



Open Source & IBM i Dernières nouveautés...

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<https://ibm.biz/bma-wiki>

Co-auteur, merci à Philippe Bourgeois!





Search

IBM Client Center Home Page > IBM Client Center Montpellier >

IBM Client Center Montpellier

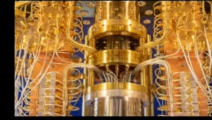
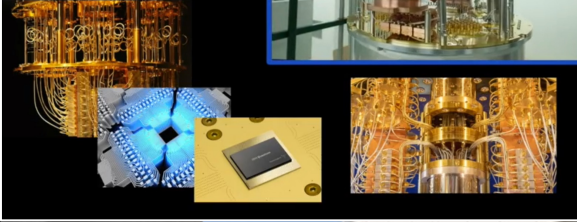
Engage with deep technical experts on current and next-generation IBM Systems technology.

Meet the experts

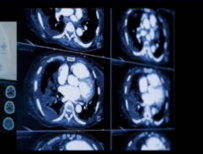
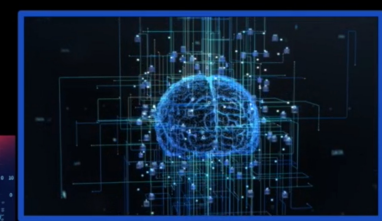
Latest news



DISCOVER THE POTENTIAL OF QUANTUM!



UNLOCK DATA VALUE!



IBM Watson

IBM Z

AIX
IBM i

IBM Blockchain

IBM Q

IBM Cloud



Red Hat



OPENSIFT



open source

↓ Solutions

↓ IBM Virtual Client Center

↓ Webinars series

<https://www.ibm.com/ibm/clientcenter/montpellier>

Support Client PoC, Workshops, Benchmaks...
Partenaires Workshops, Formations
Editeurs , Intégrateurs....

Open Source sur IBM i – Rappels

- Pourquoi l'Open Source sur IBM i ?
 - Nouvelles possibilités → ouverture de l'IBM i
 - Pour les **administrateurs** système
 - Déploiement automatisé d'applications, vérification de conformité, clonage de partition, synchronisation de fichiers, gestion de certificats, ZIP/UNZIP, création de sandbox...
 - Pour les **développeurs**
 - Echange de données par messages, gestion de PDF, appel de Services Web, de SMS, gestion événementielle, intégration de flux vidéo, IA, contrôle de sources (Git), DevOps (CI/CD)...
 - Portage d'applications
 - Facilité pour trouver des compétences
 - Evolutions permanentes
 - Passerelle vers l'IA, l'IOT, les technos Web, l'informatique quantique...

Open Source – Rappels

- Des exemples de ce qui a été délivré :

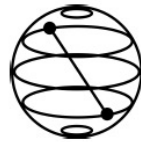
- Language Runtimes



- Tools



- Frameworks



Open Source – Rappels

- Des exemples de ce qui a été délivré :
 - **Bases de données**
 - PostgreSQL, MariaDB, SQLite
 - **Langages**
 - PHP communautaire, Node.js, Python, R, Perl...
 - **Développement et connectivité**
 - Node-RED, GCC, Driver ODBC...
 - **DevOps**
 - Git, Ant, Maven
 - **Echange de données, flux de données**
 - ActiveMQ, Kafka
 - **Editeurs**
 - Orion, sed, nano, vim
 - **Utilitaires**
 - Ansible, cURL, jq, rsync, bash, chroot, cloud-init, updatedb, locate, man, 7zip...
 - **Serveur HTTP**
 - Nginx

Open Source – Connectiv   IBM i

- Il existe plusieurs possibilit  s pour se connecter    l'IBM i :



ODBC

Now available for IBM i, Mac, Windows, Linux
Language toolkits have built-in support



SSH

New(ish) deliveries from IBM make this easier
Language toolkits have built-in support



REST APIs

Expose with IWS or a variety of open source



Enterprise Messaging

IBM MQ, ActiveMQ, Kafka, etc.



Apache Camel

Java-based framework
Connect IBM i to (almost) anything

Nouveautés Open Source IBM i 2020-2021

IBM i Anywhere
IBM i Everywhere

- 1. Documentation – Installation – Support
- 2. Driver ODBC natif IBM i
- 3. PHP Communautaire
- 4. Bases de données PostgreSQL
- 5. Utilitaires
- 6. Node-RED
- 7. Ansible
- 8. Camel – Kafka
- 9. Conclusion - Next Gen Apps, Cloud, Containers...

IBM i

IBM i Anywhere
IBM i Everywhere

1. Documentation, installation et support

Open Source Technologies

News

Abstract

Open Source Technologies

Content

You are in: [IBM i Technology Updates](#) > Open Source Technologies

Open Source for IBM i

IBM i has a multitude of open source packages available, including Java, PHP, Node.js, OpenSSH, OpenSSL, Ruby, git, and much more! Much of this software is built and delivered with RedHat technology and can be installed and managed with RPMs and the Yum package manager. Formal support for many packages is available from IBM and partners.

For more information, see the related URLs on how to get started, chat with others, or obtain support.

