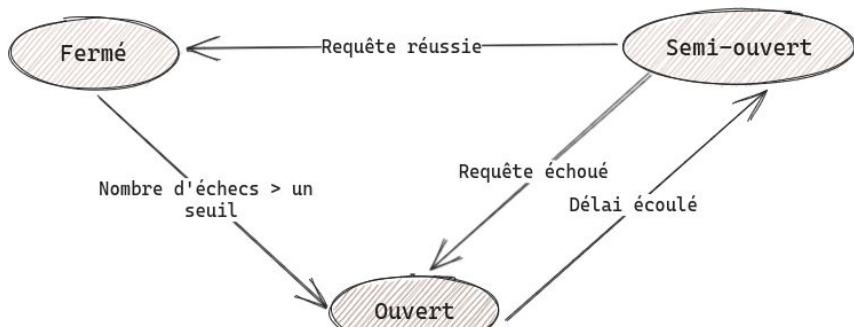
Strangler application

Instance par container(faster)



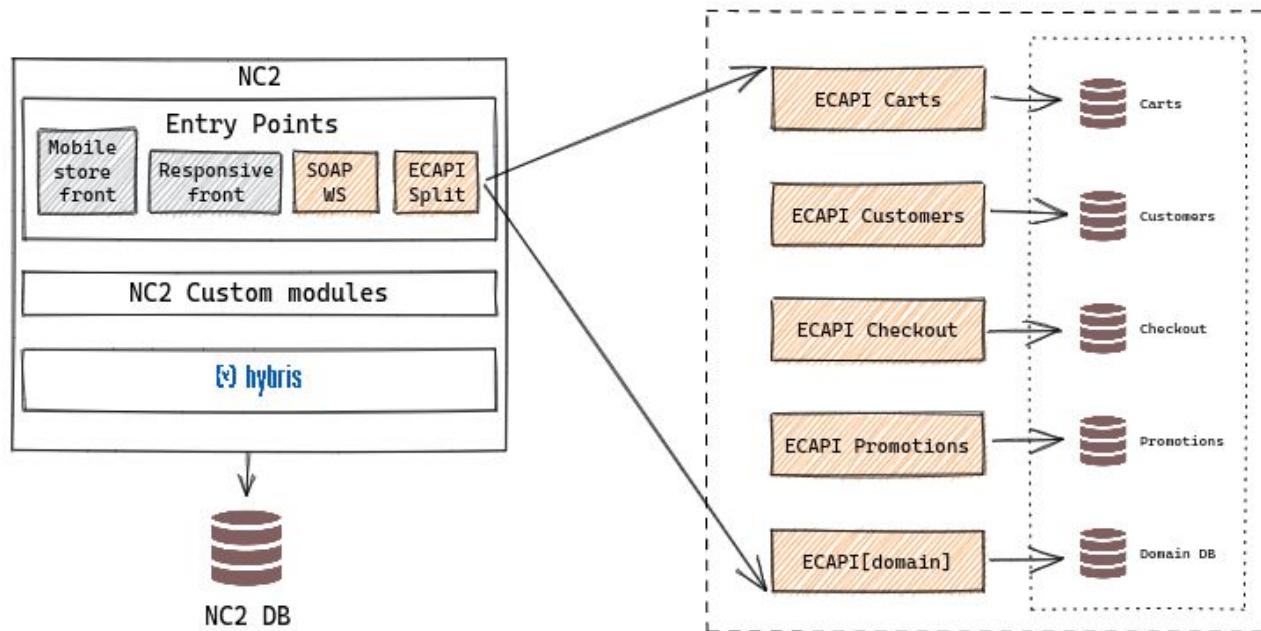
Analyse

Choix des patrons



Analyse

Architecture ECAPI split



Analyse

Analyse du module “Carts” - Besoins fonctionnels

- Ajouter et supprimer un ou plusieurs produits au panier sans nécessiter une authentification préalable.
- Voir le contenu du panier sans authentification.
- Modifier leurs paniers seulement lorsqu'ils sont authentifiés, cela peut comprendre:
 - * La modification du produit dans le panier.
 - * L'ajout des promotions et des cadeaux au panier.
 - * La possibilité de bénéficier de leurs abonnements



Analyse

Analyse du module “Carts” - Besoins non fonctionnels



Rapidité



Maintenabilité



Évolutivité



Performance



Analyse

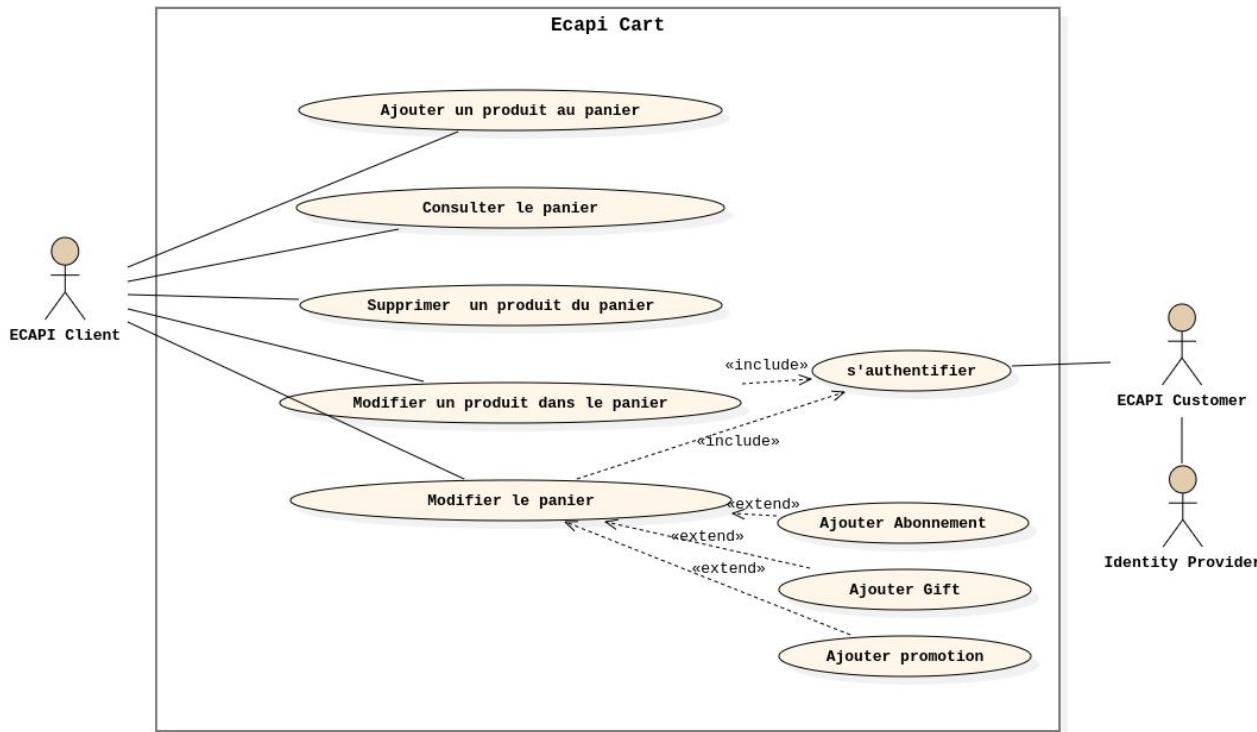
Analyse du module “Carts” - Acteurs

Acteur	Type	Description
ECAPI Client	Principale	L'application qui interagit avec l'ECAPI Cart pour la gestion des produits dans le panier. Elle peut être un autre ECAPI, NC2 ou bien l'application mobile
ECAPI Customer	Secondaire	L'application responsable de la gestion des clients du système. Elle est nécessaire pour faire l'authentification du client



