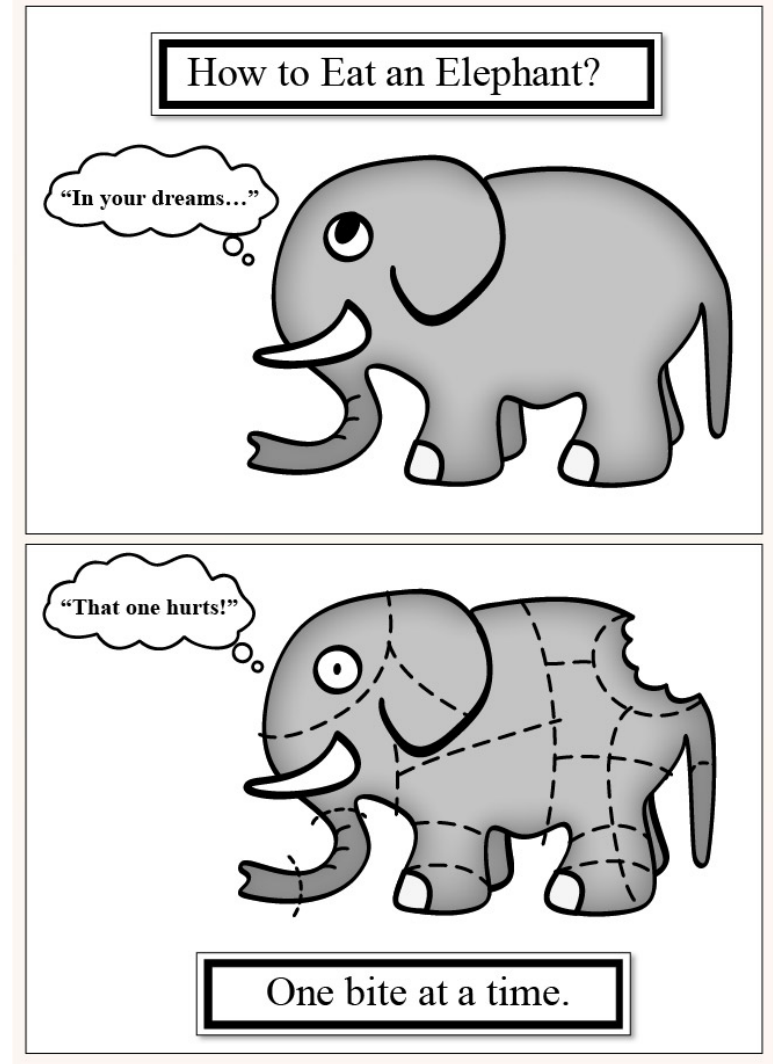


Innovation sur IBM i mangeons l'éléphant morceau par morceau.



Qui sommes nous ?



- Petit IBM i ISV and IBM business partner situé à Oostkamp, (près de Bruges) Belgique.
- Travaillons sur IBM i et ses prédécesseurs depuis plus de 40 ans.
- Applications : comptabilité, immobilier et douanes.
- Expertise en RPG, SQL, PHP, HTML, Unity, nodejs, linux...
- Site web : www.cdinvest.be
- IBM Champion 2018 et IBM Fresh Face 2017
- **What you don't know how to do, we do.**

Case studies



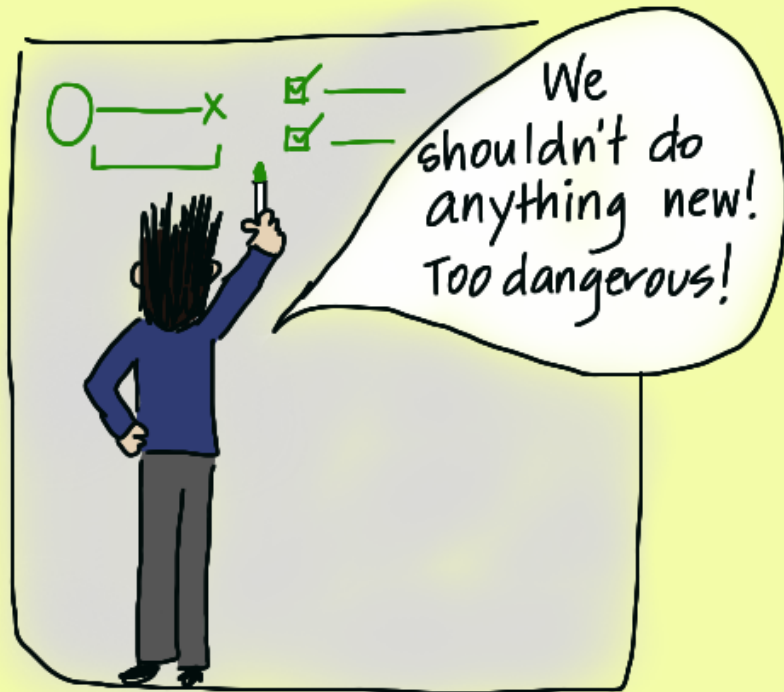
- JORI : <https://www.ibm.com/case-studies/jori>
- Fibrocit : <https://www.ibm.com/case-studies/fibrocit-systems-furniture-design>
- Cras : <https://www.ibm.com/case-studies/cras-systems-open-source>
- Oris : <https://www.ibm.com/case-studies/ORIS>
- Deknudt Frames : <https://www.ibm.com/case-studies/deknudt-frames>
- Bonehill : <https://www.ibm.com/case-studies/immo-bonehill-systems-hardware-website-compliance>
- Winsol : <https://www.ibm.com/case-studies/winsol-systems-hardware-manufacturing-digitization>

Agenda

- Microservices
- Approche de la modernisation par microservices
- Exemple concret en RPG
- Conclusions

RISK AVERSION

Corporate



VICARE

Startup




ENTREPRENEURFAIL.COM

Challenges aujourd'hui




JORI The art of fine seating

Model : BRAINBUILDER mono-move



Choose the colour of your leather. 3/3



celia papaya

Selling price of your configuration:
3.557 EUR

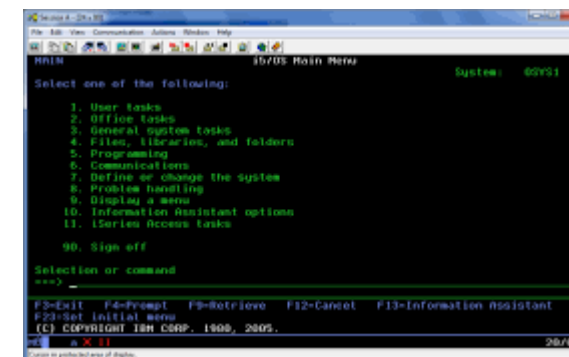
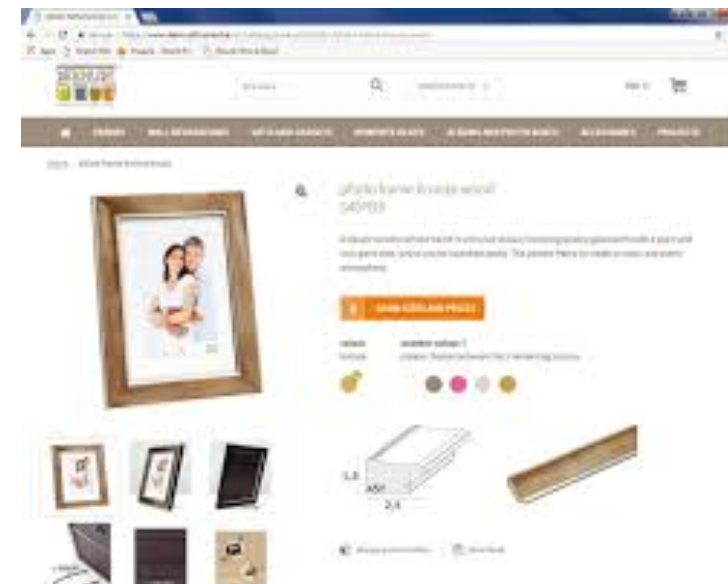
Previous Next

This illustrated version
in entry leather: 3.557 EUR
in entry fabric: 3.137 EUR

− +

SIZE OPTIONS COVERING ARMRESTS BASE Your model BRAINBUILDER



Challenges aujourd'hui




La perturbation n'est pas seulement «numérique»











La perturbation n'est pas seulement «numérique»



Demonstration of Watson Cancer Care Solution



Treatment Plan	Confidence	Patient Preferences Match	
Treatment plan 1 Systemic Chemotherapy: Carboplatin, Paclitaxel, Docetaxel	95% 	Acceptable match with patient preferences	
Treatment plan 2 Systemic Chemotherapy: Carboplatin, Paclitaxel, Irinotecan	45% 	Unacceptable match with patient preferences	
Treatment plan 3 Systemic Chemotherapy: Etoposide	8% 	Preferred match with patient preferences	
Radiation and Surgery are unlikely to be appropriate.			

 IBM WATSON

IBM Confidential: References to potential future products are subject to the Important Disclaimer provided earlier in the presentation

14

© 2012 IBM Corporation

Arguments contre modernisation

- Risque élevé d'échec-"nous avons essayé avant (plusieurs fois) et cela a échoué"
- Trop coûteux sans justification claire. Quand verrons-nous le return on investment?
- Manque de connaissances et de compétences
- Si ce n'est pas cassé ne le répare pas.

Arguments against modernisation

- Top Management ne comprend pas le problème et ils ne donnent pas de budget.
- Top Management sont toujours à la recherche d'un retour à court terme de l'investissement. Une fois qu'ils ont mis l'argent, ils veulent le récupérer.
- Nous n'avons pas réparé l'an dernier, et survécu. Pourquoi cette année serait-elle différente?

Taux de réussite

- Les taux de réussite varient de 24% à 39%, selon l'étude et le type de projet technologique
- 1 sur 6 projets (17%) réussit
- Seulement 50% des projets délivrent 44% des avantages commerciaux prévus.

Source : <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-legacy-systems-and-modernization.pdf>

Suspects habituels: raisons de l'échec

- Manque de documentation et de connaissance du système menant à des problèmes
- Mauvaise approche spécialement basée sur "manger l'éléphant en une seule fois"
- Des pressions de temps. Se précipiter dans les phases du projet pour respecter les délais
- Manque de personnes ayant des compétences pertinentes

Alors, qu'avons-nous besoin en un mot:

Nous avons besoin d'un look moderne

Nous avons besoin d'une base solide

Nous devons fournir des services web

Nous devons consommer des services

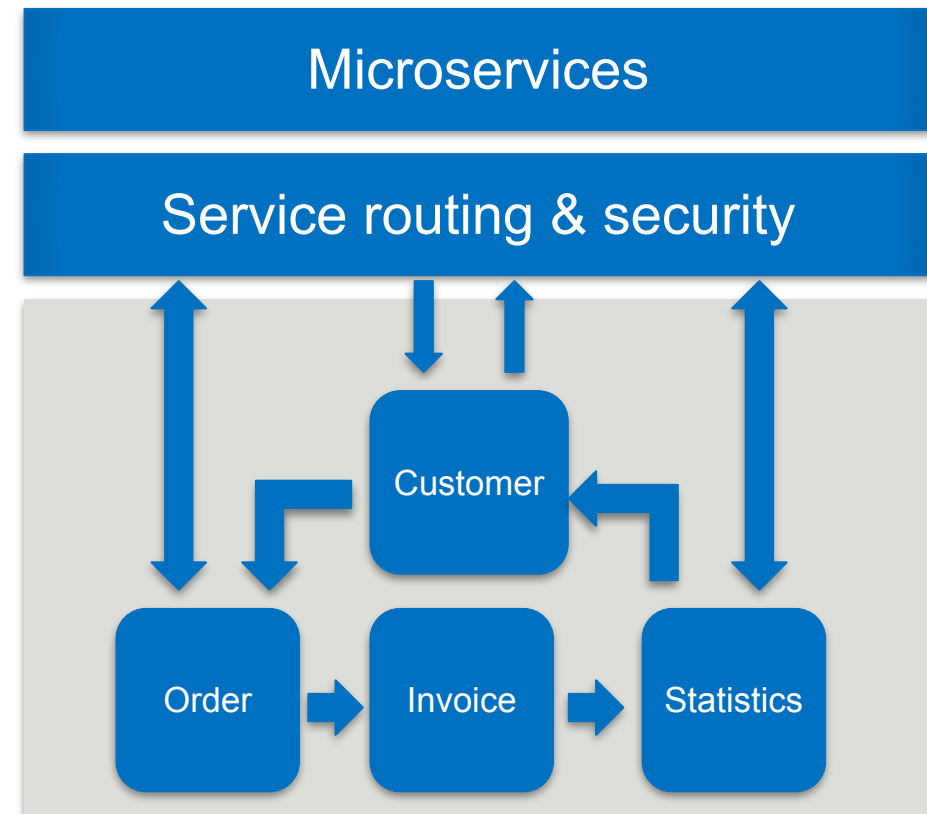
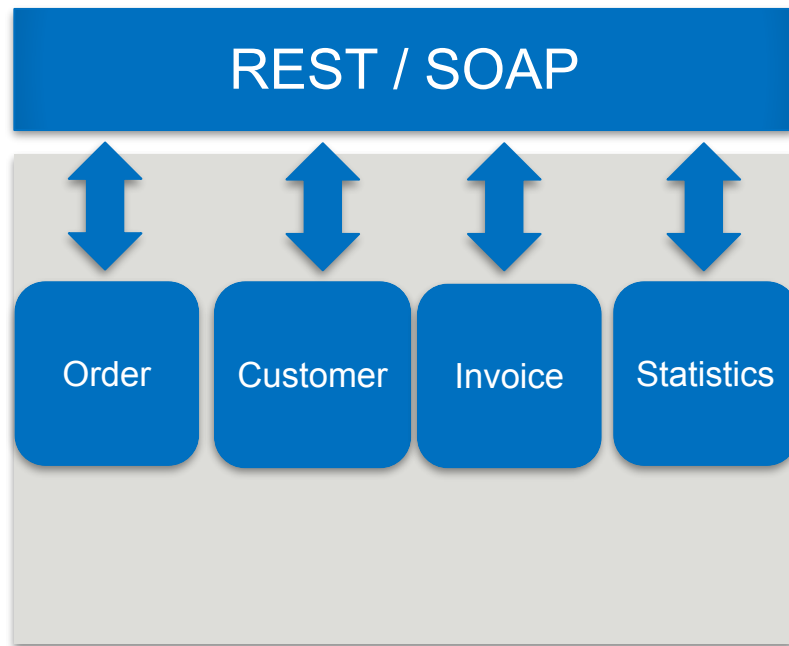
Nous devons réutiliser notre

investissement RPG

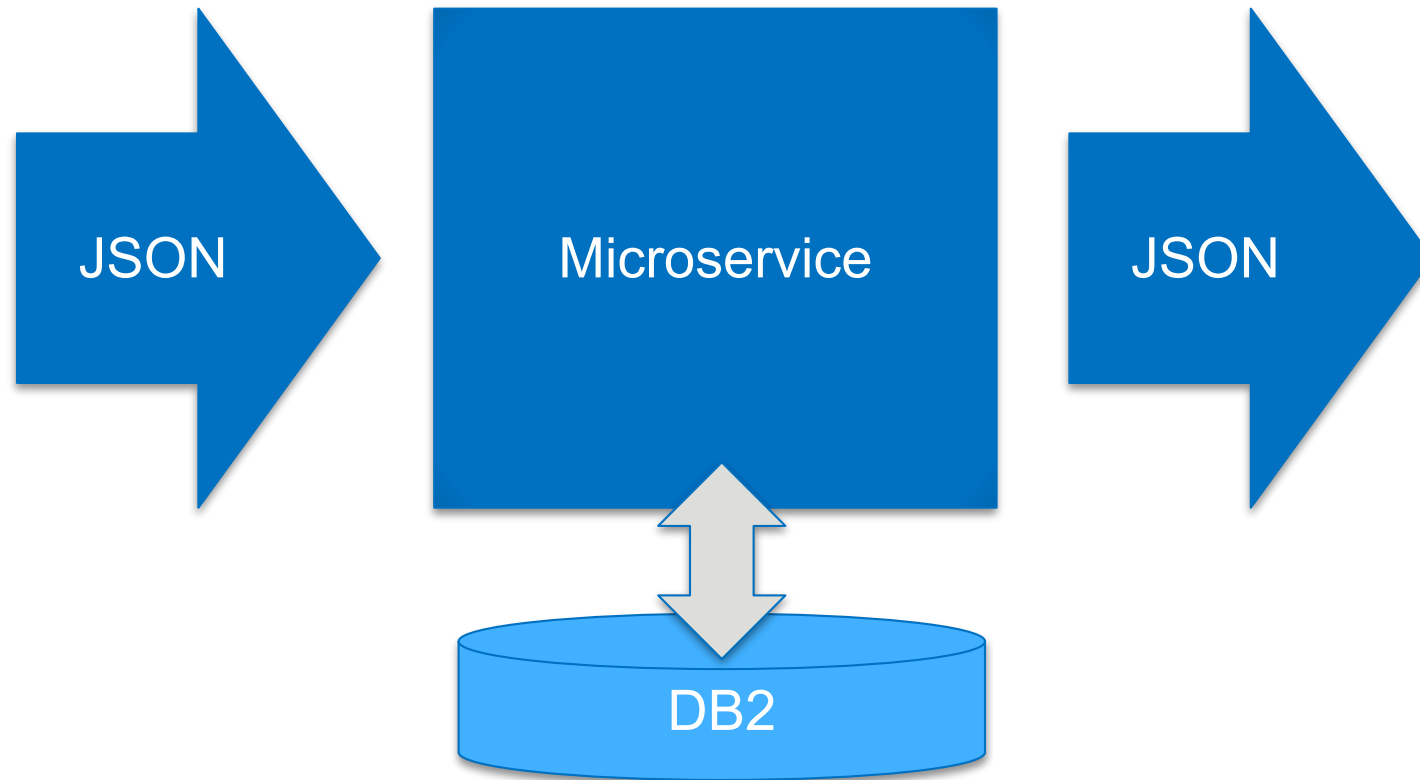
Nous devons intégrer à ...beaucoup

Que sont les microservices?

REST vs. Microservice



Qu'est-ce qu'un microservice?



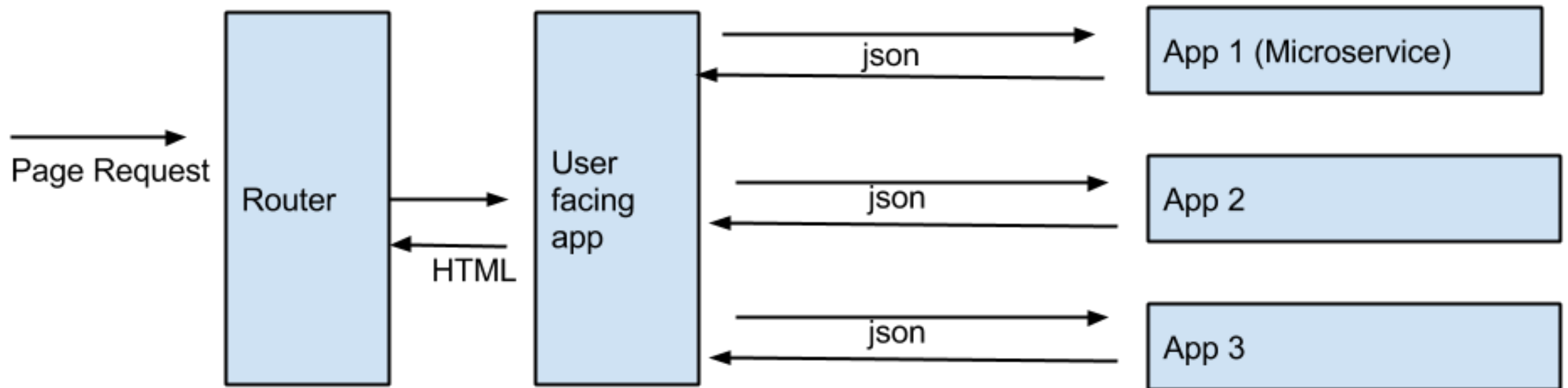
Pourquoi JSON pour formater des données?

Clean Data: JSON est simple. Les données apparaissent sous deux formes: paires nom/valeur ou comme liste de valeurs. Cela signifie moins de chance d'erreur lors du transfert de données et donc, moins de problèmes de fiabilité et de sécurité.

Efficiency: Parce que JSON évite l'apparence de l'ensemble des balises HTML et XML, il est plus petit ce qui signifie que vous gaspillez moins de ressources de transfert des données.

Scalability: Le format de données strict utilisé par JSON signifie que les transferts de données sont normalisés, ce qui rend plus facile d'étendre votre application si nécessaire. L'utilisation d'une structure de données unique signifie que vous pouvez brancher votre code partout où vous en avez besoin.

Microservice example en action



Microservice example en action

CSM Avanti -- Seizoenverhuur - Google Chrome

C.S.M. COMPUTER, SOFTWARE & MANAGEMENT BVBA [BE] | <https://www.csmbvba.be:15000/eloketp/eloket010.pgm>

Avanti BY CSM

Immo Leys demo user | Mijn kantoor | Documentatie en support | Afmelden

Vakantieverhuur Vraag en aanbod Contracten Statistieken Print output Pandfiche LC/0025

Pandfiche LC/0025 Sluiten

Algemeen Comfort Omschrijving Fotos Documenten Bezetting Prijzen Publicatie Adressen Tellers

Opslaan Wijzig gebouw Annuleer

Gebouw

Code: LC

Naam: Longchamp

Postcode: 8400

Gemeente: Oostende

Straat: Zeedijk

Nummer: 116

Regio: Oostende (0.6.1)

Kantoor: Immo Leys - Vastgoed Naessens

Algemeen

Pandcode: 0025

Actief: ☒ Actief

Busnr: 2C geen Busnr: ☐

Garagenr:

Slaapkamers: 0

Etage: 2

Exclusief mandaat: ☐

Soort: STU - STUDIO

Soort toerisme websites: STU - studio

Telefoonnr:






























App.nr: 2C

Personen: 2



Lift: ☒

NLD 16:31
BEP 09/09/2018

Microservice example en action

Name	Status	Type	Initiator	Size	Time	Waterfall
 szext070.pgm	200	xhr	VM25 ext-base.js:1	477 B	65 ms	
 szext070.pgm	200	xhr	VM25 ext-base.js:1	297 B	42 ms	
 szext140.pgm?sid=16281809091828&sessie=1...	200	document	VM31 miframe.js:112	10.2 KB	119 ms	
 szext135.pgm?sid=16281809091828&pandid=...	200	document	miframe.js:112	31.9 KB	124 ms	
 szext135.pgm	200	xhr	ext-base.js:1	1.4 KB	49 ms	
 szext135.pgm	200	xhr	ext-base.js:1	300 B	61 ms	
 szext135.pgm	200	xhr	ext-base.js:1	821 B	48 ms	
 szext135.pgm	200	xhr	ext-base.js:1	676 B	45 ms	
 szext135.pgm	200	xhr	ext-base.js:1	506 B	49 ms	
 szext135.pgm	200	xhr	ext-base.js:1	363 B	95 ms	
 szext135.pgm	200	xhr	ext-base.js:1	233 B	51 ms	
 szext135.pgm	200	xhr	ext-base.js:1	853 B	58 ms	
 szext307.pgm	200	xhr	ext-base.js:1	39.4 KB	1.37 s	
 szext070.pgm	200	xhr	VM25 ext-base.js:1	332 B	40 ms	
 szext070.pgm	200	xhr	VM25 ext-base.js:1	332 B	65 ms	