Related Information

[IBM i Open Source Resources](#)

[Getting Started with IBM i RPMs](#)

[Information about obtaining support for open source software](#)

[IBM i Open Source Chat \(requires you to join at link below\)](#)

[IBM i Open Source Chat - Join/Signup](#)

[Open Source Examples Repository \(GitHub\)](#)



Open Source et IBM i – Documentation

IBM i Anywhere
IBM i Everywhere

ibmi-oss-resources

Important resources for anyone interested in open source on IBM i

[View on GitHub](#)



- [Python SQLAlchemy Adapter](#)
- [XMLService](#)
- [ODBC driver](#)
- [PostgreSQL](#)
- [PHP options for IBM i](#)
- [Ruby on IBM i](#)
- [IBM i chroot containers](#)
- [Self-signed TLS certificate validation in IBM i OSS](#)

IBM i Open Source Resources

Important resources for anyone interested in open source on IBM i

Documentation - General

- [IBM i Open Source documentation from IBM](#)
- [Getting Started with IBM i RPMs](#)

Documentation - Specific

- [Node.js toolkit](#)
- [Node.js odbc module](#)
- [Node.js idb-connector module](#)
- [Node.js idb-pconnector module](#)
- [Loopback \(Node.js API framework\) connector](#)
- [Python toolkit](#)

Support

- [Open Source Support for IBM i](#)

Examples

- [IBM i Open Source Examples](#)

Community

- [IBM i Open Source Chat on Ryver](#) (must first join at [this link](#))
- [IBM i Community Slack](#)
- [IBM Community pages for IBM i](#)
- [IBMiOSS LinkedIn group](#)
- [#IBMiOSS hashtag on Twitter](#)

Blogs

- [Kevin Adler's Blog](#)
- [Seiden Group Blog](#)
- [FAQ400 Blog](#)
- [Anand Khekale's Technical Musings](#)

Videos

- [JORI + IBM i: Designing digital transformation](#)
- [FormaServ video library](#)
- [The Bearded Geek on IBM i - Youtube Channel](#)

Open Source et IBM i – Documentation

IBM i Anywhere
IBM i Everywhere

IBM i Customer Stories

- [IBM i Customer Stories page](#)

Individual customer stories

Company (link)	Synopsis
SAIB	Using Node.js to integrate with Amazon Alexa
Genetco	Updating their ERP system and implementing new GUI interfaces
Trans Am Piping Products	Using PHP to redesign their website and increase productivity
Magid	Transforming green screen UIs to PHP
JDS Industries	Several digital transformation projects us PHP, including mobile and Google Maps integration
Hatco Corporation	Using PHP for web presence, and git for source control
Stonetales Properties	Using Node.js to build new solutions when acquiring another company
FormaServ Systems	Using Node.js to enable and streamline digital tax filing in the UK
RPC Superfos	Using open source languages such as Python and Node.js for frontend user interface modernization

King III Solutions	Using PHP in a loosely-coupled fashion to modernize and build new solutions
H/T Bendix	Using Node.js for web presence and product catalog
ORIS	Using Drupal and other open source technologies to create an online portal for rental properties
Norwegian Air Ambulance Foundation	Using open source to digitally transform air ambulance operations
Sunstate	Using PHP to digitize and streamline parts procurement
Mutual Distributing Company	Leveraging multiple languages, including RPG, Node.js, Ruby, Python and PHP, to enable web presence and mobile integration

Case Studies

Company (link)	Synopsis	Quote
CRAS	Deployed Node-RED to integrate with PLC IoT devices	<i>“The ability to run the latest open source software alongside unmodified code from the 1980s is surely unheard of on any other platform, and this offers huge value to our</i>

Open Source et IBM i – *Installation*

IBM i Anywhere
IBM i Everywhere

The screenshot shows the IBM i Access Client Solutions application window. The title bar reads "IBM i Access Client Solutions". The main header area contains the text "IBM i Access Client Solutions" and the IBM logo. Below the header is a menu bar with "Fichier", "Edition", "Actions", "Outils", and "Aide". The "Outils" menu is open, displaying a list of options: "Génération de journaux de maintenance", "Compression des journaux de maintenance", "Réinitialisation pour maintenance", "Associations de fichier...", "Gestion des clés", "Demandes Navigator", "Gestion de modules open source" (highlighted with a red box), and "Répertoire de maintenance". On the left side of the interface, there is a sidebar with a tree view containing "Bienvenue", "Système : 9.128.137.19", "Général" (expanded), and "Base de données". The "Général" section includes "Transfert de données", "Emulateur 5250", "Système de fichiers", "Navigator for i", and "Sortie imprimante". The main content area on the right displays a "Bienvenue dans IBM i Access Client Solutions" message, followed by introductory text about the application's non-tributary interface and navigation instructions.

Open Source et IBM i – Installation

IBM i Anywhere
IBM i Everywhere

Gestion de modules open source

Fichier Affichage Connexion Utilitaires

Connexion : bourgeois@9.128.137.198:/

Modules installés Mises à jour disponibles Modules disponibles

Module	Version	Référentiel
bash	4.4-7	@ibm
ca-certificates	2_git20170807.10b2785-2	@ibm
ca-certificates-mozilla	2019.2.32-0	@ibm/7.2
chsh	1.0.1-1	@ibm/7.2
cloud-init	1.3-1	@ibm
coreutils-gnu	8.25-5	@ibm/7.2
coreutils-pase-dummy	7.2-0	@ibm/7.2
curl	7.70.0-3	@ibm
file-magic	5.32-6	@ibm/7.2
libarchive13	3.3.3-1	@ibm/7.2
libbz2-1	1.0.6-15	@ibm/7.2
libcurl4	7.70.0-3	@ibm
libdb48	4.8.30-3	@ibm/7.2
libexpat1	2.2.9-1	@ibm/7.2
libffi6	3.2.1-2	@ibm/7.2
libgcc-aix	6.3.0-25	@ibm/7.2
libgcc_s1	6.3.0-25	@ibm/7.2
libglib-2_0-0	2.52.0-4	@ibm/7.2
libiconv2	1.14-4	@ibm/7.2
libintl9	0.19.8-1	@ibm/7.2
liblua5_3	5.3.4-3	@ibm/7.2