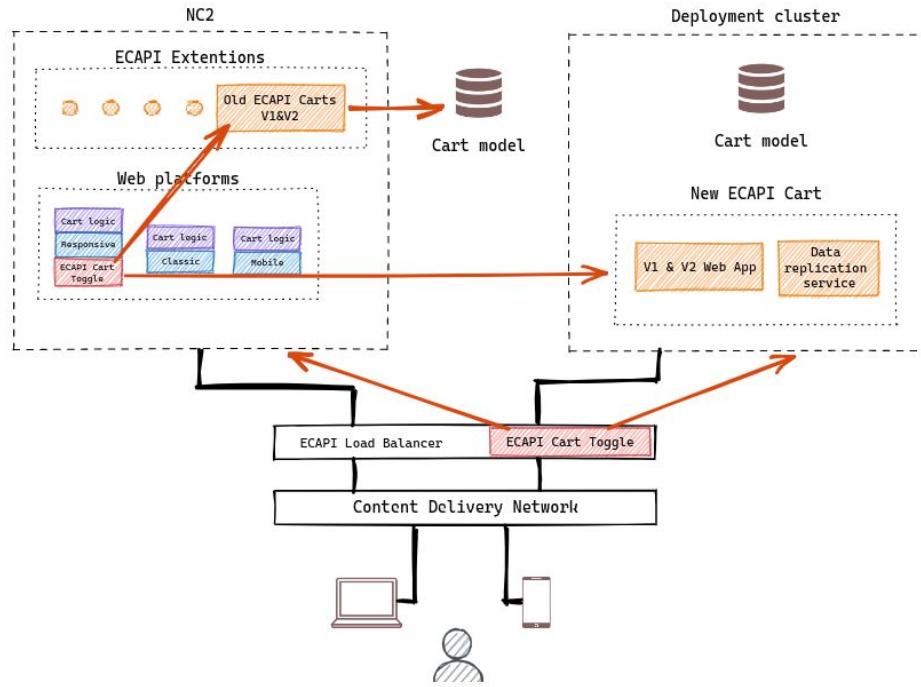
Analyse

Analyse du module “Carts” - Use Case



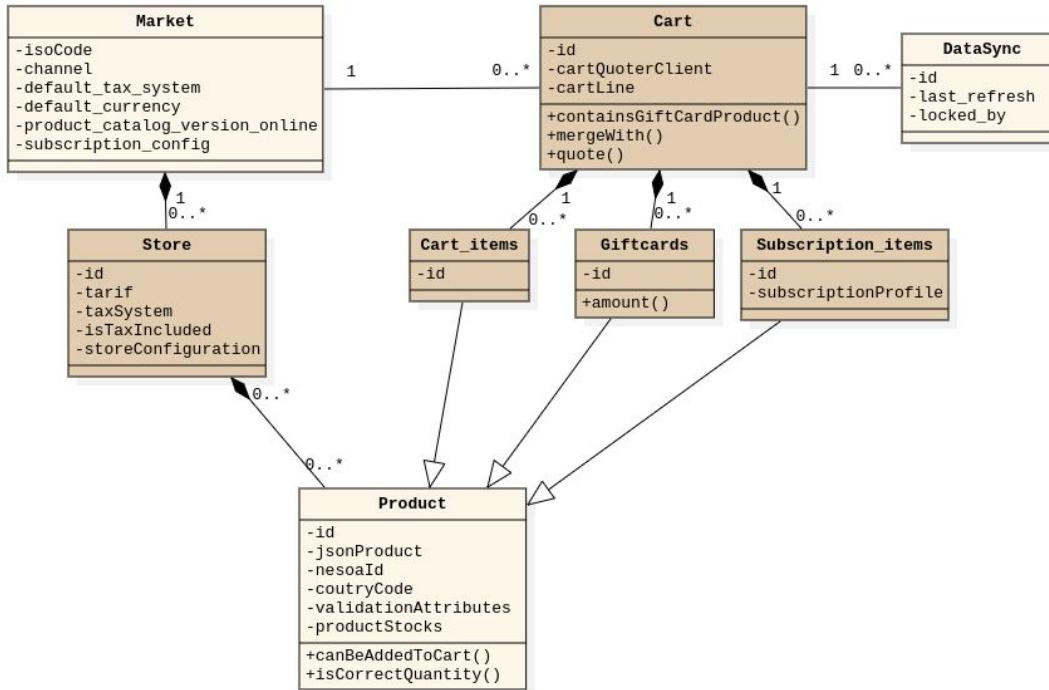
Analyse

Intégration du micro-service ECAPI Cart



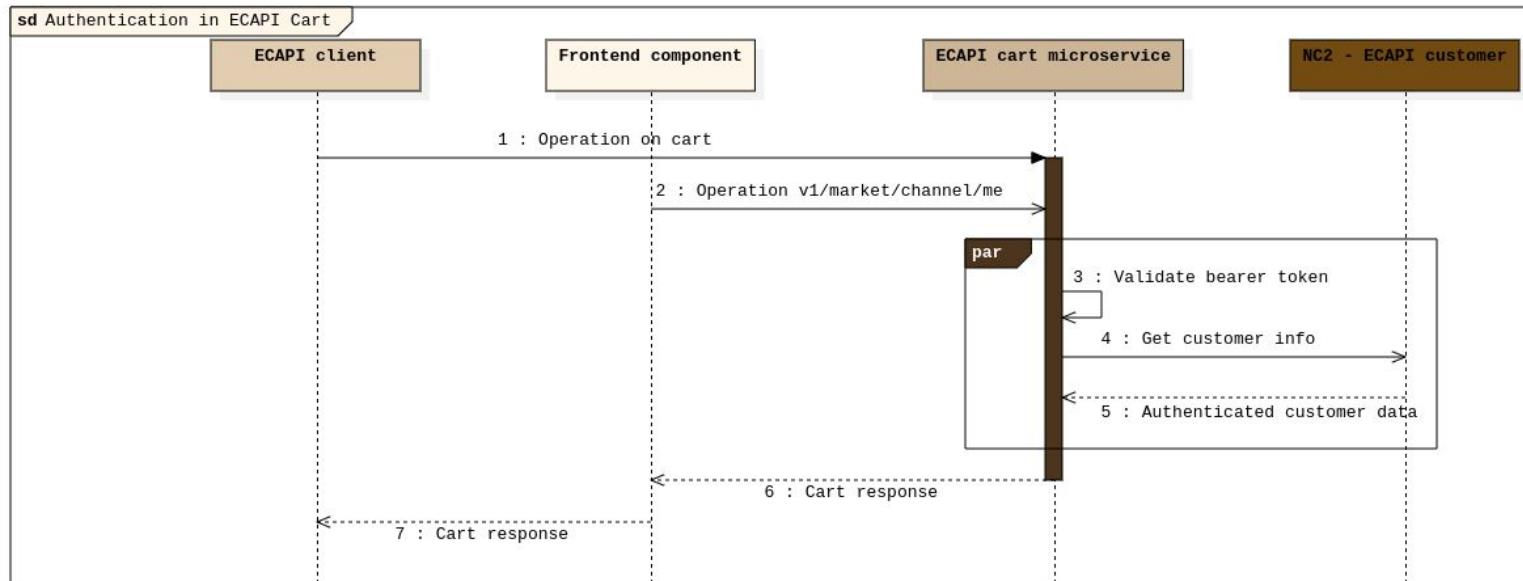
Conception

Diagramme de classe



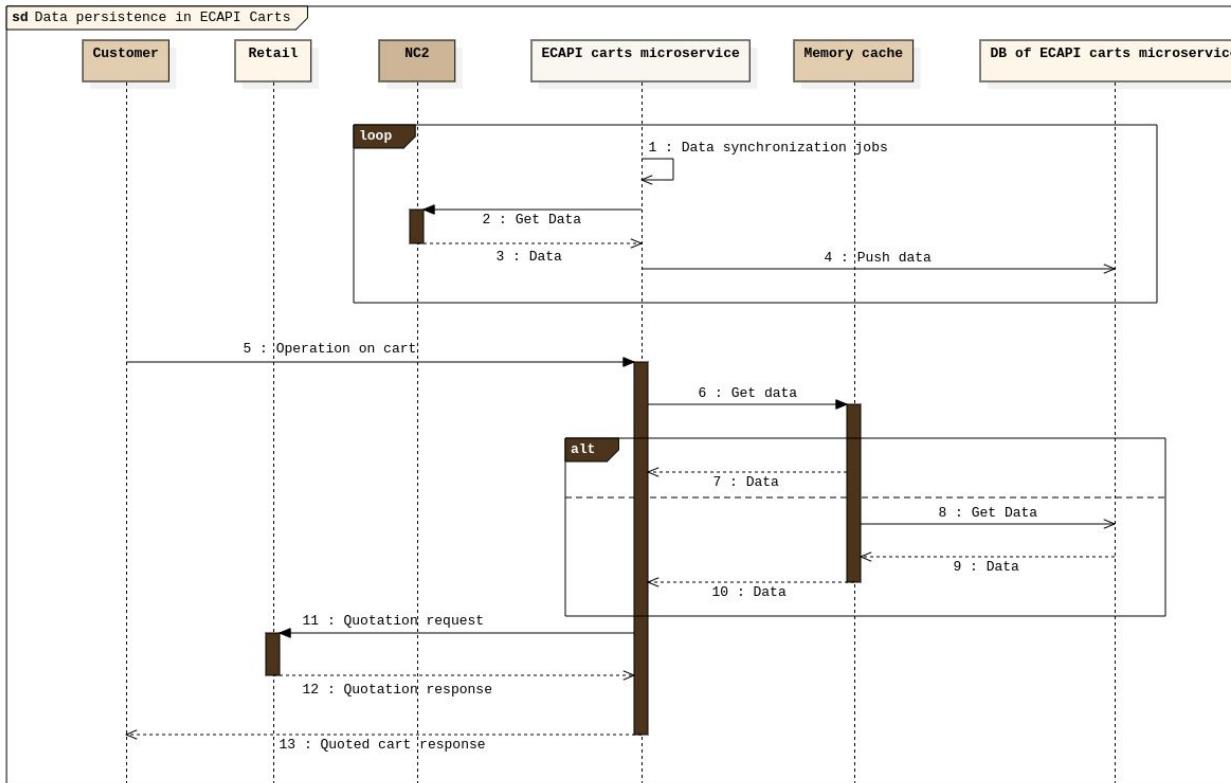
Conception

Diagramme de séquence - flux d'authentification



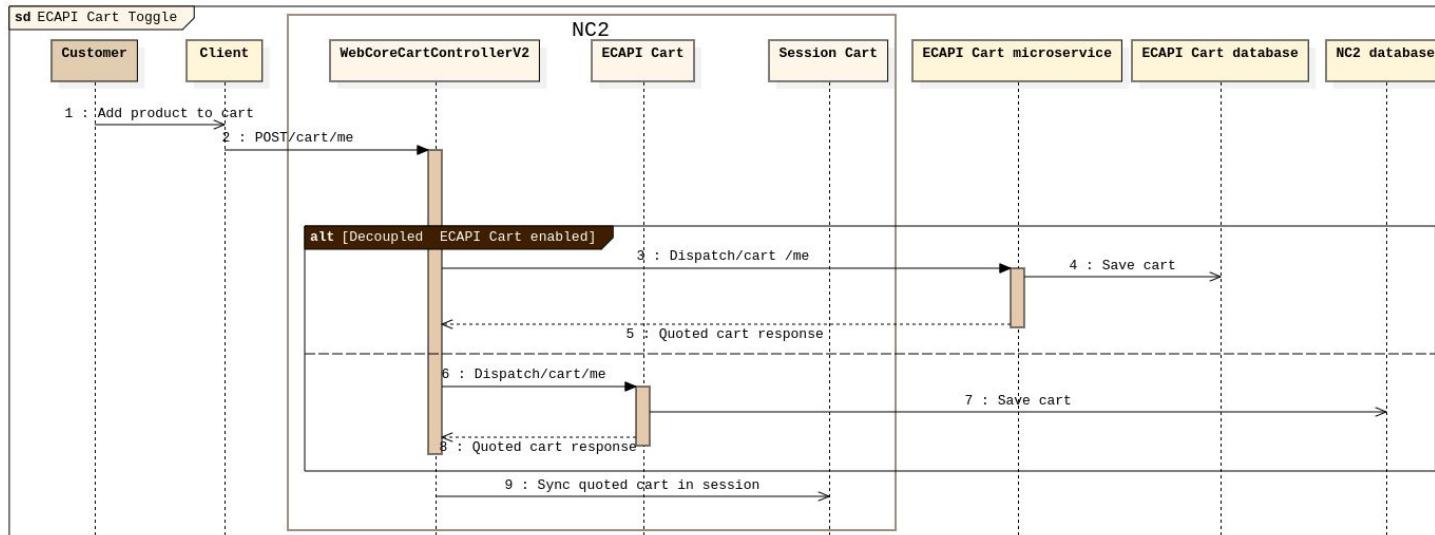
Conception

Diagramme de séquence - flux persistance des données



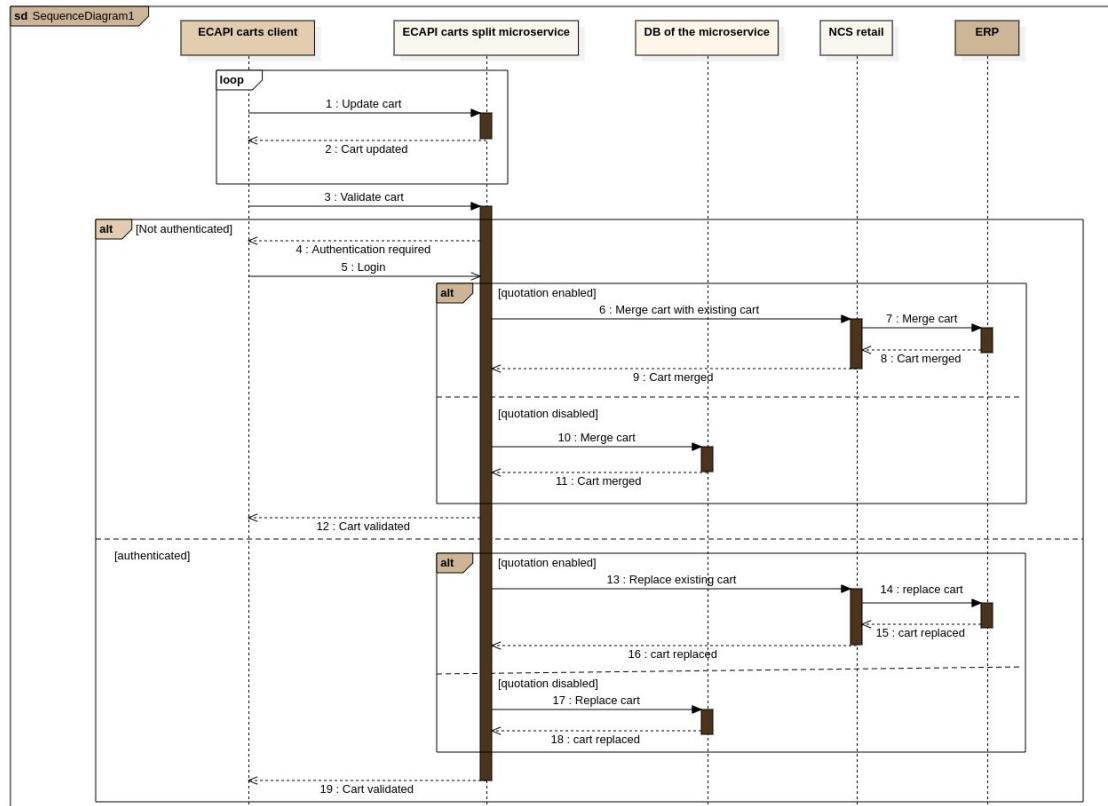
Conception

Diagramme de séquence - ECAPI Cart Toggle



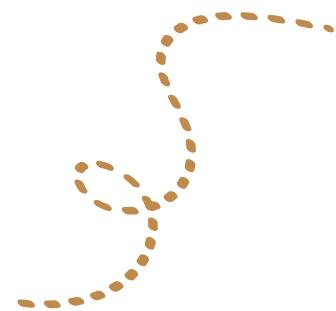
Conception

Diagramme de séquence - Merge, replace, quote





Chapitre -3- Réalisation



Outils

Gestion de projet

Jira Dashboards - Projects - Issues - Gantt - Boards - Structure - eazyBI - Create

eBusiness and Solution Delivery projects have been put in read-only mode, please use Nespresso eBusiness and IT Nespresso Sustain projects accordingly as of now

Manage Dashboards

Favorites My Popular Search

Favorite Dashboards

This page allows you to manage all your favorite dashboards.

Name	Owner	Shared with
★ Dashboard - Toubkal Team	Abdellah Faleh (Afaleh)	• 12 shares Show

Atlassian Jira Project Management Software (v8.20.108202019-shaeface47f9) · about Jira · Report a problem