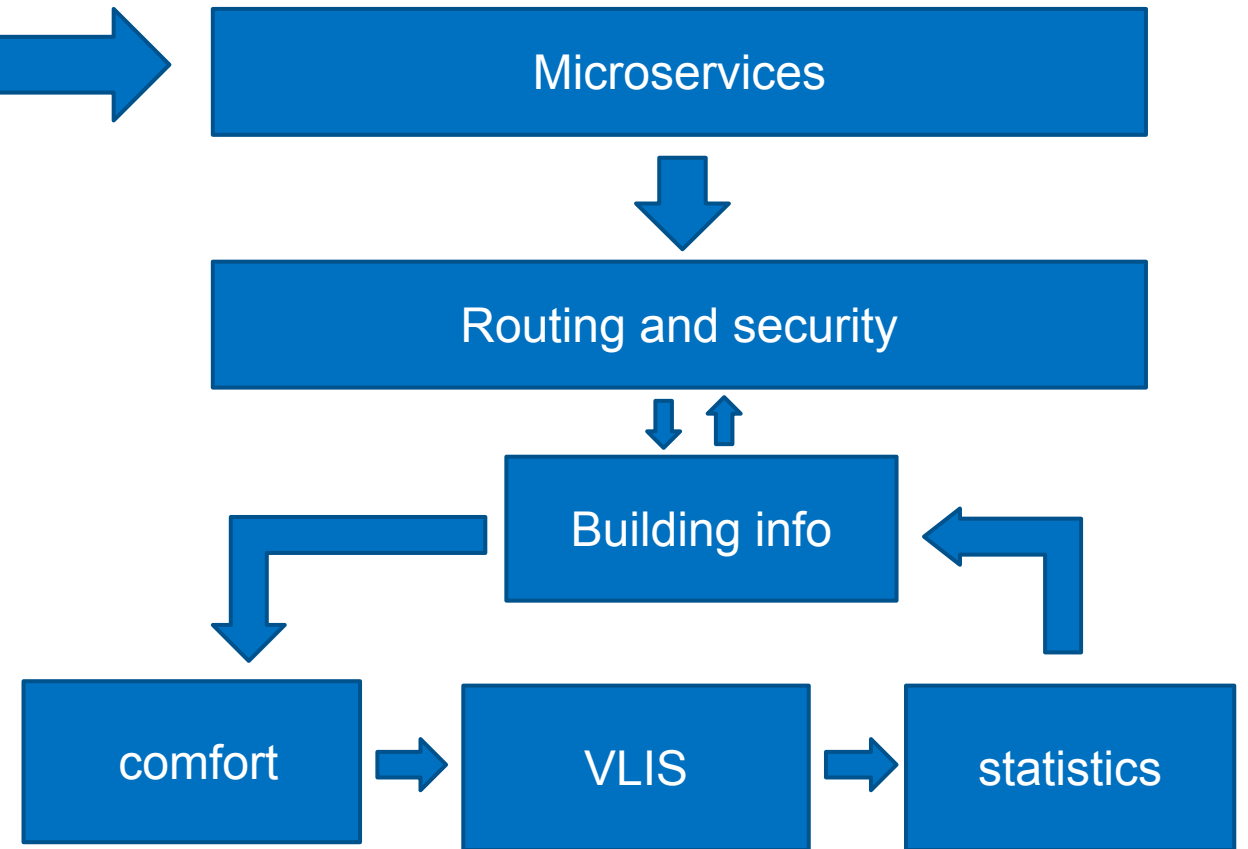
Microservice example en action

Name	×	Headers	Preview	Response	Cookies	Timing
<input type="checkbox"/> szext070.pgm	1			{		
<input type="checkbox"/> szext070.pgm	2			"PANDID": "00019392",		
 szext140.pgm?sid=16281809091828&sessie=16281809091828&pandid=00019392&targetopt=	3			"AGEBEX": "LC",		
 szext135.pgm?sid=16281809091828&pandid=00019392	4			"GNAAMG": "Longchamp",		
<input type="checkbox"/> szext135.pgm	5			"GSTRAAT": "Zeedijk 116",		
<input type="checkbox"/> szext135.pgm	6			"GSTR": "Zeedijk",		
<input type="checkbox"/> szext135.pgm	7			"GNR": "116",		
<input type="checkbox"/> szext135.pgm	8			"GPOSTNR": "8400",		
<input type="checkbox"/> szext135.pgm	9			"GLOKAL": "Oostende",		
<input type="checkbox"/> szext135.pgm	10			"GREGIO": "0.6.1",		
<input type="checkbox"/> szext135.pgm	11			"ASLEUTA": "00024427",		
<input type="checkbox"/> szext135.pgm	12			"AAPPNR": "0025",		
<input type="checkbox"/> szext135.pgm	13			"PDPKEY": "",		
<input type="checkbox"/> szext135.pgm	14			"APPTYP": "STU",		
<input type="checkbox"/> szext135.pgm	15			"AKDOM10": "STU",		
<input type="checkbox"/> szext135.pgm	16			"ABUSNR": "2C",		
<input checked="" type="checkbox"/> szext135.pgm	17			"ABUSCHK": "false",		
<input type="checkbox"/> szext307.pgm	18			"ATELNR": "",		
<input type="checkbox"/> szext070.pgm	19			"ANRGAR": "",		
<input type="checkbox"/> szext070.pgm	20			"ANRKELD": "2C",		
<input type="checkbox"/> szext070.pgm	21			"ASLAAPK": "0",		
<input type="checkbox"/> szext070.pgm	22			"APERS": "2",		
	23			"AETAGE": "2",		
	24			"ALIFT": "true",		
	25			"ADTEREN": "0",		
16 / 209 requests 88.3 KB / 89.5 KB transferred		Line 1, Column 1				

Microservice example

Request :

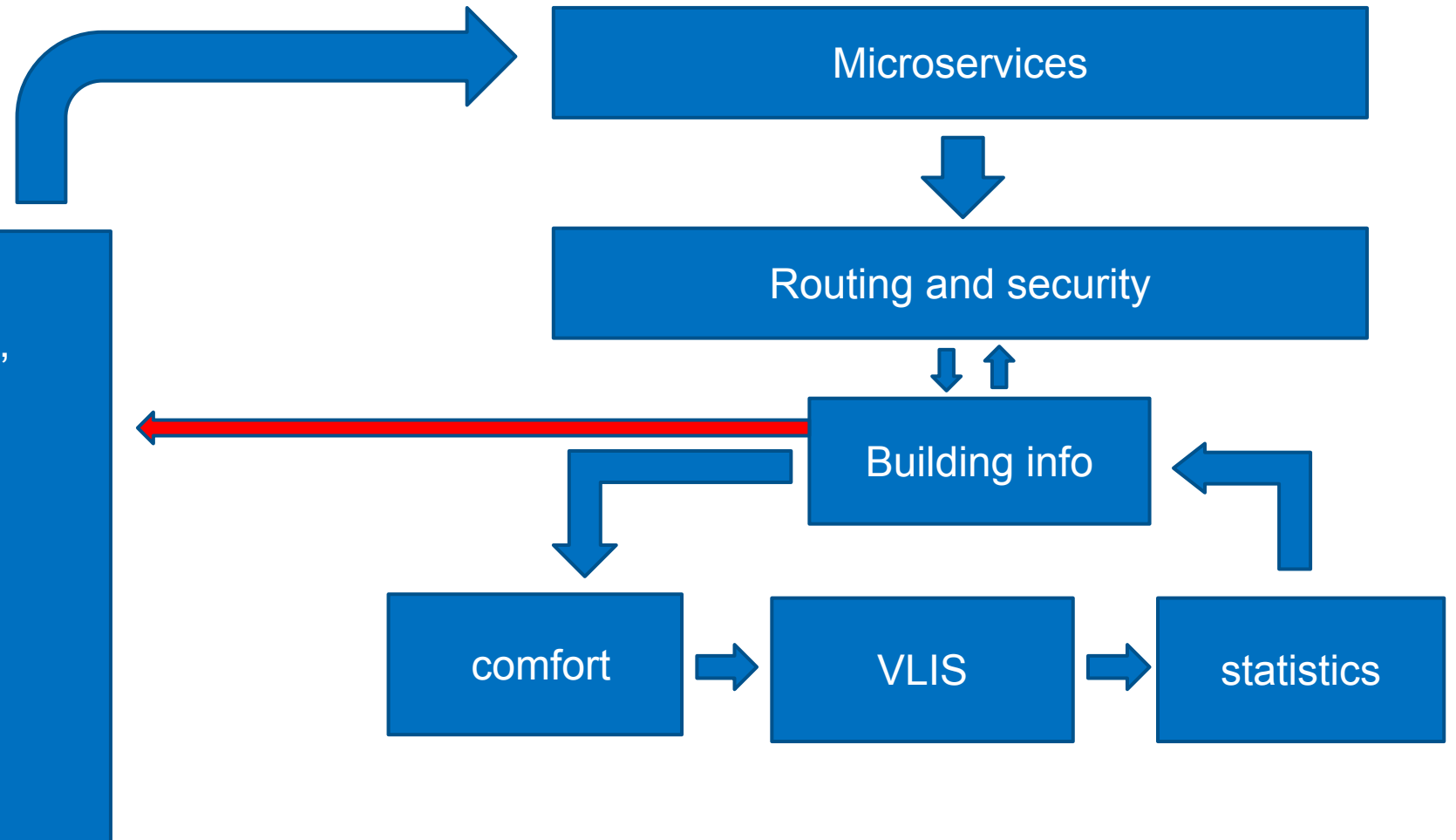
{ "apartmentID" : 123456 }



Microservice example

Request :

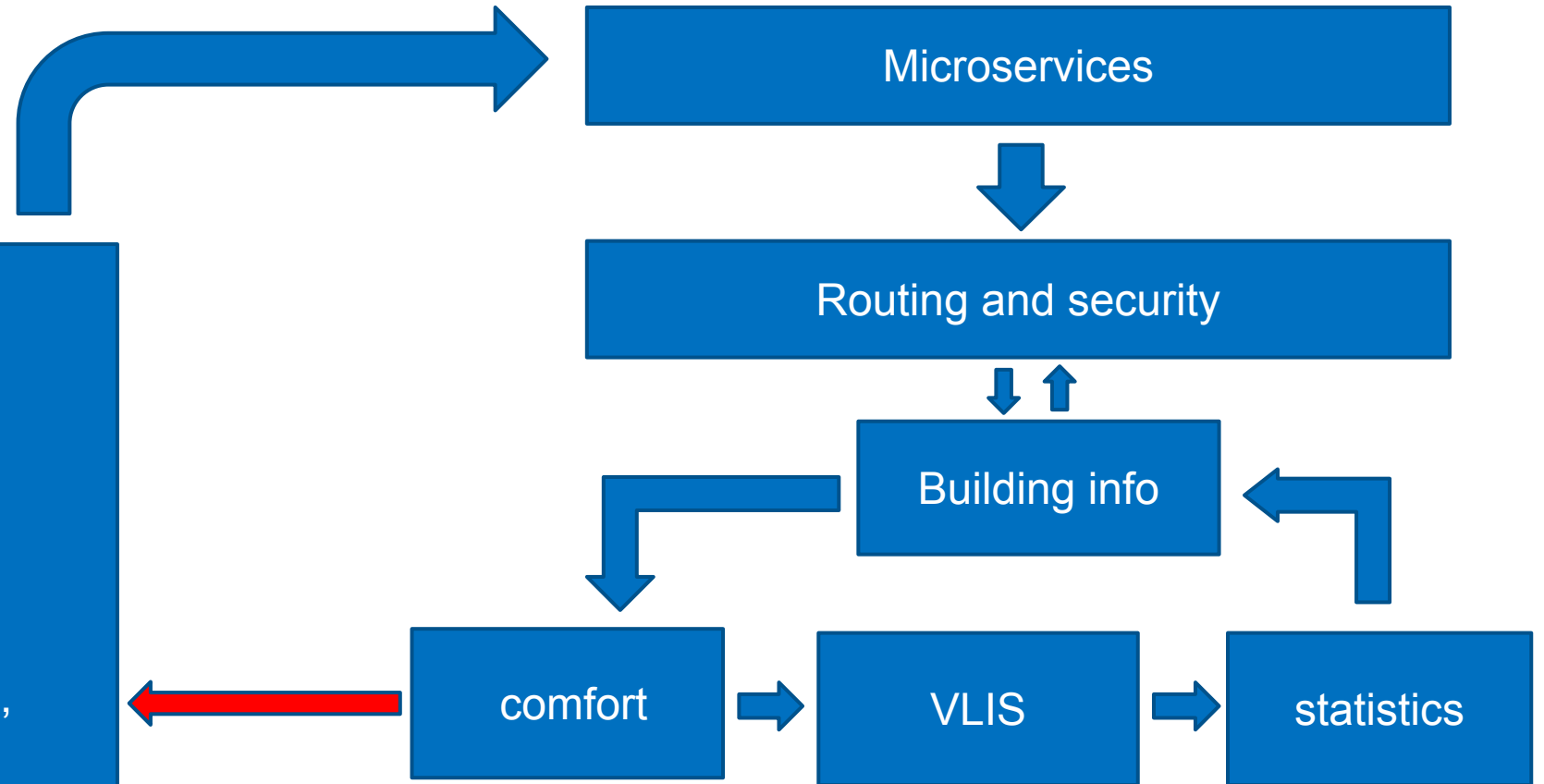
```
{  
  "apartmentID": 123456,  
  "name" : "Longchamp",  
  "street": "Zeedijk",  
  "number": "116",  
  "zipcode": "8400",  
  ....  
}
```