Terminé : 60 lignes extraites

Informations Show files Réinstallation Retrait

Gestion de modules open source

Fichier Affichage Connexion Utilitaires

Connexion : bourgeois@9.128.137.198:/

Modules installés **Mises à jour disponibles** Modules disponibles

Module	Version	Référentiel
bash	5.1-1	ibm
coreutils-gnu	8.25-6	ibm
curl	7.76.1-1	ibm
libcurl4	7.76.1-1	ibm
libgcc-aix	6.3.0-29	ibm
libgcc_s1	6.3.0-29	ibm
libopenssl1_1	1.1.1k-1	ibm
libreadline8	8.1-2	ibm
libstdcplusplus6	6.3.0-29	ibm
libutil2	0.10.0-1	ibm
perl	5.24.1-4	ibm
python2-rpm	4.13.1-12	ibm
rpm	4.13.1-12	ibm

Terminé : 13 lignes extraites

Informations Mise à niveau

Gestion de modules open source

Fichier Affichage Connexion Utilitaires

Connexion : bourgeois@9.128.137.198:/

Modules installés Mises à jour disponibles **Modules disponibles**

Module	Version	Référentiel
R	3.6.3-1	ibm
R-devel	3.6.3-1	ibm
activemq	5.15.12-1	ibm
ansible	2.9.10-1	ibm
ant	1.10.5-1	ibm
ant-doc	1.10.5-1	ibm
autoconf	2.69-3	ibm
automake	1.15-3	ibm
autossh	1.4g-0	ibm
bash	5.1-1	ibm
bison	3.0.4-2	ibm
blas-devel	3.8.0-2	ibm
brotil	1.0.9-1	ibm
brotil-devel	1.0.9-1	ibm
bzip2	1.0.6-15	ibm
bzip2-devel	1.0.6-15	ibm
c-ares-devel	1.17.1-1	ibm
c-ares-utils	1.17.1-1	ibm
cairo-devel	1.17.4-2	ibm
cblas-devel	3.8.0-2	ibm
ccache	3.2.7-2	ibm


Terminé : 471 lignes extraites

Informations Installation

Open Source et IBM i – *Support*

- Support compris dans la **SWMA IBM i** :
 - L'installation des packages par YUM ou par ACS
 - Les produits sous licence (5733-DG1 et 5733-SC1)

- Pour les packages **RPM**, deux possibilités :
 - 1. Support **communautaire**, gratuit
 - Suivi d'incidents : <https://github.com/IBM/ibmi-oss-issues/>
 - Chat : <http://ibm.biz/ibmi-oss-chat> (inscription : <http://ibm.biz/ibmi-oss-chat-join>)

 - 2. Support **IBM TSS** (Technology Support Services), facturable
 - <https://www.ibm.com/support/pages/open-source-support-ibm-i> 

■ Support **IBM**

Open Source Support for IBM i

The following products can be supported on IBM i. Please note that this list is updated regularly and might not be exhaustive. For packages not listed here, please discuss with your seller. We may be able to add support or offer a special bid to fit your needs:

- ActiveMQ
- Ansible
- Apache Ant
- Apache Camel
- Apache Commons
- Apache Kafka
- Apache Maven
- Apache Tomcat
- Apigility
- Curl
- Drupal
- Git
- GNU Make
- GNU awk (gawk)
- GNU sed
- Jenkins
- Joomla
- Loopback
- Nginx
- Node.js
- PCRE
- PHP
- Perl
- Python
- R
- Redis
- Rsync
- Spring
- Vim
- Wordpress
- Zookeeper

IBM i

IBM i Anywhere
IBM i Everywhere

2. Driver ODBC natif IBM i

Le driver ODBC natif IBM i

- Le driver ODBC est disponible sous 4 OS :
 - Windows
 - Linux
 - Mac OS
 - **IBM i**
- **Pourquoi** un driver ODBC natif IBM i ?
 - Pour pouvoir utiliser les libraries ODBC standard à partir de différents langages (PHP, Python, Node.js, Ruby, R...)
 - Pour pouvoir développer des applications sous Windows/Linux et les déployer sous IBM i
- **Comment** récupérer ce driver ODBC natif IBM i ?
 - En téléchargeant le "IBM i PASE ODBC Driver" à partir du site de téléchargement d'ACS

Installation

- Installation du "IBM i PASE ODBC Driver"
 - <https://www.ibm.com/support/pages/ibm-i-access-client-solutions>

IBM i Access - Client Solutions

IBM i Access

Overview Client Solutions Web/Mobile Windows

IBM i Access Client Solutions provides a Java based, platform-indepenc Linux, Mac, and Windows™. IBM i Access Client Solutions consolidates t location. The latest version of IBM i Access Client Solutions is available