Atlassian

- Interface Jira -

ATLASSIAN Confluence

- Logo confluence -

BRAINSTORM GROUP VOTE DISCUSS REVIEW SHARE

Toubkal > Sprint Toubkal Team - 2023/08 - JUNE 2

Autre ideas under each topic I'M FINISHED No members finished

ORGANIZATION Nespresso

TEAM Toubkal

RETROSPECTIVE Sprint Toubkal Team - 2023...

REVIEW

SHARE

EX-RETROSPECTIVE

TeamRetro

SUPPORT & FEEDBACK HELP & KNOWLEDGE BASE

39

Ce que nous avons bien fait

Ce que nous pouvons mieux faire

Ideas

Actions

- Interface teamRetro -

Outils

Gestion de projet

The screenshot shows the Bitbucket interface for the repository 'ECAPI-Cart'. The left sidebar lists various sub-modules: ncs-cart-admin-core, ncs-cart-admin-rest, ncs-cart-core, ncs-cart-ecapi-client, ncs-cart-jacoco, ncs-cart-repository, ncs-cart-test, ncs-cart-retail-client, and ncs-cart-webapp. The main area displays a list of pull requests (PRs) with their titles, sizes, and dates:

- PR #74902: Create a multi modules project for the carts POC (401 B, 14 Dec 2021)
- PR #11652: Fix Tomcat context path (120 B, 08 May 2023)
- PR #15136: Add new maven settings in Jenkinsfile (523 B, 22 May 2023)
- Bump to 1.19-SNAPSHOT (20.63 KB, 5 days ago)
- PR #31410: Expose support endpoint (7.08 KB, 27 Apr 2023)