Microservice example

Request :

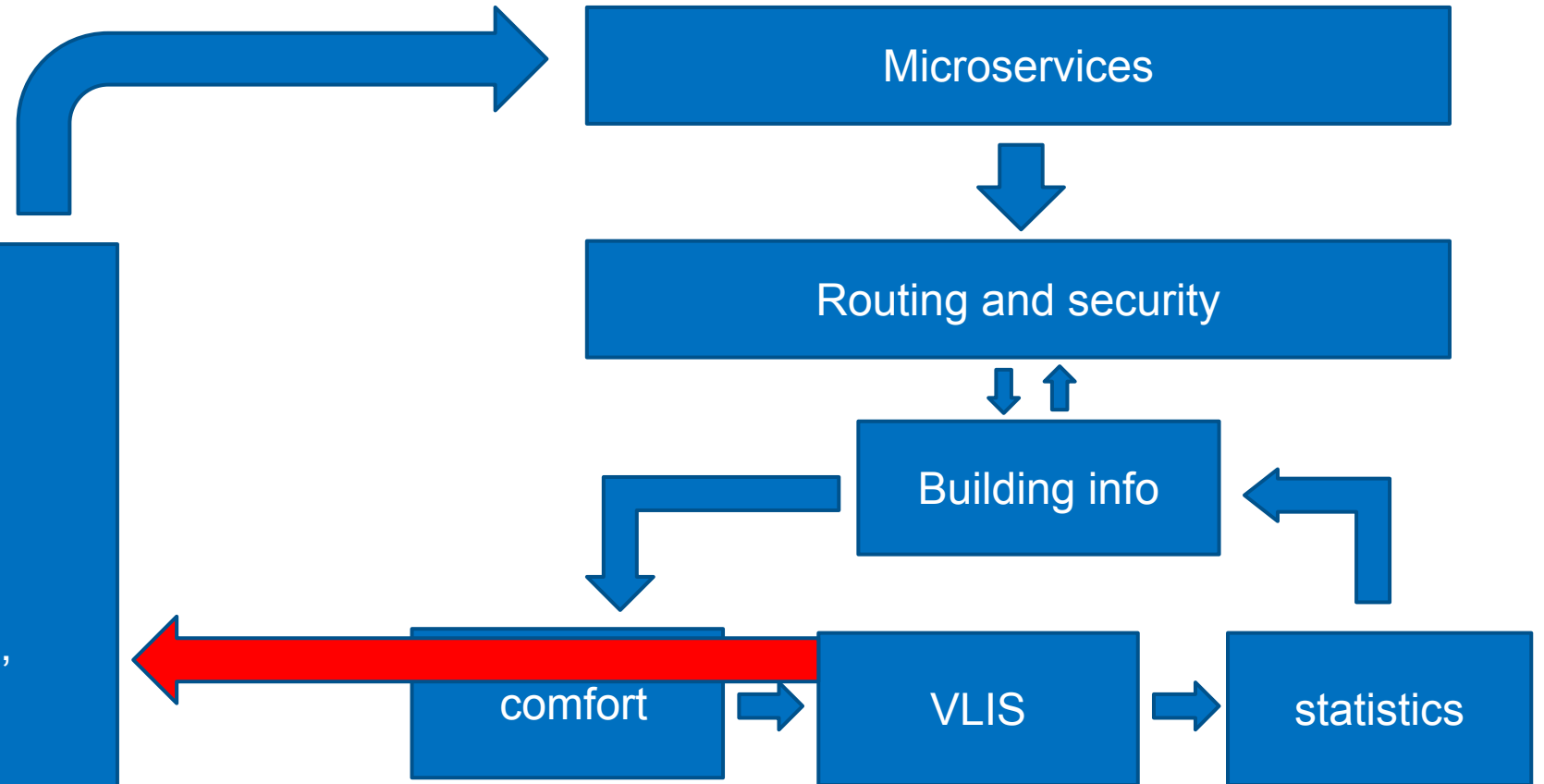
```
{
  "apartmentID": 123456,
  "name": "Longchamp",
  "street": "Zeedijk",
  "number": "116",
  "zipcode": "8400",
  "comfort": [
    { "id": "bedrooms", "value": "2" },
    { "id": "floor", "value": "4" }
  ]
}
```



Microservice example

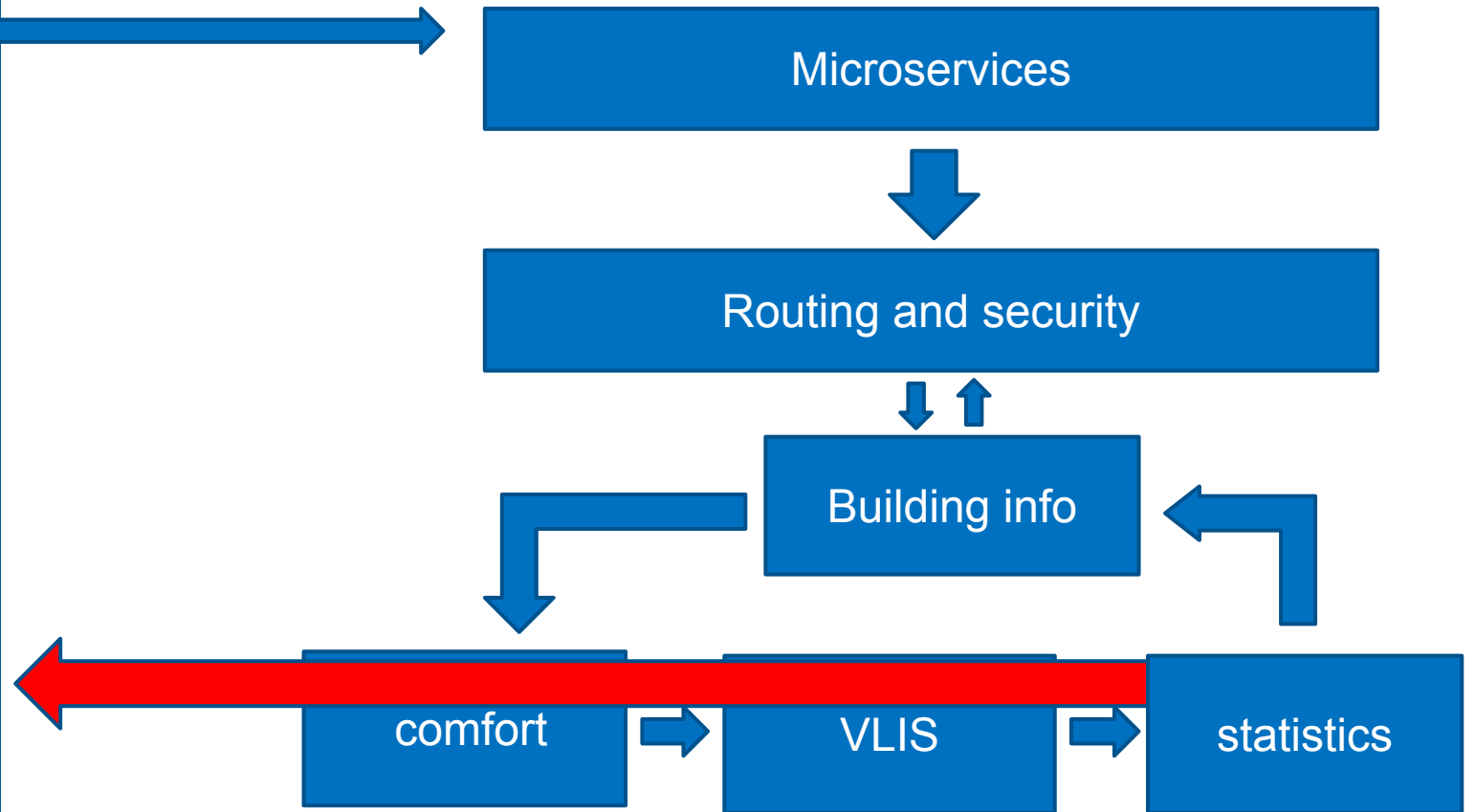
Request :

```
{
  "apartmentID": 123456,
  "name": "Longchamp",
  "street": "Zeedijk",
  "number": "116",
  "zipcode": "8400",
  "comfort": [
    { "id": "bedrooms", "value": "2" },
    { "id": "floor", "value": "4" }
  ],
  "gouvernement": {
    "guid": "abc", "pimid": "def"
  }
}
```



Microservice example

```
{
  "apartmentID": 123456,
  "name": "Longchamp",
  "street": "Zeedijk",
  "number": "116",
  "zipcode": "8400",
  "comfort": [
    { "id": "bedrooms", "value": "2" },
    { "id": "floor", "value": "4" }
  ],
  "government": {
    "guid": "abc", "pimid": "def"
  },
  "statistics": {
    "turnovercurrentyear": 1234,
    "turnoverpreviousyear": 1200
  }
}
```

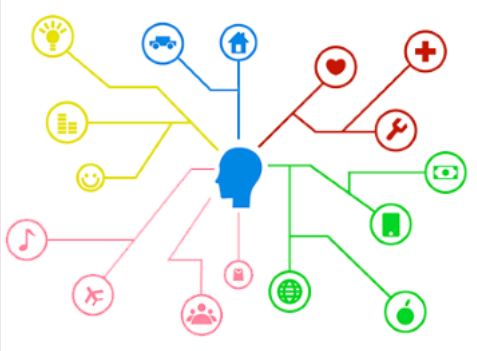


Pourquoi microservices



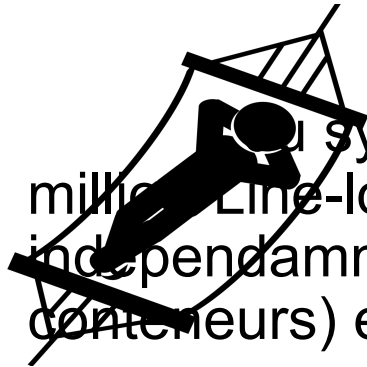
Modularité Eat the elephant one piece at the time.