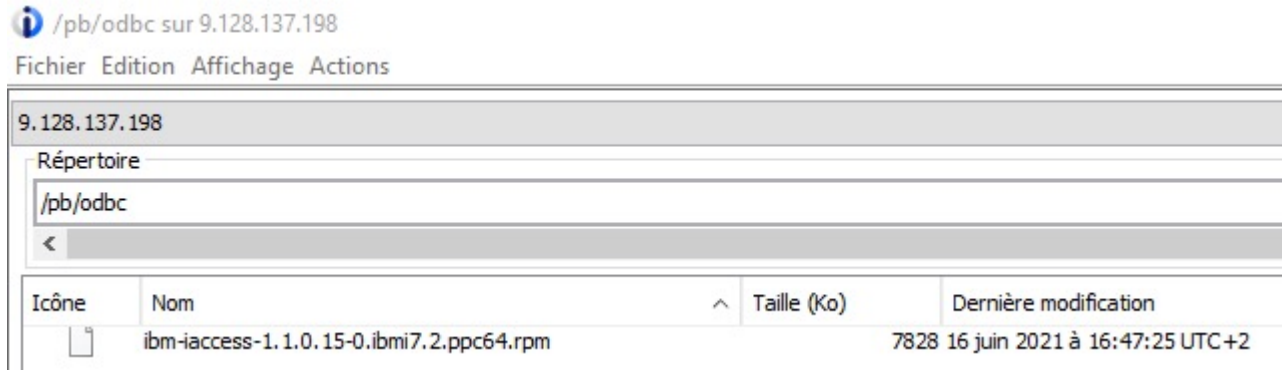
→ Downloads for IBM i Access Client Solutions

→ QuickStartGuide

→ GettingStarted

Description	Filename	Size	Action
IBM i Access Client Solutions (1.1.8.7)	IBMiAccess_v1r1.zip	141195249 B	Download ↓
Readme file for 5733-XJ1	Readme.txt	5 KB	Download ↓
Quick Start Guide	QuickStartGuide_en.html	11 KB	Download ↓
Getting Started	GettingStarted_en.html	122 KB	Download ↓
ACS EHELLAPI - Version 8.21.102	acshellapi.exe	986935 B	Download ↓
ACS Windows App Pkg English (64bit)	IBMiAccess_v1r1_WindowsAP_English.zip	53686358 B	Download ↓
ACS Linux App Pkg	IBMiAccess_v1r1_LinuxAP.zip	20147169 B	Download ↓
ACS PASE App Pkg	IBMiAccess_v1r1_PASE_AP.zip	8314619 B	Download ↓
ACS Mac App Pkg	IBMiAccess_v1r1_macOS_AP.zip	3791359 B	Download ↓

- Installation du "IBM i PASE ODBC Driver"
 - Dézipper le fichier résultat du Download (IBMiAccess_v1r1_PASE_AP.zip) et copier le fichier **ibm-iaccess-1.1.0.xx-0.ibm7.2.ppc64.rpm** dans un répertoire de votre choix dans l'IFS



Installation

- Installation du "IBM i PASE ODBC Driver"

```
> yum install /pb/odbc/ibm-iaccess-1.1.0.15-0.ibm7.2.ppc64.rpm
Configuration du processus d'installation
Examen de /pb/odbc/ibm-iaccess-1.1.0.15-0.ibm7.2.ppc64.rpm : ibm-iaccess-1.1
.0.15-0.ppc64
Sélection de /pb/odbc/ibm-iaccess-1.1.0.15-0.ibm7.2.ppc64.rpm pour installat
ion
Résolution des dépendances
```

...

```
Installé :
  ibm-iaccess.ppc64 0:1.1.0.15-0

Terminé !
$
```

Modules installés	Mises à jour disponibles	Modules disponibles
Module	Version	Référentiel
curl	7.70.0-3	@ibm
file-magic	5.32-6	@ibm/7.2
grep-gnu	3.0-2	@ibm
ibm-iaccess	1.1.0.15-0	@/ibm-iaccess-1.1.0.15-0.ibm7.2.ppc64
libarchive13	3.3.3-1	@ibm/7.2
libbz2-1	1.0.6-15	@ibm/7.2
libcurl4	7.70.0-3	@ibm

■ Installation du "IBM i PASE ODBC Driver"

- Fichier `odbc.ini` fourni par défaut (dans `/QOpenSys/etc`) :

```
> cd /qopensys/etc
$
> cat odbc.ini

### IBM provided DSN - do not remove this line ###
[*LOCAL]
Description = Default IBM i local database
Driver      = IBM i Access ODBC Driver
System     = localhost
UserID     = *CURRENT
### Start of DSN customization
### End of DSN customization
### IBM provided DSN - do not remove this line ###
$
```

On peut indiquer le nom ou l'@IP
d'une base de données distante

PTFs nécessaires pour utiliser `*CURRENT`
comme profil sans mot de passe :

- 7.2 : SI69058
- 7.3 : SI68113
- 7.4 : aucune

- Documentation : <https://github.com/IBM/ibmi-oss-examples/blob/master/odbc/odbc.md>

Test

```
> isql *LOCAL
```

```
+-----+  
| Connected! |
```

```
SQL>
```

```
> select * from video.films
```

CODFILM	CODREA	TITRE	GENRE	DUREE	ANNEE
1	12	MEILLEUR (LE)	O	129	1984
29	10	POURSUITE IMPITOYABLE (LA)	D	135	1965
37	6	RIDEAU DECHIRE (LE)	P	125	1966
64	2	HOMMES DU PRESIDENT (LES)	H	126	1976

IBM i

IBM i Anywhere
IBM i Everywhere

3. PHP Communautaire

PHP communautaire versus PHP avec Zend Server

- *Zend Server **Basic** Edition* n'est plus livré avec l'IBM i depuis le 30/06/2020
- *Zend Server **Basic** Edition* ne sera plus édité par Perforce (anciennement Zend) à partir du 30/06/2021
- A aujourd'hui pour faire du PHP sous IBM i, il existe 2 solutions :
 - 1. Zend Server dans les éditions **Professional** ou **Enterprise**