At the bottom, there's a note about the application being split into multiple Maven sub-modules: "The application is split into multiple Maven sub-modules: <https://dsu-confluence.nestle.biz/display/SFSR/%5BECAPI+Cart%5D+-+Multi+module+project>".

- Bitbucket : Repository -

The screenshot shows a Bitbucket pull request titled "feature/ITNP-33911_Ecapi_Carts_Validation_for_wrong_request_body". The pull request has been merged into the master branch. It includes a commit from Salma_ElMarbouhi_MA-Rabat. The activity section shows a comment from dimitri.v.mahmoudi on a code snippet in RequestValidatorV2.java:

```

45 +
46 +     try {
47 +         for (CartlineRequest line : cartRequest.getLines()) {
48 +             validateLine(line, failures);
49 +         }
50 +         if (cartRequest.getGiftCards() != null) {
51 +             for (GiftRequest gift : cartRequest.getGiftCards()) {
52 +                 validateGift(gift, failures);
53 +             }
54 +         }
55 +     } catch (NullPointerIOException e) {
56 +         Error error = new Error(randomId(), toString(), ErrorReason.BAD_BODY, null, EMPTY_REQUEST_BODY_ERROR_MESSAGE, null, new Date());

```

A reply from dimitri.v.mahmoudi follows: "It's not really empty, we need some exception like InvalidRequestFormatException".