Approche de mise en œuvre progressive. Je commence
petites équipes possédant le cycle de vie complet de
ress capability°



Complexité segmentée Séparer un gros problème en
problèmes gérés par les petites équipes assure les
sont conservés en évitant un « legacy » in the

Pourquoi microservices



Facilité de déploiement/Vitesse S'éloignant du déploiement du système entier (c.-à-. "un changement de ligne à un mille. Line-long monolithique"). Déployer des services indépendamment et rapidement (par exemple avec des conteneurs) et introduire l'automatisation (livraison continue)



Évolutivité et résilience Scale independently and possibly on demand. Bulkheads to isolate problems and avoid whole system failures (avoiding the cascade effect), then test resilience

Pourquoi microservices



Breaking organisational silos Organiser de petites équipes basées sur les capacités de l'entreprise afin que les silos organisationnels se reflètent dans les systèmes sont construits (Loi de



Enabling cloud transition Construire des applications natives basées sur des conteneurs tout en adhérant aux standards de base, l'adoption de Cloud est une

op

APPROCHE DE LA MODERNISATION

API-fication

- 1.API-fication
- 2.Re-engineer & coexist
- 3.Switch-over and start over

API-fication



WEB API / SERVICES



Terminals



Order mngt

Product

Inventory

Pricing

Shipment

Consignments

Sales

Purchasing

Payables

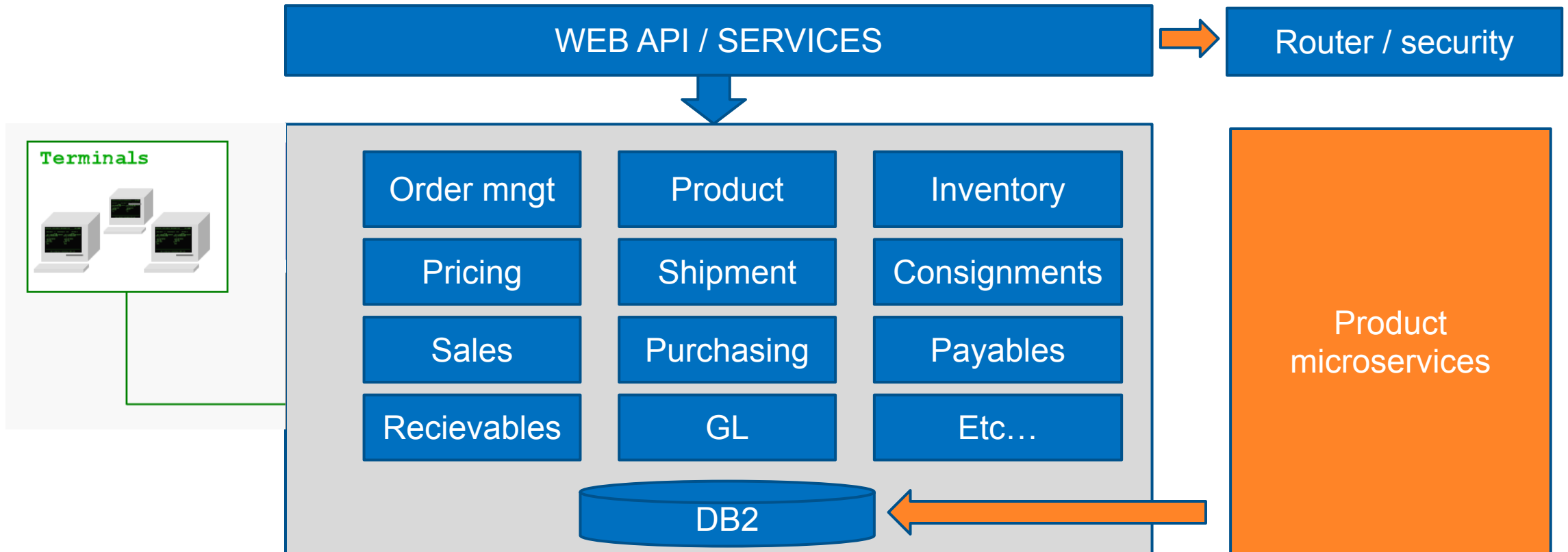
Recievables

GL

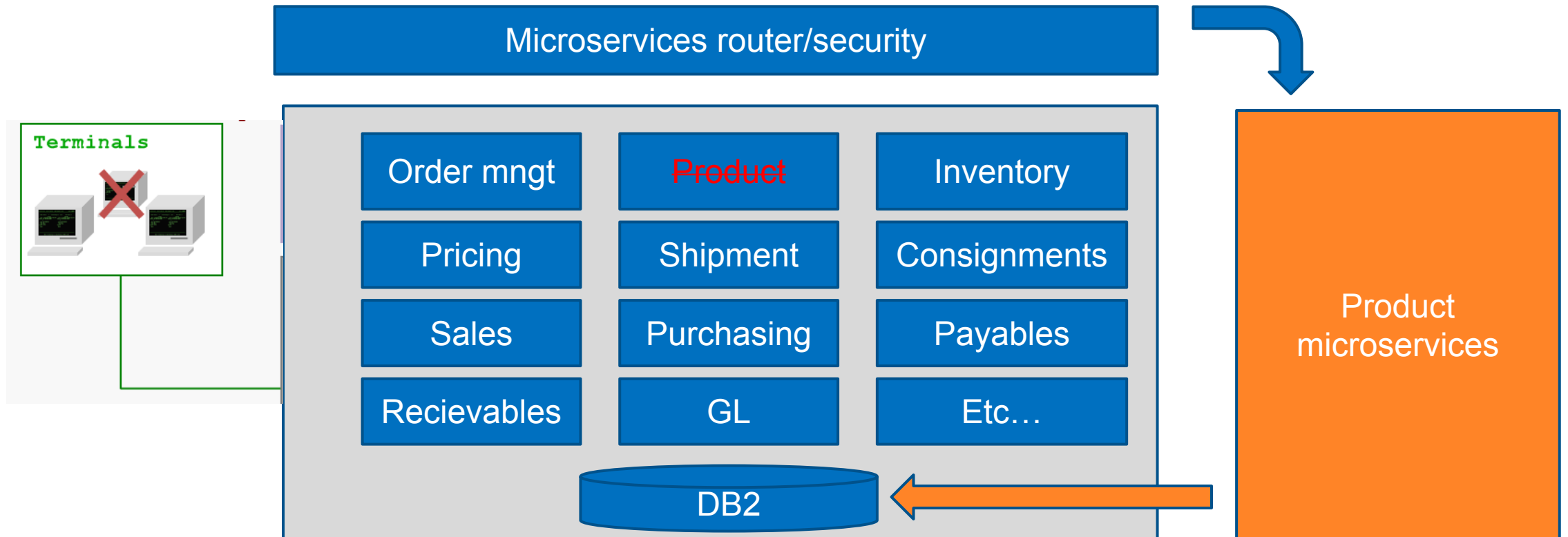
Etc...

DB2

Re-engineer + co-exist



Switch over & start over



RPG & MICROSERVICES

CGIDEV2 (EASY400.net)

- Free et open source toolkit pour développer des applications Web interactives en utilisant RPG
- Commencé en 1999, nous l'avons utilisé depuis lors.
- Utilisation: sites Internet, interfaces Web, puissant en combinaison avec d'autres outils ou avec des fonctionnalités améliorées
- très facile à utiliser lorsque vous savez RPG, les pages Web sont comme l'impression (formats d'enregistrement/variables).
- Principaux inconvénients:
 - Pas de gestion de session
 - Pas de support JSON

YAJL et autres outils Scott Klement

- <https://www.scottklement.com/>
- LIBHTTP : outil pour consommer des WebServices à partir de RPG (depuis 2002)
- YJAL : outil pour lire et écrire JSON (depuis 2013)
- Les deux libhttp et YJAL sont de grands outils utilisés en combinaison avec cgidev2. Vous pouvez utiliser cgidev2 pour lire la demande à partir du navigateur et utiliser YJAL pour écrire la réponse dans JSON. De cette façon, vous pouvez facilement construire un backend puissant et flexible.



Start

Deknuds Frames

instellingen dealersites

Webinstellingen


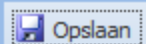
Zoeken op Klantnr: Naam: Firmanaam: Lokaliteit: Postnr:

Klantnummer	Contactpersoon	Firmanaam	Adres	Lokaliteit	Postnr	Telefoonnr	Gsmnr	Faxnr	Taal	Land
		Test							D	D
1	Test	Testegem					111dd,		N	B
2	Connie Derammelaere		Sprietestraat 45	Desselgem	8792	0479247793			N	B
3	Philippe Bruggeman		Bredeweg 113	De Haan	8420				N	B
4	Peter Emmereys		Vrijgeweidestraat 36	Mechelen	2800	0497/38.04.76			N	B
5	Stradiot Hilde		C.hansoulstraat 66/4	Machelen	1830	0478/681741			N	B
8	Gino Buffel		Grote Hazewindstraat 8-10	hoogede	8830	0498 08 53 61			N	B
9	Sophie Vancauwenberghe		Nieuwstraat 81	Lendelede	8860	0496373784			N	B
10	Alexandra De Lange		Engelbert Moensstraat 13	Meerbeek	3078	0496985789			N	B
11	Ellen Vileyn		Proones 27	Poperinge	8970	0486/794982			N	B
12	Leen Lagrain		A.devlamyncklaan 4	Tielt	8700	051401411			N	B
13	Desy Demeersman		Zijpstraat 27	duffel	2570				N	B
14	Sara Thonnon		Bosveldstraat 65	Tienen	3300				N	B
15	Bart Van Haecke		Bontestraat 79	Zottegem	9620	0475441139			N	B
16	Diane Verreyken		Kapellekensweg 8	muizen	2812	015 41 92 26			N	B
17	Kelly Guldentops		Valkstraat 12	Sint-Katelijne-Waver	2860	0473 566358			N	B
18	Jessica Bogaerts		Stationsstraat 29	Haacht	3150	0497919959			N	B
19	Nathalie Algoet		Tarwestraat 65	HARELBEKE	8530				N	B
20	Leen Lagrain		A.devlamyncklaan 4	Tielt	8700	051401411			N	B
21	Dimitri Plaisier		Spreeuwenstraat 4 Bus 101	Kessel-Lo	3010	0473703595			N	B
435	Vera Vanderlocht	Meester V.d. Borghstr. 104		PUTTE	2580				N	B
10001	Nicolas Derycke		Bissegemstraat 33	Gullegem	8560	056261000			F	B
10002	Thijs Benoit		Guido Gezellelaan 27	deerlijk	8540				N	B
10003	Thijs 3 Benoit		Guide Gezellelaan 27	deerlijk	8540				N	B



Start

Deknuddt Frames

 instellingen dealersites

Opslaan



Document toevoegen



Document afbeelden



Document verwijderen



Terug

Nr: 8

Firma naam:

Login:

Paswoord:

Acceptatie dealer: ☐Actief: ☐Unsubscribe: ☐Leverpunt: ☐

Domein dealersite:

Couponcode:

Hoofdklant website:

Type document

Naam document

Opmerking document

Gebruiker

Datum

SENCHA EXTJS FRONT-END FRAMEWORK

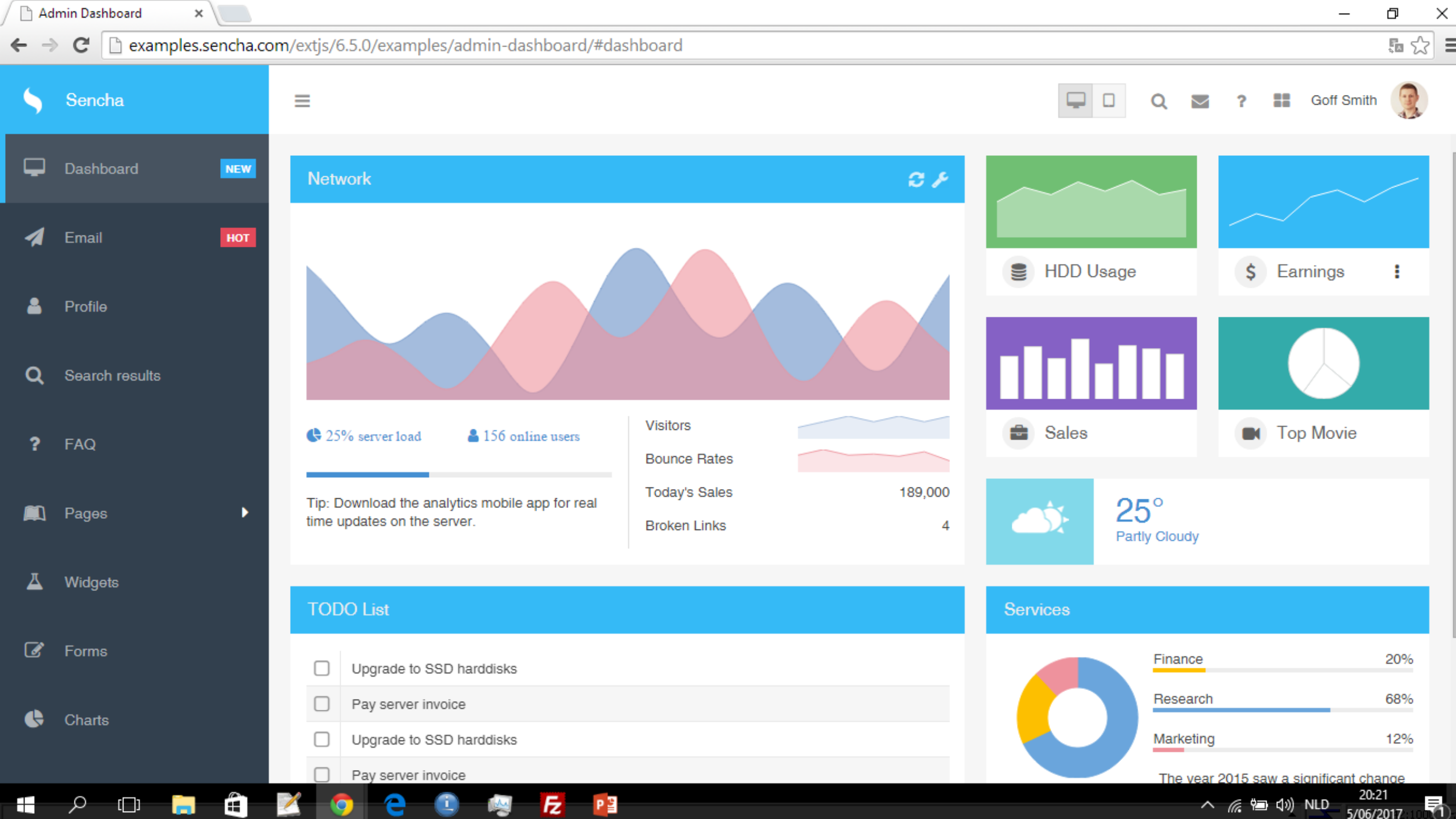
- utilisateur depuis qu'il a commencé en 2007
- Framework JavaScript permettant le développement inter-navigateurs et multiplates-formes d'applications Web et mobiles.
- Ext JS inclut un ensemble de contrôles de formulaire basés sur GUI (ou "widgets ") à utiliser dans les applications Web
- Plus d'info sur <https://www.sencha.com/>

SENCHA EXTJS FRONT-END FRAMEWORK

- Ext JS features 115+ high-performance, pre-tested and integrated UI components including calendar, grids, charts and more.
- The Ext JS Grid and Advanced Charting package can handle millions of records with ease.
- The framework includes a robust data package that can consume data from any back-end data source

Why EXTJS

- Cross-browser support
- Rich UI components
- Two way binding
- MVC (Model View Controller)/MVVM (Model View, View Model)
- Easy DOM access
- Client-side routing → Single-Page Application (SPA).





Summary Grid Example

Note that the js is not minified so it is readable. See [group-summary-grid.js](#).

Sponsored Projects

Toggle Summary

Task	Due Date ↑	Estimate	Rate	Cost
 Ext Forms: Field Anchoring				
Integrate 2.0 Forms with 2.0 Layouts	06/24/2007	6 hours	\$150.00	\$900.00
Implement AnchorLayout	06/25/2007	4 hours	\$150.00	\$600.00
Add support for multiple types of anchors	06/27/2007	4 hours	\$150.00	\$600.00
Testing and debugging	06/29/2007	8 hours	\$0.00	\$0.00
(4 Tasks)	06/29/2007	22 hours	\$112.50	\$2,100.00
 Ext Grid: Single-level Grouping				
Add required rendering "hooks" to GridView	07/01/2007	6 hours	\$100.00	\$600.00
Extend GridView and override rendering functions	07/03/2007	6 hours	\$100.00	\$600.00
Extend Store with grouping functionality	07/04/2007	4 hours	\$100.00	\$400.00

Data Binding Example

This example expands upon the [XML Grid example](#) and shows how to implement data binding for a master-detail view.

Note that the js is not minified so it is readable. See [binding.js](#).

Book List

Author	Title	Manufacturer	Product Group
Sidney Sheldon	Master of the Game	Warner Books	Book
Sidney Sheldon	Are You Afraid of the Dark?	Warner Books	Book
Sidney Sheldon	If Tomorrow Comes	Warner Books	Book
Sidney Sheldon	Tell Me Your Dreams	Warner Vision	Book
Sidney Sheldon	Bloodline	Warner Books	Book
Sidney Sheldon	The Other Side of Me	Warner Books	Book
Sidney Sheldon	A Stranger in the Mirror	Warner Books	Book
Sidney Sheldon	The Sky Is Falling	William Morrow & Co...	Book
Sidney Sheldon	Nothing Lasts Forever	Warner Books	Book

Title: [If Tomorrow Comes](#)

Author: Sidney Sheldon

Manufacturer: Warner Books

Product Group: Book


Ext JS Themes

View and test every Ext component against bundled Ext Themes, or your own custom themes.

Theme: Classic

The diagram illustrates two types of panels. The 'Basic Panel' is shown as a rectangular box with a light blue header containing the text 'Basic Panel' and a white body containing the text 'Some content'. The 'Collapsed Panel' is shown as a smaller rectangular box with a light blue header containing the text 'Collapsed Panel' and a small downward-pointing arrow icon on the right side.

The diagram shows a 'Framed Panel' containing a 'test' label and a sub-panel. The sub-panel is titled 'Collapsed Framed Panel' and contains three labels: 'test A', 'Some content', and 'test B'. The sub-panel is currently collapsed, showing only the 'test A' label.



Window

Toolbar

Click Submit for Confirmation Msg.

Submit

A screenshot of a software interface titled "Basic Panel With Toolbars". The interface has a light blue header bar. Below the header, there is a toolbar area containing a "Button Group" which includes a green circular button with a plus sign and a red "X" button, both followed by dropdown menus labeled "Menu Button" and "Cut". The main content area is a large white rectangle, flanked by light blue vertical bars on the left and right, labeled "Left" and "Right" respectively. At the bottom, there is a footer bar with labels "Toolbar", "Button", "Menu", and "Split Button" (each with a dropdown arrow), followed by a "Toggle Button".

Form Widgets

Plain Label

TextField:

ComboBox:

DateField:

TimeField:

NumberField:

TextArea:

This field is hard-coded to have the "valid" style (it will require some code changes to add/remove this style dynamically)

Checkboxes: ☒ Foo ☐ Bar

Radios: ☒ Foo ☐ Bar

Tahoma **B** *I* U ^A _A [List Icons] [Color Picker] [Font Size] [Text Color] [Help]

Mouse over toolbar for tooltips.

BorderLayout Panel

North

North

West

West

Center

Center

East

East

South

South

JSON

- JSON = JavaScript Object Notation
- JSON est une syntaxe de stockage et d'échange de données.
- JSON est du texte, écrit avec la notation d'objet JavaScript.

JSON – DATA EXCHANGE

- Lorsque vous échangez des données entre un navigateur et un serveur, les données ne peuvent être que du texte.
- Tout objet JavaScript peut être converti en JSON et envoyé au serveur.
- Tout JSON reçu du serveur peut être converti en objets JavaScript.
- Aucune analyse compliquée et traductions nécessaires.

JSON - SYNTAX RULES

- La syntaxe JSON est dérivée de la syntaxe de notation d'objet JavaScript:
- Les données sont dans les paires nom/valeur
- Les données sont séparées par des virgules
- Accolades définissent objets
- Crochets démarquent des arrays

JSON - NAME + VALUE

- Les données JSON sont écrites en tant que paires nom/valeur.
- Une paire nom/valeur se compose d'un nom de champ (en guillemets doubles), suivi d'un signe deux-points, suivi d'une valeur:
- Exemple : `{"name":"Koen"}`

JSON VERSUS XML

- JSON et XML peuvent être utilisés pour recevoir des données d'un serveur Web.
- Les exemples JSON et XML suivants définissent à la fois un objet Person, avec un tableau de 3 personnes:

JSON EXAMPLE

```
{ "persons": [  
  { "firstName": "Koen", "lastName": "Decorte" },  
  { "firstName": "Jeroen", "lastName": "Decorte" },  
  { "firstName": "Bart", "lastName": "Decorte" }  
]
```

XML example

```
<persons>
  <person>
    <firstName>Koen</firstName> <lastName>Decorte</lastName>
  </person>
  <person>
    <firstName>Jeroen</firstName> <lastName>Decorte</lastName>
  </person>
  <person>
    <firstName>Bart</firstName> <lastName>Decorte</lastName>
  </person>
</persons>
```

JSON - XML

- JSON et XML sont “autodescriptif” (lisible par l'homme)
- JSON et XML sont hiérarchiques (valeurs dans les valeurs)
- JSON et XML peuvent être analysés et utilisés par de nombreux langages de programmation
- JSON et XML peuvent être récupérés avec un XMLHttpRequest

JSON - XML

- JSON n'utilise pas la balise de fin
- JSON est plus court
- JSON est plus rapide à lire et à écrire
- JSON peut utiliser des arrays

La plus grande différence est:

XML has to be parsed with an XML parser. JSON can be parsed by a standard JavaScript function. For AJAX applications, JSON is faster and easier than XML.

XML doit être parsé avec un parseur XML. JSON peut être parsé par une fonction JavaScript standard. Pour les applications Ajax, JSON est plus rapide et plus facile que XML.

PREPARE RPG BACKEND TO TALK JSON

- Install cgidv2
- Install Yajl
- Configure HTTP Apache server
- Setup development library

HTTP CONFIG BASICS

- Options +ExecCGI +FollowSymLinks -SymLinksIfOwnerMatch -Includes -Indexes -MultiViews
- ServerName CSMEXT
- Listen *:10001
- DefaultNetCCSID 1208
- MaxKeepAliveRequests 10
- TimeOut 120

HTTP CONFIG BASICS

```
<Directory /QSYS.LIB/CSMEXT.LIB>
```

```
CGIConvMode %%EBCDIC/MIXED%%
```

```
Options +ExecCGI
```

```
order allow,deny
```

```
Allow From all
```

```
AddOutputFilter INCLUDES .pgm .pl .class
```

```
</Directory>
```

HTTP CONFIG BASICS

- AliasMatch `^/QSYS\LIB/CSMEXT\LIB/(.*) /QSYS.LIB/CSMEXT.LIB/$1`
- ScriptAliasMatch `^/csmextp/(.*) /QSYS.LIB/CSMEXT.LIB/$1`

LET RPG TALK TO BROWSER

RPG HEADER

H optimize(*NONE)

H decedit('.)

H truncnbr(*NO)

H datedit(*YMD) datfmt(*YMD)

H option(*srcstmt : *nodebugio)

H fixnbr(*zoned : *inputpacked)

H bnmdir('CGIDEV2':'YAJL':'QC2LE':'QUSAPIBD')

H DFTACTGRP(*NO) ACTGRP('EXTDEMO')

LET RPG TALK TO BROWSER

RPG COPY BOOKS

/copy *libl/qcpyprc,prototypeb

/copy *libl/qcpyprc,usec

/copy *libl/qcpyprc,variables3

/copy *libl/qcpyprc,yajl_h

LET RPG TALK TO BROWSER

- RPG READ INPUT FROM THE BROWSER

* parse browser input

C eval nbrVars =

C zhbgetinput(savedquerystring:qusec)

C eval action = zhbgetvar('action')

LET RPG TALK TO BROWSER

```
C      select
C      when    action = 'getSubfile'
C      exsr    getsubfile
C      when    action = 'getRow'
C      exsr    getrow
C      other
C      exsr    startnok
C      endsl
C      exsr    send2browser
```

LET RPG TALK TO BROWSER

```
C          select
C          when    action = 'getSubfile'
C          exsr    getsubfile
C          when    action = 'getRow'
C          exsr    getrow
C          other
C          exsr    startnok
C          endsl
C          exsr    send2browser
```

LET RPG TALK TO BROWSER

* succes output → {"SUCCESS": "1"}

```
callp    yajl_genOpen(*OFF)
```

```
callp    yajl_beginObj()
```

```
callp    yajl_addChar('SUCCESS':'1')
```

```
callp    yajl_endObj()
```

LET RPG TALK TO BROWSER

* send output to browser

```
eval    httpStatus = 200  
callp   yajl_writeStdout(httpStatus: errout)  
callp   yajl_genClose()
```

SQL SETTINGS

```
set option srtseq=*langidshr,  
        closqlcsr=*endmod,  
        commit=*none
```

First SQL line in code and needs to be excuted first.