PERFORCE

COMPARISON CHART

Zend Server for IBM i Editions

PRODUCTION EDITION DETAILED FEATURE COMPARISON

- 2. PHP communautaire

Features

	Basic For getting started with PHP on IBM i	Professional For running business critical applications	Enterprise For running mission critical, enterprise applications
Support and Security Fixes			
Support via...	Web Tickets	Phone	Phone (24x7x365)
PI Response Time	2 Business Days	6 Business Hours	2 Hours
Security Hot Fixes	✗	✓	✓
PHP, ZF 1 & 2 & Apigility Support	✗	✓	✓
Long-Term Support (LTS)	✗	✓	✓
Customer Requested Fixes for PHP, ZF 1 & 2 & Apigility	✗	✗	✓

Le PHP communautaire sous IBM i

IBM i Anywhere
IBM i Everywhere

- Version gratuite Open Source de PHP
 - Basée sur des RPM
- Installation rapide et facile
 - Par YUM, standard de l'industrie (`yum install php-*`)
 - Ou par IBM ACS (Access Client Solutions)
- Mise à jour facile (`yum update / ACS`)
- Serveur Apache ou Nginx
- Accès à DB2 en ODBC
 - Autres possibilités : connecteurs *ibm_db2*, *pdo_ibm* avec la distribution CommunityPlus+ PHP
- Support
 - Gratuit, communautaire
 - Facturable, par IBM TSS : <http://ibm.biz/ibmi-oss-support>
 - Facturable avec la distribution CommunityPlus+ PHP : <https://cfd-innovation.fr/php/community-plus-php/>

Installation des modules PHP

IBM i Anywhere
IBM i Everywhere

Gestion de modules open source

Fichier Affichage Connexion Utilitaires

Connexion : bourgeois@9.128.137.198:/

Modules installés Mises à jour disponibles **Modules disponibles**

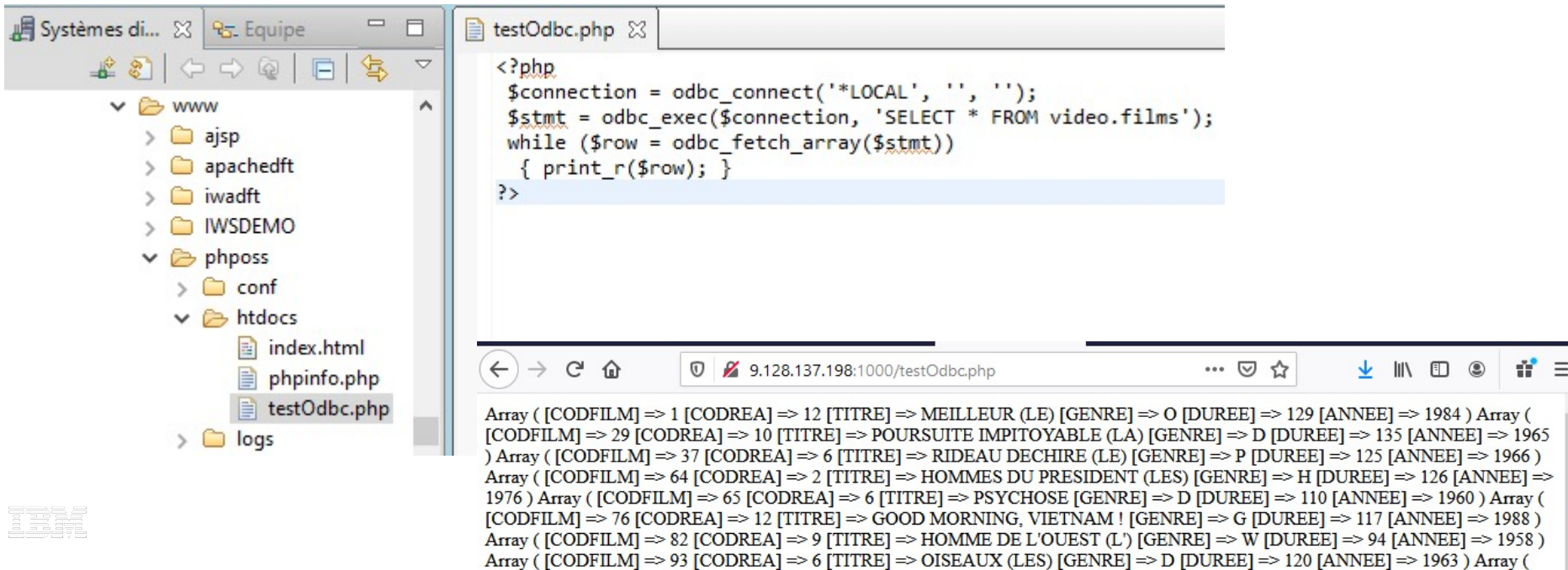
Module	Version	Référentiel
perl	5.24.1-4	ibm
perl-devel	5.24.1-4	ibm
php-bcmath	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-bz2	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-calendar	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-cli	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-common	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-ctype	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-curl	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-devel	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-exif	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-fileinfo	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-fpm	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-ftp	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-gd	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-gettext	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-iconv	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-mbstring	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-mysqli	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-odbc	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-opcache	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-openssl	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-pdo	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-phar	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-process	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-soap	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-sockets	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-sodium	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-sqlite3	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-tokenizer	7.3.13-0	repos.zend.com_ibmiphp_ppc64
php-xml	7.3.13-0	repos.zend.com_ibmiphp_ppc64
pigz	2.4-1	ibm