- Bitbucket : Pull Request -



- Logo Git -



Outils

Développement et testing



Swagger™



Outils

SGBD



Build

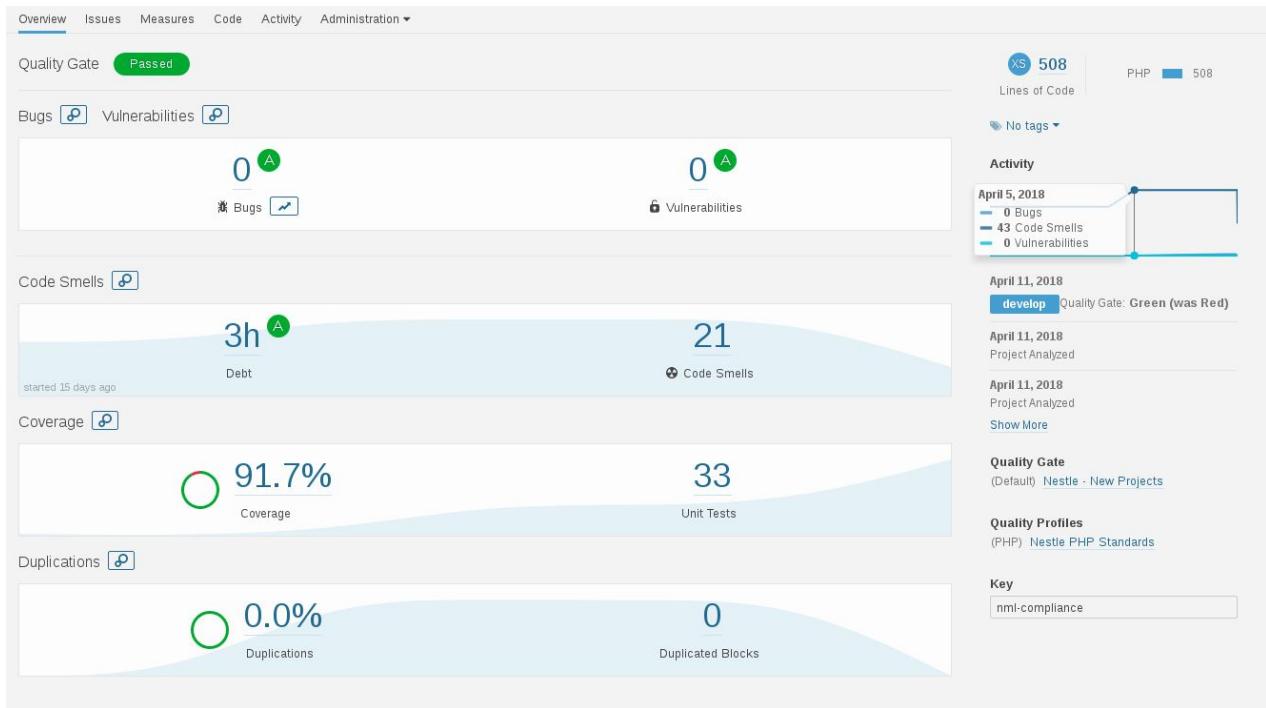


Maven™



Outils

Suivi et révision du code



- Interface SonarQube -

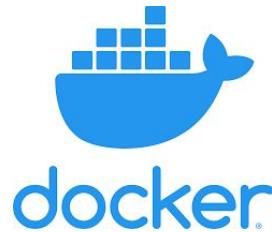


Outils

Monitoring



Déploiement

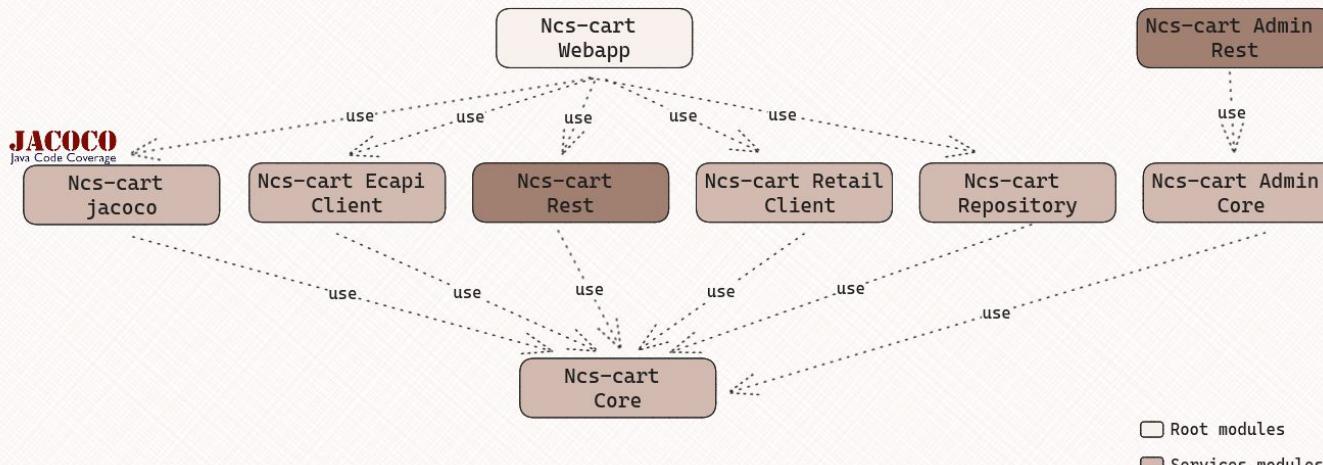


minikube



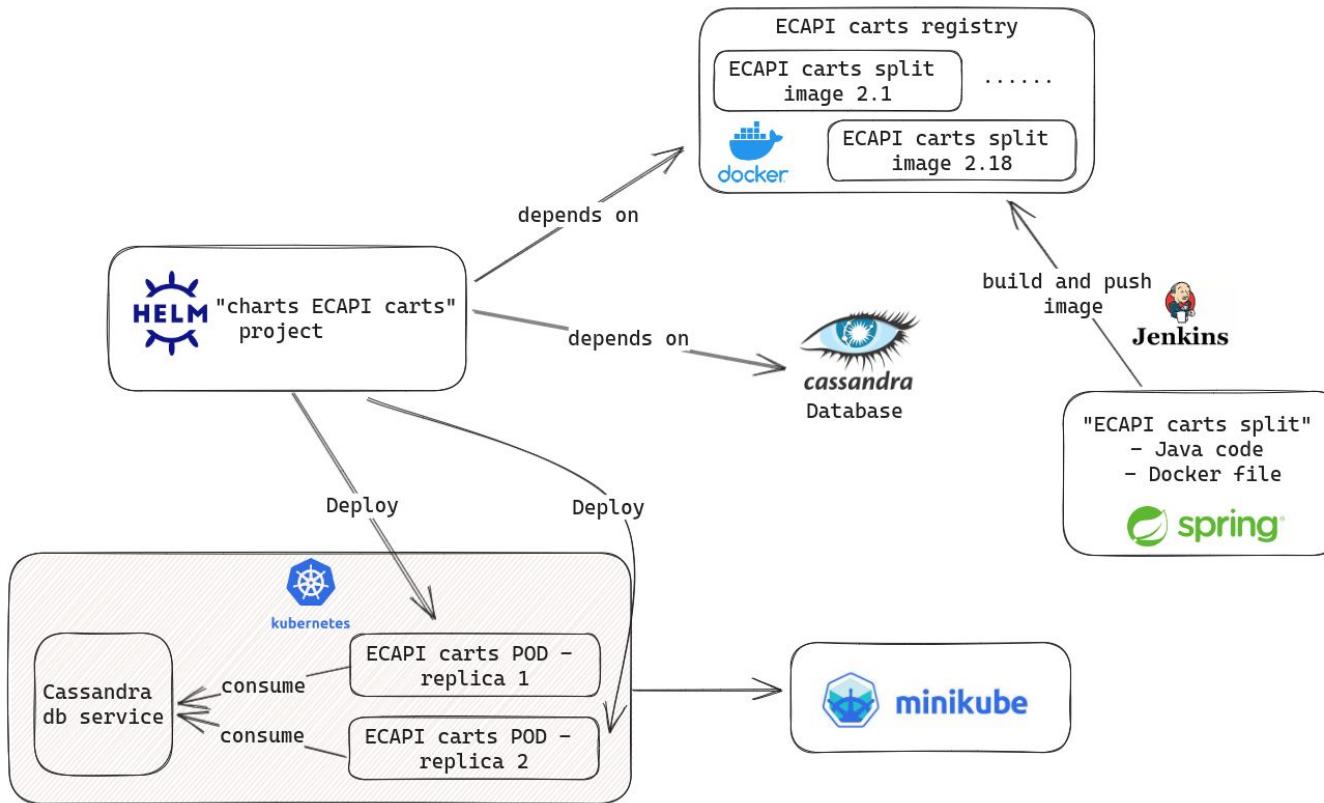
Architecture technique du module

Développement



Architecture technique du module

Déploiement



Implémentation des endpoints

- NOTE

- We added support for cookie authentication on the endpoints that support bearer authentication.
For now, in order to not affect other API Clients and to not have breaking changes, we will keep the Bearer Token Authentication type on the affected endpoints, but for the future, the desire is to move completely to using the tokens as a cookie.