LET RPG TALK TO BROWSER

* Get entry

```
C          eval      row = c2n2(zhbgetvar('wid'))
```

```
c/exec sql
```

```
c+ select wid, wcode, wdesc, wseq into :wid, :wcode, :wdesc, :wseq
```

```
c+ from workw where wid = :row
```

```
c/end-exec
```

```
C          if      SqlStt <> SqlNormal
```

```
→  SEND ERROR
```

```
c          endif
```

BUILD JSON RECORD

```
callp    yajl_beginObj()  
callp    yajl_addChar('WID':  
                    %trim(%editc(wid:'4')))  
callp    yajl_addChar('WCODE':  
                    %trim(wcode))  
callp    yajl_addChar('WDESC':  
                    %trim(wdesc))  
callp    yajl_addChar('WSEQ':  
                    %trim(%editc(wseq:'4')))  
callp    yajl_endObj()
```

EXAMPLE OUTPUT

```
{"SUCCESS":"1","WID":"1","WCODE":  
"KDC01","WDESC":"Koen  
Decorte","WSEQ":"10"}
```

SEND QUERY RESULT AS A PAGING GRID

* retrieve the browser parameters

```
C      eval    start=c2n2(zhbgetvar('start'))
C      eval    limit=c2n2(zhbgetvar('limit'))
C      if      limit=0
C      eval    limit = 250
C      endif
C      eval    search = zhbgetvar('search')
C      eval    sort = zhbgetvar('sort')
C      eval    sortDir = zhbgetvar('dir')
```

* build SQL statement

```
C          move1  X'7D'      SQ          1
C          eval   stmt='SELECT wid, wcode,, wdesc, wseq'
C              + ' from workw'
C  search      ifne   *blanks
C          eval   stmt = stmt + ' where wdesc like ' + sq +
C              '% ' + %trim(search) + '% ' +sq
C          endif
C  sort        ifne   *blanks
C          eval   stmt = stmt + ' order by ' + %trim(sort)+ ' '
C              + %trim(sortdir) + ', wid'
C          else
C          eval   stmt = stmt
C              + ' order by wid'
C          endif
```

* prepare statement

C/exec sql include sqlca

C/end-exec

C/exec sql prepare subfileSelect from :stmt

C/end-exec

C if sqlstt=SQLEOF

C exsr none

C leavesr

C endif

* open cursor

c/exec sql

c+ declare csr001 insensitive scroll cursor for subfileSelect

c/end-exec

c/exec sql open csr001

c/end-exec

c z-add sqler2 totalcount

```

* position
c/exec sql include sqlca
c/end-exec
c          if      start <> 0
c/exec sql fetch relative :start from
c+      csr001 for :limit rows into :workwRecords
c/end-exec
C          else
c/exec sql fetch csr001 for :limit rows into :workwRecords
c/end-exec
C          endif
c          if      sqlcod<>GOOD
C          exsr    none
c          leavesr
c          endif
C  sqler2      iflt    limit
C          z-add    sqler2      limit
C          endif

```

```
callp    yajl_beginObj()
callp    yajl_addChar('SUCCEES: '1')
callp    yajl_addChar('totalCount': %trim(%editc(totalcount:'4'))))
callp    yajl_beginArray('WORKWREC')
C    1          do          limit          I
callp    yajl_beginObj()
callp    yajl_addChar('WID': %trim(%editc(workwrecords(i).wid:'4'))))
callp    yajl_addChar('WCODE': %trim(workwrecords(i).wcode))
callp    yajl_addChar('WDESC': %trim(workwrecords(i).wdesc))
callp    yajl_addChar('WSEQ': %trim(%editc(workwrecords(i).wseq:'4'))))
callp    yajl_endObj()
C          enddo
callp    yajl_endArray()
callp    yajl_endObj()
```


LET RPG TALK TO BROWSER

```
{"SUCCESS":"1","totalCount":"2","WORK  
WREC":  
[{"WID":"1","WCODE":"KDC01","WDESC":  
"Koen Decorte","WSEQ":"10"},  
{"WID":"2","WCODE":"JDC01","WDESC":  
"Jeroen Decorte","WSEQ":"20"}]}
```

```
<!DOCTYPE html>
<html>
<head>
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta name="viewport" content="width=device-width, initial-scale=1,
maximum-scale=1, user-scalable=no">
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
<title>WORKWITH</title>
<link rel="stylesheet" type="text/css" href="/crext/css/crext.css" />
<link rel="stylesheet" type="text/css" href="/ext-6.0.2/build/classic/theme-
classic/resources/theme-classic-all.css">
<script src="/ext-6.0.2/build/ext-all.js"></script>
<script src="/ext-6.0.2/build/classic/theme-classic/theme-classic.js"></script>
```

EXTJS template

- Wait until the DOM is ready and Ext JS is loaded and parsed.
- Ext JS provides a function called `Ext.onReady`, which executes a callback automatically when all the nodes in the tree can be accessed.

```
Ext.onReady(function(){  
    alert("This is my first Extjs app !");  
});
```

EXTJS template

- An alternative to this code can also be:

```
Ext.application({  
    name : 'MyFirstApplication',  
    launch : function() {  
        Ext.Msg.alert("Hello", " my first Ext JS app");  
    } });
```

- Advantage of Ext JS is that the library only uses one single object in the global scope called Ext to allocate all the classes and objects within the framework.

EXTJS MESSAGES

- `Ext.Msg.alert("Alert","This is my first Ext js app !");`
- First parameter = title
- Second parameter = message
- Confirmation message :
- `Ext.Msg.confirm("Confirm","Do you like Ext JS ?");`

Handling the confirmation response

- `Ext.Msg.confirm("Confirm","Do you like Ext JS 5?",`

```
function(btn){    if (btn === "yes") {
```

```
    Ext.Msg.alert("Great!","This is great!");
```

```
    } else {
```

```
    Ext.Msg.alert("Really?","That's too bad.");
```

```
    }
```

```
});
```

BUILD THE INTERFACE - TEXTFIELDS

- {xtype: 'numberfield', id: 'p0', name: 'p0', fieldLabel: 'ID', width: 200, maxLength:7, allowDecimals: false, allowBlank:true, selectOnFocus: false},
- {xtype: 'textfield', id: 'p1', name: 'p1', fieldLabel: 'Code', width: 200, maxLength:15, allowBlank:false, selectOnFocus: false, fieldStyle : {textTransform: "uppercase"}},
- {xtype: 'textfield', id: 'p2', name: 'p2', fieldLabel: 'Description', width: 425, maxLength:50, allowBlank:false, selectOnFocus: false},

BUILD THE INTERFACE - PANEL

```
var panelEdit = new Ext.Panel({
    layout: 'fit',
    title: 'Work with file WORKW',
    header: true,
    items: [screenEdit],
    tbar:[
        {text: 'Save', tooltip: 'Save row', iconCls: 'save', handler: updateRow},
        '-',
        {text: 'Cancel', tooltip: 'Cancel', iconCls: 'cancel', handler: function() {
            Ext.getCmp('viewport').layout.setActiveItem(0);
        }}
    ]
});
```


BUILD THE INTERFACE - GRID

```
var subfileRec = [  
  {header: "ID", sortable: true, width: 100, dataIndex: 'WID'},  
  {header: "Code", sortable: true, width: 100, dataIndex: 'WCODE'},  
  {header: "Description", sortable: true, width: 400, dataIndex: 'WDESC'},  
  {header: "Sequence", sortable: true, width: 100, dataIndex: 'WSEQ'}  
];
```

BUILD THE INTERFACE - GRID

```
var gridSubfile = new Ext.grid.GridPanel({  
    scrollable: true,  
    trackOver: true,  
    loadMask: true,  
    title: 'Work with file WORKW',  
    header: true,  
    store: storeWorkw,  
    columns: subfileRec,  
    frame: false,  
    viewConfig: {  
        listeners : {  
            .....  
        }  
    }  
});
```

LINK EVERYTHING TOGETHER - AJAX

```
Ext.Ajax.request({ url:"serverside/rpgprogram.pgm",
    success: function(response,options){
        console.log('success function executed, here we can do some stuff !');
    },
    failure: function(response,options){
        Ext.Msg.alert("Message", 'server-side failure with status code ' + response.status);
    },
    callback: function( options, success, response ){
        console.log('Callback executed, we can do some stuff !');
    }
});
```

LINK EVERYTHING TOGETHER - AJAX

- Success function only executed on server response with a 200-299 status
- On response status is 403, 404, 500, 503, or any other error status, the failure callback is executed.
- Each function (success or failure) receives two parameters. The first parameter = server response object. The second parameter is the configuration option
- The callback function is always executed, on success and failure. This function receives a third parameter, a boolean value which indicates if the request was successful.

LINK EVERYTHING TOGETHER - AJAX

```
success: function(response,options){ var data =  
Ext.decode(response.responseText);  
Ext.Msg.alert("Message", data.msg); },
```

```
if (data.SUCCESS=='1') {  
Ext.getCmp('p0').setValue(data.WID);  
Ext.getCmp('p1').setValue(data.WCODE);
```

```
....
```

LINK EVERYTHING TOGETHER - AJAX

```
Ext.define('WORKW', {extend: 'Ext.data.Model', fields: ['WID',  
'WCODE', 'WDESC', 'WSEQ']});
```

Models represent objects or entities inside our application, like records on the IBM i.

Models are used by a data store.

A model contains fields, validations etc...

LINK EVERYTHING TOGETHER - AJAX

```
var storeWorkw =Ext.create('Ext.data.Store',  
    {extend : 'Ext.data.Store',  
    autoLoad: true,  
    model: 'WORKW',  
    proxy: {type: 'ajax', url: '/crawebd/workw.pgm', noCache: true,  
    reader : {type: 'json', rootProperty: 'WORKWREC',  
    totalProperty: 'totalCount'}}},
```





....

LINK EVERYTHING TOGETHER - AJAX

EXTJS store uses a proxy to send and retrieve the data.

A proxy in Ext JS is a class that handles and manipulates the data (parsing, organizing, and so on), so the store can read and save or send data to the server.

Work with file WORKW

 Add row  Change row  Delete row Search: 

ID	Code	Description	Sequence
1	KDC01	Koen Decorte	10
2	JDC01	Jeroen Decorte	20

WORKWITH

10.172.11.106:10001/workwith.html

Work with file WORKW

+

Add row

⚙

Change row

−

Delete row

Search:

ID	Code	Description	Sequence
1	KDC01	Sort Ascending	10
2	JDC01	Sort Descending	20

Columns

☒ ID

☒ Code

☒ Description

☒ Sequence

10.172.11.106:10001/workwith.html#

Work with file WORKW

Save Cancel

ID: 1

Code: KDC01

Description: Koen Decorte

Sequence: 10

WHERE TO GO FROM HERE

- ADD SECURITY
- ADD SESSION CONTROL
- MENU SYSTEM
- USE MVC
- ...