Terminé : 496 lignes extraites

Informations **Installation**



Test d'un script PHP avec accès DB2 en ODBC



The screenshot shows a web browser window displaying the output of a PHP script named `testOdbc.php`. The script connects to a local ODBC data source and queries a table named `video.films`. The output shows a list of film records with fields like `CODFILM`, `CODREA`, `TITRE`, `GENRE`, `DUREE`, and `ANNEE`.

```
<?php
$connection = odbc_connect('*LOCAL', '', '');
$stmt = odbc_exec($connection, 'SELECT * FROM video.films');
while ($row = odbc_fetch_array($stmt))
{ print_r($row); }
?>
```

Array ([CODFILM] => 1 [CODREA] => 12 [TITRE] => MEILLEUR (LE) [GENRE] => O [DUREE] => 129 [ANNEE] => 1984) Array ([CODFILM] => 29 [CODREA] => 10 [TITRE] => POURSUITE IMPITOYABLE (LA) [GENRE] => D [DUREE] => 135 [ANNEE] => 1965) Array ([CODFILM] => 37 [CODREA] => 6 [TITRE] => RIDEAU DECHIRE (LE) [GENRE] => P [DUREE] => 125 [ANNEE] => 1966) Array ([CODFILM] => 64 [CODREA] => 2 [TITRE] => HOMMES DU PRESIDENT (LES) [GENRE] => H [DUREE] => 126 [ANNEE] => 1976) Array ([CODFILM] => 65 [CODREA] => 6 [TITRE] => PSYCHOSE [GENRE] => D [DUREE] => 110 [ANNEE] => 1960) Array ([CODFILM] => 76 [CODREA] => 12 [TITRE] => GOOD MORNING, VIETNAM ! [GENRE] => G [DUREE] => 117 [ANNEE] => 1988) Array ([CODFILM] => 82 [CODREA] => 9 [TITRE] => HOMME DE L'OUEST (L') [GENRE] => W [DUREE] => 94 [ANNEE] => 1958) Array ([CODFILM] => 93 [CODREA] => 6 [TITRE] => OISEAUX (LES) [GENRE] => D [DUREE] => 120 [ANNEE] => 1963) Array (

4. Base de données PostgreSQL

Qu'est-ce que PostgreSQL ?

- Base de données **relationnelle** Open Source très largement utilisée
- Accessible à partir des langages Java, PHP, Python, Node.js, Ruby, R, Perl...
- Interfaces
 - psql : mode commande
 - phpPgAdmin : interface graphique Web développée en PHP



Installation

Gestion de modules open source

Fichier Affichage Connexion Utilitaires

Connexion : bourgeois@9.128.137.198:/

Modules installés Mises à jour disponibles **Modules disponibles**

Module	Version	Référentiel
pkg-conng	0.29.2-2	ibm
popt-devel	1.16-2	ibm
postgresql	12.2-2	ibm
postgresql-contrib	12.2-2	ibm
postgresql-devel	12.2-2	ibm
postgresql-docs	12.2-2	ibm
postgresql-libecpg	12.2-2	ibm
postgresql-libpgtypes	12.2-2	ibm
postgresql-libpq	12.2-2	ibm
postgresql-server	12.2-2	ibm

Informations **Installation**

```
Installed:
postgresql12.ppc64 0:12.2-2      postgresql12-contrib.ppc64 0:12.2-2
postgresql12-devel.ppc64 0:12.2-2 postgresql12-docs.ppc64 0:12.2-2
postgresql12-libecpg.ppc64 0:12.2-2 postgresql12-libpgtypes.ppc64 0:12.2-2
postgresql12-libpq.ppc64 0:12.2-2 postgresql12-server.ppc64 0:12.2-2

Complete!
```

Modules installés Mises à jour disponibles Modules disponibles

Module	Version	Référentiel
prnp-sodium	7.3.13-0	@repos.zend.com_ibmipnp_ppc64
php-sqlite3	7.3.13-0	@repos.zend.com_ibmiphp_ppc64
php-tokenizer	7.3.13-0	@repos.zend.com_ibmiphp_ppc64
php-xml	7.3.13-0	@repos.zend.com_ibmiphp_ppc64
postgresql	12.2-2	@ibm
postgresql-contrib	12.2-2	@ibm
postgresql-devel	12.2-2	@ibm
postgresql-docs	12.2-2	@ibm
postgresql-libecpg	12.2-2	@ibm
postgresql-libpgtypes	12.2-2	@ibm
postgresql-libpq	12.2-2	@ibm
postgresql-server	12.2-2	@ibm



Démarrage

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```
-bash-4.4$ pg_ctl start -D /usr/local/postgres -l logfile  
waiting for server to start.... done  
server started  
-bash-4.4$
```

IBM

IBM i

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IBM i Everywhere

IBM

5. Utilitaires

- Rappel – Principaux utilitaires **déjà existants** :
 - **cURL** : récupération de ressources par URL
 - **rsync** : synchronisation de fichiers
 - **lftp** : transfert de fichiers
 - **updatedb** et **locate** : recherche de fichiers
 - **bash** : shell Unix
 - **chroot** : création de bacs à sable
 - **cloud-init** : clonage d'une VM
 - **textinfo** : génération de documentation
 - **ghostscript** : manipulation de PDF
 - **zip, unzip, gzip** : zippage / dézippage
 - ... et des dizaines d'autres

Utilitaires Open Source sous IBM i

- Principaux **nouveaux** utilitaires :
 - **7ZIP**
 - Zippage / dézippage
 - **MAN**
 - Système d'aide du monde Unix
 - **ANSIBLE**
 - Automatisation des déploiements de systèmes et d'applications

7Zip – Installation

Gestion de modules open source

Fichier Affichage Connexion Utilitaires

Connexion : bourgeois@9.128.137.198:/

Modules installés Mises à jour disponibles **Modules disponibles**

Module	Version	Référentiel
p11-kit-trust	0.23.14-1	ibm
p7zip	16.02-2	ibm
pase-build-tools	1.0.0-2	ibm
pase-libs-dummy	7.2-0	ibm
pase-utf8-locale	7.2-0	ibm

Terminé : 332 lignes extraites

Informations **Installation**