[Nestlé - Delivery - Website](#)

[Send email to Nestlé - Delivery](#)

Schemes

HTTPS

Authorize

apiname carts

Carts ▾

POST

[/{market}/{channel}/anonymous/quoted](#) Quote cart content for anonymous user and/or authenticated user (if auth token provided in the request).

POST

[/{market}/{channel}/me/quoted](#) Merge cart with quotation for authenticated customer (auth token provided in the request).

PUT

[/{market}/{channel}/me/quoted](#) Replace cart with quotation for authenticated customer (auth token provided in the request).

POST

[/{market}/{channel}/me/unquoted](#) Merge cart without quotation for authenticated customer (auth token provided in the request).

PUT

[/{market}/{channel}/me/unquoted](#) Replace cart without quotation for authenticated customer (auth token provided in the request).

DELETE

[/{market}/{channel}/me](#) Reset persistent cart for authenticated user (auth token provided in the request).

GET

[/{market}/{channel}/config](#) Retrieves Market configurations, specific for Carts domain.

Models



Résultats des endpoints

Merge

https://www-staging.nespresso.com/ch/en/ecapi/2/cart/me/unquoted?frontend=responsive

POST https://www-staging.nespresso.com/ch/en/ecapi/2/cart/me/unquoted?frontend=responsive

Params • Authorization Headers (24) Body • Pre-request Script Tests Settings Cookies Beautify

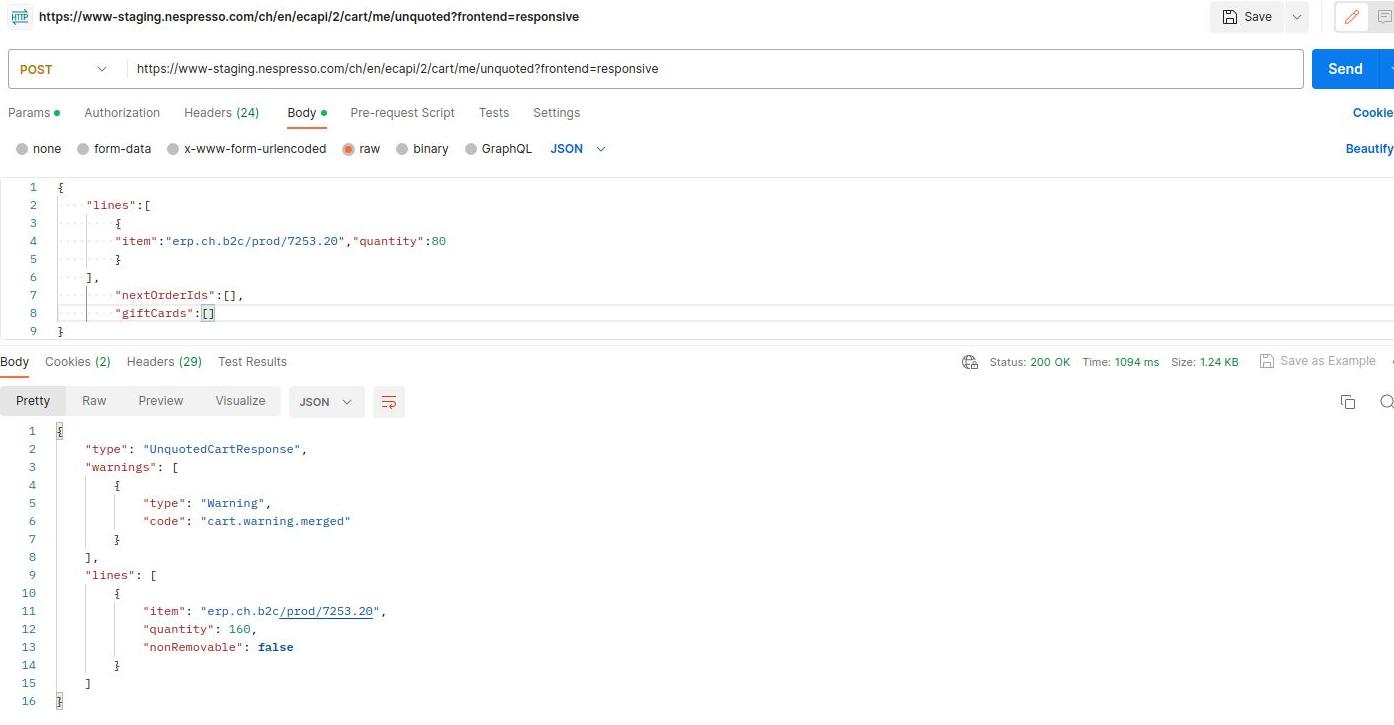
none form-data x-www-form-urlencoded raw binary GraphQL JSON

```
1 {
2   "lines": [
3     {
4       "item": "exp.ch.b2c/prod/7253.20",
5       "quantity": 80
6     }
7   ],
8   "nextOrderIds": [],
9   "giftCards": []
}
```

Body Cookies (2) Headers (29) Test Results Status: 200 OK Time: 1094 ms Size: 1.24 KB Save as Example

Pretty Raw Preview Visualize JSON

```
1 {
2   "type": "UnquotedCartResponse",
3   "warnings": [
4     {
5       "type": "Warning",
6       "code": "cart.warning.merged"
7     }
8   ],
9   "lines": [
10    {
11      "item": "exp.ch.b2c/prod/7253.20",
12      "quantity": 160,
13      "nonRemovable": false
14    }
15  ]
16 }
```



Résultats des endpoints

Replace

The screenshot shows a Postman interface for a `PUT` request to `https://www-staging.nespresso.com/ch/en/ecapi/2/cart/me/unquoted?frontend=responsive`. The `Body` tab is selected, displaying the following JSON payload:

```
1
2   "lines": [
3     {
4       "item": "exp.ch.b2c/prod/7253.20",
5       "quantity": 80
6     },
7     {
8       "item": "exp.ch.b2c/prod/7250.20",
9       "quantity": 70
10    }
11  ],
12  "nextOrderIds": [],
13  "giftCards": []
```

The response body is also displayed in JSON format, showing the updated cart state:

```
1
2   "type": "UnquotedCartResponse",
3   "warnings": [],
4   "lines": [
5     {
6       "item": "exp.ch.b2c/prod/7253.20",
7       "quantity": 80,
8       "nonRemovable": false
9     },
10    {
11      "item": "exp.ch.b2c/prod/7250.20",
12      "quantity": 70,
13      "nonRemovable": false
14    }
15  ]
```

At the bottom right of the interface, there is a small illustration of a coffee bag overflowing with beans.