RPG for microservices – simple router

```
■
**FREE
/include *libl/qcpyprc,pln_h

/include *libl/qcpyprc,pln_d
/include *libl/qcpyprc,prototypeb
/include *libl/qcpyprc,usec
/include *libl/qcpyprc,variables3
/include *libl/qcpyprc,jsonprc
/include *libl/qcpyprc,pln010_h
/include *libl/qcpyprc,pln025_h

DCL-PR SetLibrary extpgm('CRPLN001');
END-PR;

dcl-pr Execute extpgm(program);
  sid CHAR(14);
  action CHAR(50);
END-PR;

dcl-s program CHAR(10);
dcl-s action CHAR(50);
dcl-s sid CHAR(14);
```

RPG for microservices – simple router

```
DCL-PR  SetLibrary extpgm('CRPLN001');
END-PR;

dcl-pr Execute extpgm(program);
      sid CHAR(14);
      action CHAR(50);
END-PR;

dcl-s program CHAR(10);
dcl-s action CHAR(50);
dcl-s sid CHAR(14);

// Retrieve general parameters from webservice
// -----
nbrVars =
      zhbgetinput(savedquerystring:qusec);
program = zhbgetvarupper('program');
action = zhbgetvarupper('action');
sid = zhbgetvar('sid');
```

RPG for microservices – simple router

```
// No parameters = show logon screen
// -----
if program = *blanks;
  program = 'CRPLN010';
  action = *blanks;
  sid = *blanks;
endif;

// Set environment
// -----
SetLibrary();

wrtdebug( program + ' ' + sid );
wrtjobdbg(*on);

// Check session
// -----
if program <> 'CRPLN010' or
  ( action <> 'LOGIN' and action <> *blanks );
  if PLN010_CheckSession( sid ) <> SUCCESS;
    JSONstartnok();
    JSONerrormsg('SESSION' : 'Session error');
    JSON2browser();
    *inlr = *on;
    return;
  endif;
endif;
```

RPG for microservices – simple router

```
// Set environment according to session
// -----
// Dit moet actief staan bij het in productie gaan ]]
  PLN025_SetLibraryList(sid);

// Call program
// -----
monitor;
  Execute( sid : action );
on-error;
  JSONstartnok();
  JSONerrormsg('ERROR' : 'Error in webservice');
  JSON2browser();
endmon;

*inlr = *on;
return;
```


RPG for microservices – JSON router

```
dcl-s docNode like(yajl_val);  
dcl-s node like(yajl_val);  
dcl-s errMsg varchar(500);  
dcl-s program varchar(10);
```

```
docNode = yajl_stdin_load_tree(*on: errMsg);  
if errMsg <> ?;  
    // JSON was invalid, return an error message  
endif;
```

```
node = yajl_object_find(docNode: "program");  
if node = *null;  
    // return error message  
else;  
    program = yajl_get_string(node);  
endif;
```

CONCLUSIONS

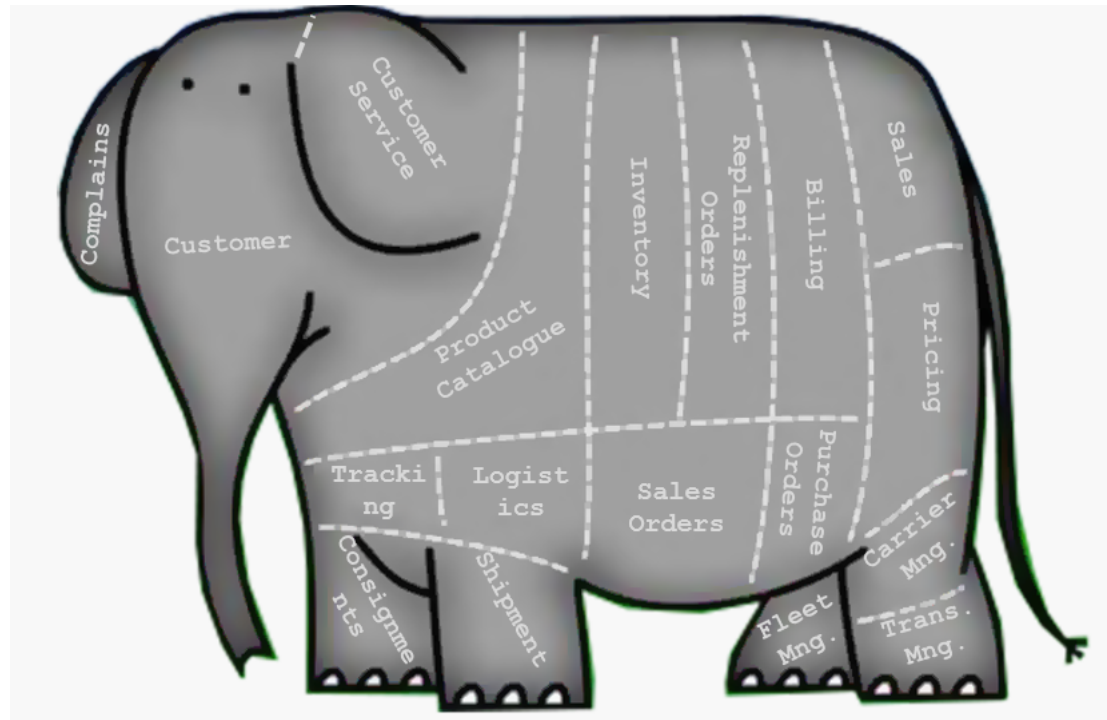
Avoid legacy to legacy modernization!!

- Make your new system modular so it is easier to evolve.



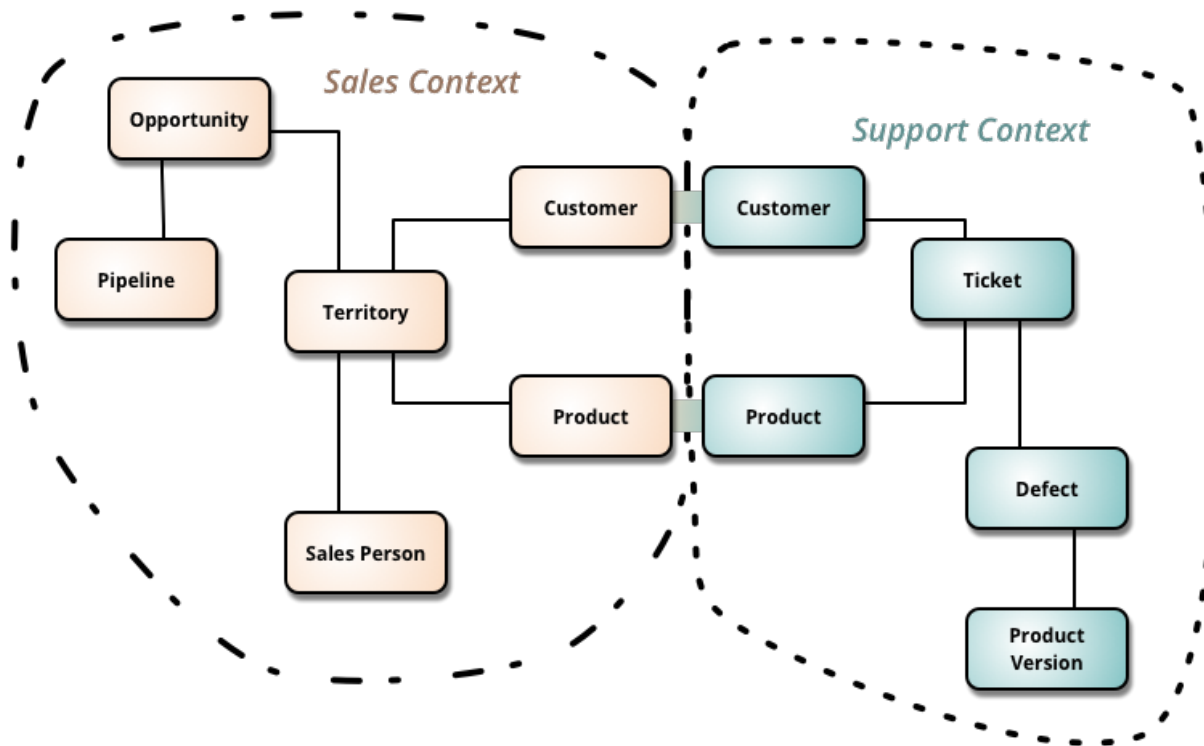
Do it one piece a the time!

Understand the problem. Slice and dice your elephant by defining boundaries in the business capabilities. Modernize one piece at the time. Start small !!



Create bundles – Bounded context

Gather together those things that change for the same reason, and separate those things that change for different reasons

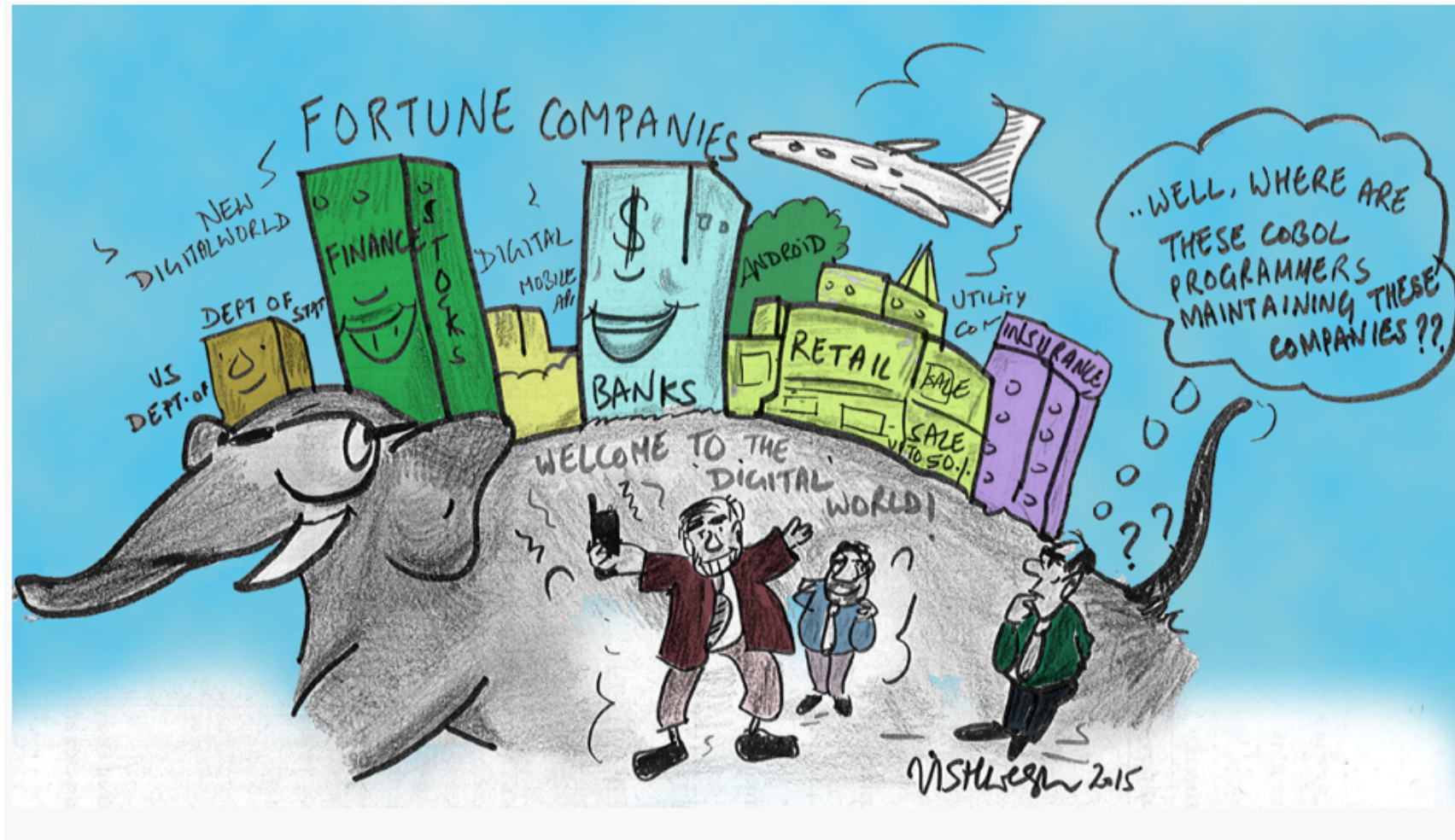


Speed wins over efficiency !!

Speed means learning about your customers/users and giving them what they want at a faster pace. Use simple patterns automated by tooling. Learn the walk before running !!



The world runs on legacy !!



Bernard de Chartres

“nani gigantum humeris insidentes”

Des nains sur des épaules de géants



MERCI DE VOTRE ATTENTION