```
Package Installation
Setting up Install Process
Resolving Dependencies
--> Running transaction check
-->> Package p7zip.ppc64 0:16.02-2 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package Arch Version Repository Size
=====
Installing:
p7zip ppc64 16.02-2 ibm 2.5 M

Transaction Summary
=====
Install 1 Package

Total download size: 2.5 M
Installed size: 7.5 M
Is this ok [y/N]: Y
Downloading Packages:
p7zip-16.02-2.ibm17.2.ppc64.rpm | 2.5 MB 00:01
Running Transaction Check
Running Transaction Test
Transaction Test Succeeded
Running Transaction
Installing : p7zip-16.02-2.ppc64 1/1

Installed:
p7zip.ppc64 0:16.02-2

Complete!
```



7Zip – Dans un CL

```
***** Début des données *****  
0001.00      QSH      CMD('/qopensys/pkgs/bin/7z x /pb/test.gz +  
0002.00      -o/pb')  
***** Fin des données *****
```

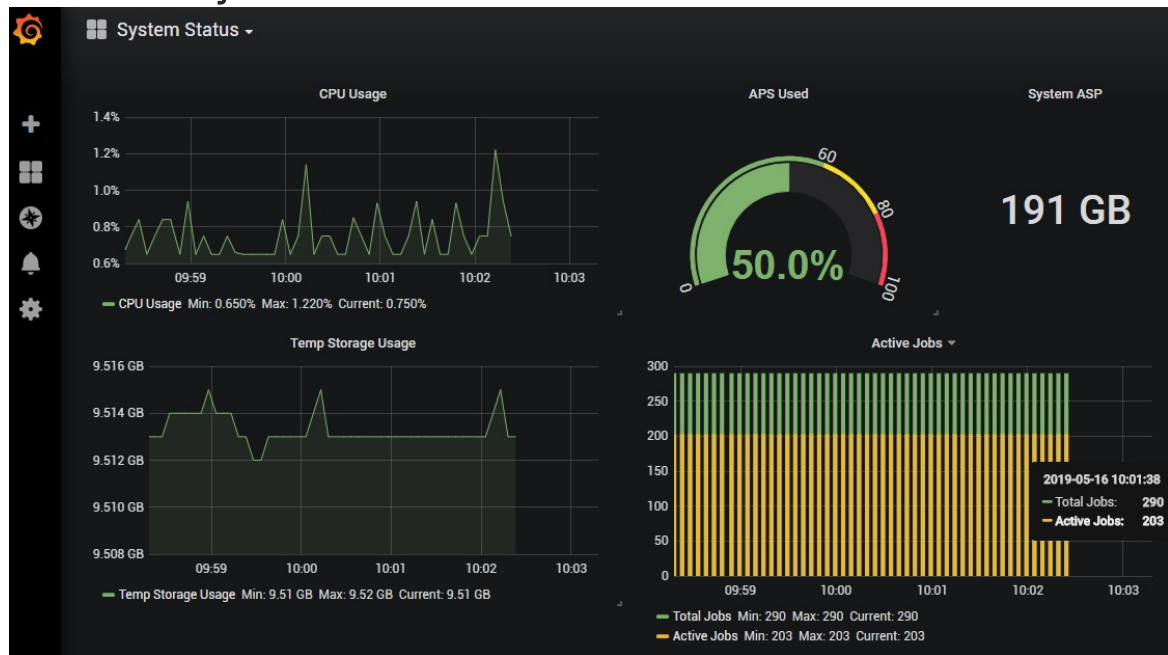
```
call unzip7zip
```

```
Scanning the drive for archives:  
1 file, 325722 bytes (319 KiB)  
  
Extracting archive: /pb/test.gz  
--  
Path = /pb/test.gz  
Type = gzip  
Headers Size = 72  
  
Everything is Ok  
  
Size:          369963  
Compressed: 325722  
Press ENTER to end terminal session.  
  