Résultats des endpoints

Light quotation

HTTP <https://www-staging.nespresso.com/ch/en/ecapi/2/cart/light-quotation?frontend=responsive>

POST | https://www-staging.nespresso.com/ch/en/ecapi/2/cart/light-quotation?frontend=responsive

Params • Authorization Headers (23) Body • Pre-request Script Tests Settings Cookies Beautify

none form-data x-www-form-urlencoded raw binary GraphQL JSON

```
1: {
2:   "lines": [
3:     {
4:       "item": "erp.ch.b2c/prod/7253.20",
5:       "quantity": 70
6:     }
7:   ],
8:   "nextOrderIds": [],
9:   "giftCards": []
10: }
```

Body Cookies (2) Headers (29) Test Results Status: 200 OK Time: 1030 ms Size: 1.22 KB Save as Example

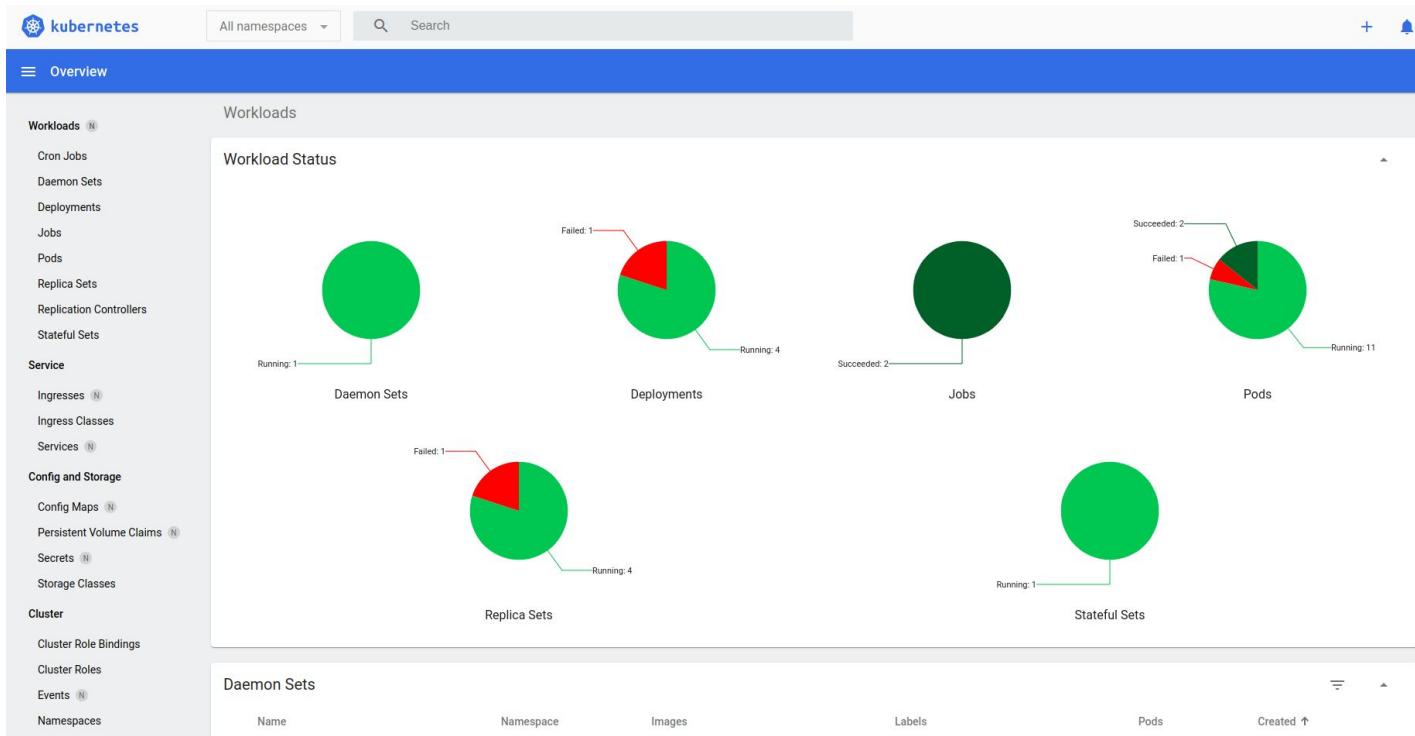
Pretty Raw Preview Visualize JSON

```
1: {
2:   "warnings": [],
3:   "lines": [
4:     {
5:       "unitPrice": 1.58,
6:       "item": "erp.ch.b2c/prod/7253.20",
7:       "quantity": 70,
8:       "nonRemovable": false
9:     }
10:   ],
11:   "extraLines": []
12: }
```



Résultats du déploiement

Workloads dans Kubernetes



Résultats du déploiement

Namespaces et noeuds minikube

The screenshot shows the Kubernetes UI for the 'ecapicarts-svc' service in the 'dev01' namespace. The left sidebar lists various Kubernetes resources: Workloads, Cron Jobs, Daemon Sets, Deployments, Jobs, Pods, Replica Sets, Replication Controllers, Stateful Sets, Service, Ingresses, Ingress Classes, Services, Config and Storage, Config Maps, Persistent Volume Claims, Secrets, Storage Classes, Cluster, Cluster Role Bindings, Cluster Roles, Events, and Namespaces. The 'Services' section is currently selected.

Metadata

Name	Namespace	Created	Age	UID
ecapicarts-svc	dev01	Jun 2, 2023	2 days ago	c95dfeaa-f74e-4910-8eb7-e9735081ba75

Labels: app: ecapicarts, app.kubernetes.io/managed-by: Helm, env: defaultenv

Annotations: meta.helm.sh/release-name: ecapicart-v1, meta.helm.sh/release-namespace: dev01

Resource information

Type	Cluster IP	Session Affinity
ClusterIP	10.102.72.155	None

Selector: app: ecapicarts, env: defaultenv

Endpoints

Host	Ports (Name, Port, Protocol)	Node	Ready
10.244.0.29	http:8080,TCP	minikube	-

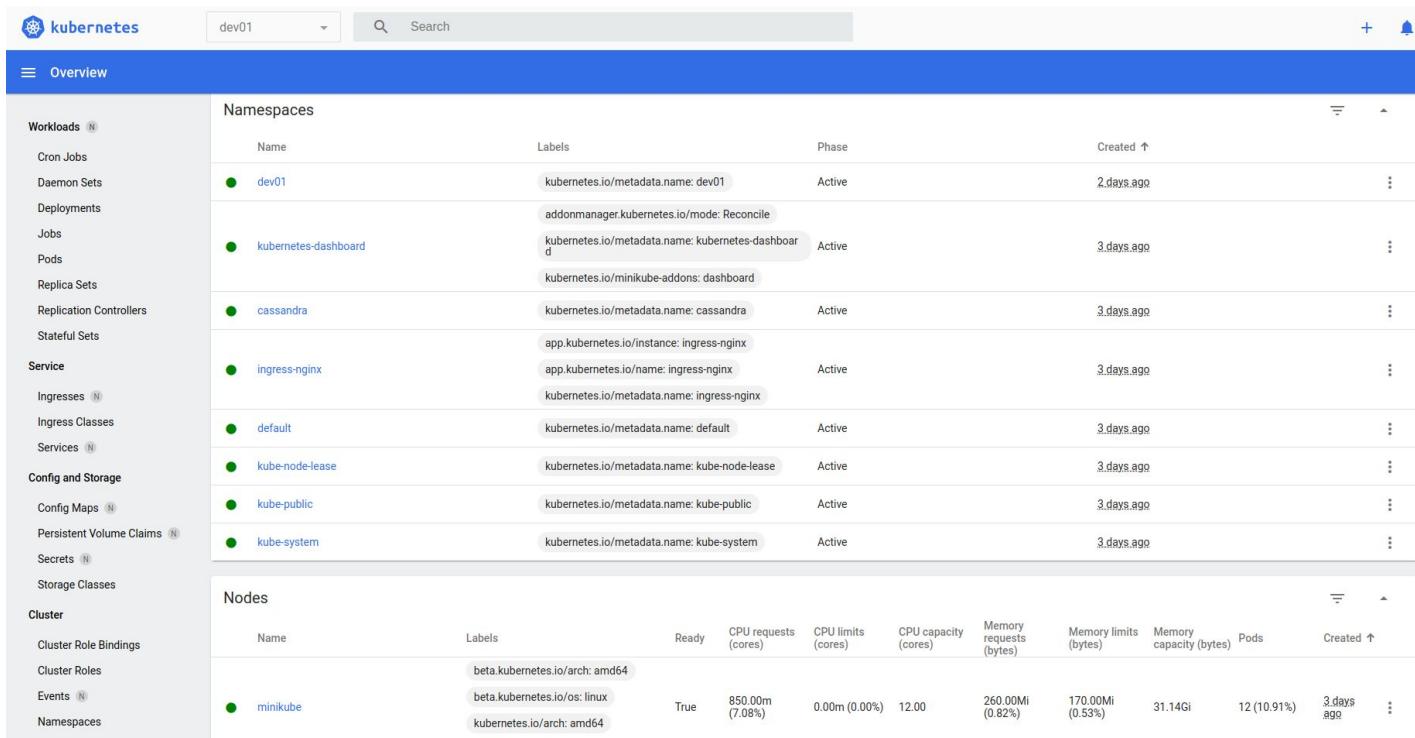
Pods

Name	Images	Labels	Node	Status	Restarts	CPU Usage (cores)	Memory Usage (bytes)	Created
ecapicarts		app: ecapicarts						



Résultats du déploiement

Déploiement du namespace ECAPI Cart

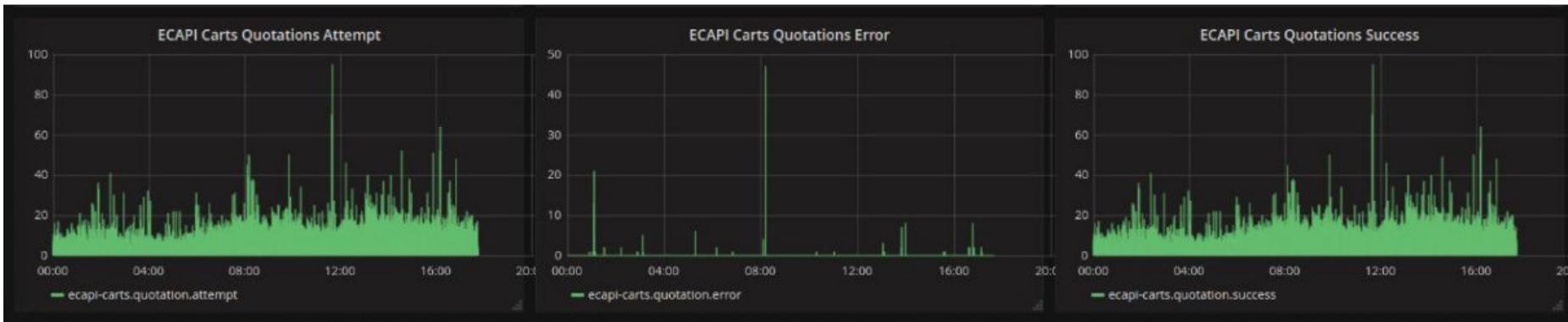
A screenshot of the Kubernetes dashboard interface. The top navigation bar shows 'kubernetes' and a dropdown set to 'dev01'. A search bar is present. The main area has a blue header 'Overview'. On the left, a sidebar lists various Kubernetes resources: Workloads (Cron Jobs, Daemon Sets, Deployments, Jobs, Pods, Replica Sets, Replication Controllers), Service (Ingresses, Services), Config and Storage (Config Maps, Persistent Volume Claims, Secrets), and Cluster (Cluster Role Bindings, Cluster Roles, Events, Namespaces). The main content area is divided into two sections: 'Namespaces' and 'Nodes'. The 'Namespaces' section lists ten namespaces with their names, labels, phase, creation time, and three-dot actions. The 'Nodes' section lists one node, 'minikube', with its details: name, labels, ready status, CPU requests/limits, memory requests/limits, pods, and creation time.

Name	Labels	Phase	Created
dev01	kubernetes.io/metadata.name: dev01 addonmanager.kubernetes.io/mode: Reconcile	Active	2 days ago
kubernetes-dashboard	kubernetes.io/metadata.name: kubernetes-dashboard kubernetes.io/minikube-addons: dashboard	Active	3 days ago
cassandra	kubernetes.io/metadata.name: cassandra	Active	3 days ago
ingress-nginx	app.kubernetes.io/instance: ingress-nginx app.kubernetes.io/name: ingress-nginx kubernetes.io/metadata.name: ingress-nginx	Active	3 days ago
default	kubernetes.io/metadata.name: default	Active	3 days ago
kube-node-lease	kubernetes.io/metadata.name: kube-node-lease	Active	3 days ago
kube-public	kubernetes.io/metadata.name: kube-public	Active	3 days ago
kube-system	kubernetes.io/metadata.name: kube-system	Active	3 days ago

Name	Labels	Ready	CPU requests (cores)	CPU limits (cores)	CPU capacity (cores)	Memory requests (bytes)	Memory limits (bytes)	Memory capacity (bytes)	Pods	Created
minikube	beta.kubernetes.io/arch: amd64 beta.kubernetes.io/os: linux kubernetes.io/arch: amd64	True	850.00m (7.08%)	0.00m (0.00%)	12.00	260.00Mi (0.82%)	170.00Mi (0.53%)	31.14Gi	12 (10.91%)	3 days ago



Résultats du monitoring





Conclusion et perspectives



Conclusion

- Projet très intéressant
- Excellente opportunité de découvrir des projets concrets dans un environnement professionnel et agile
- L'équipe Toubkal, une équipe axée sur les valeurs de coopération et d'innovation
- L'initiative de proposer une solution pour la migration de l'architecture du backend de Nespresso vers une architecture microservices

Perspective

- La mise en production de ce microservice spécifique
- Création d'une template microservice selon le patron "service template" pour simplifier le développement des nouveaux microservices
- La migration progressive des autres modules vers la nouvelle architecture ECAPI split



Participation à la migration du backend du projet Nespresso Club 2 vers l'architecture ECAPI Split et développement du module "Cart"

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