==> _____
```

```
F3=Exit F4=End of File F6=Print F9=Retrieve F17=Top  
F18=Bottom F19=Left F20=Right F21=User Window
```

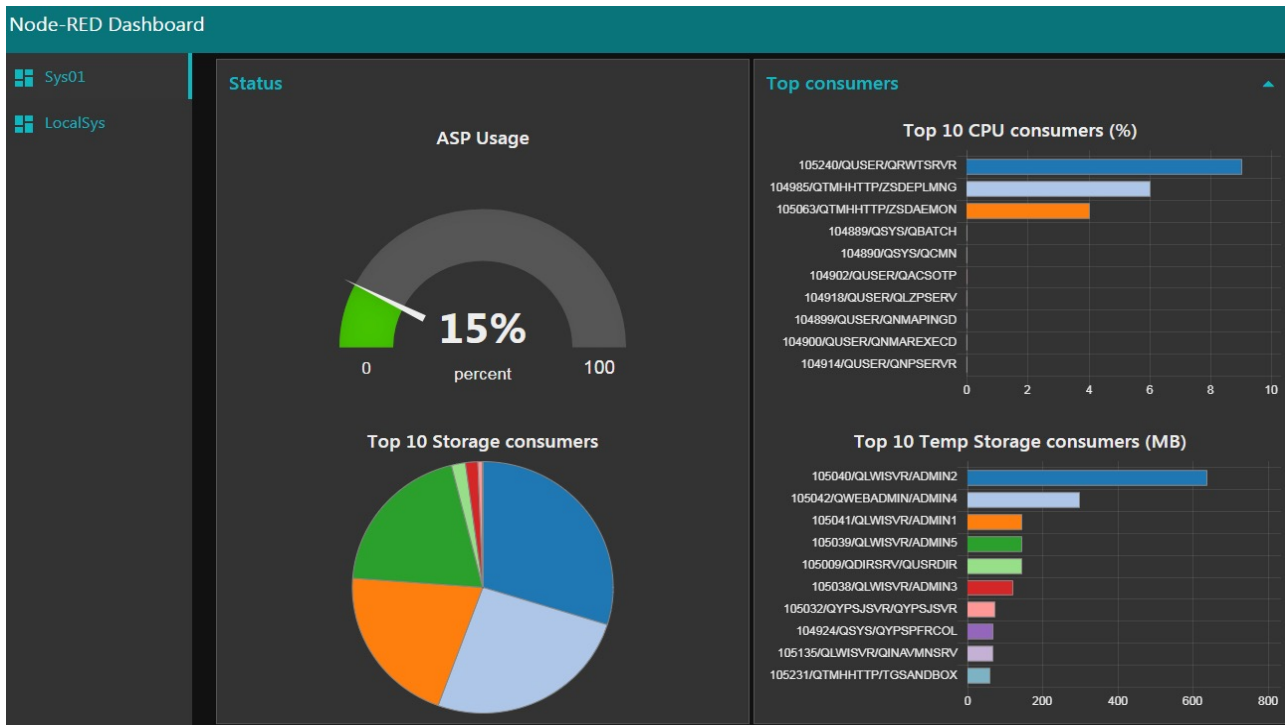
Utilitaires – Exemples IBM i

- Disponibles ici : <https://github.com/IBM/ibmi-oss-examples/>
- Exemple 1 – Node.js + **Grafana**



Utilitaires – Exemples IBM i

- Exemple 2 – Node.js + **Node-RED**



IBM i

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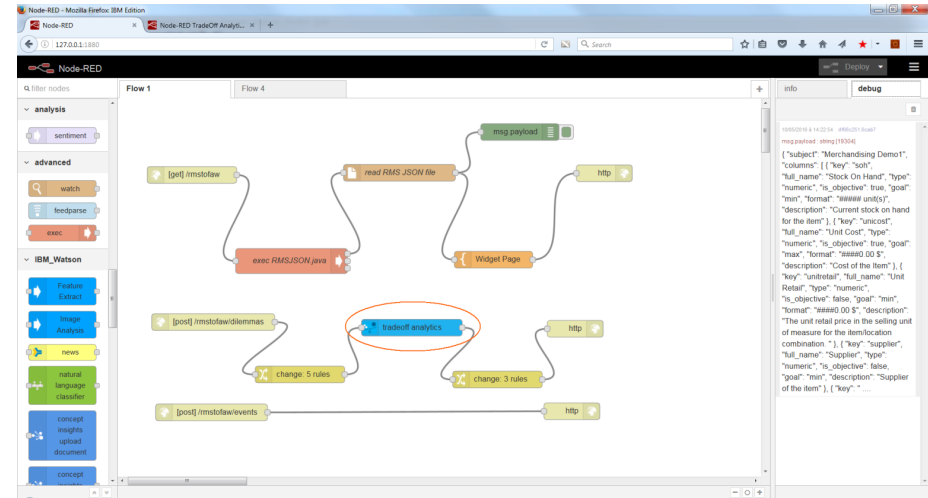
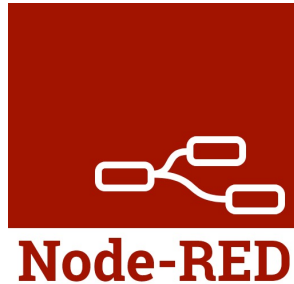
6. Node-RED

Node-RED

<https://nodered.org>

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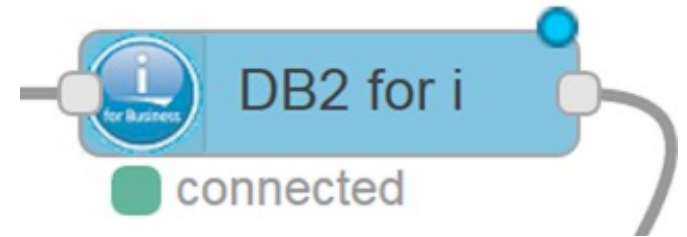
- Node-RED – outil gratuit et open source développé par IBM initialement fait pour l'internet des objets
- Permet de coder graphiquement et rapidement, et de connecter matériels, API, applications ensemble
- Editeur Web - flow editor – contient un grand nombre de nodes dans sa palette évolutive : on trouve tous types de nodes dans un repository en ligne
- Basé sur JavaScript (runtime Nodejs)
- Node-RED est aussi un service IBM Cloud



Node-RED & IBM i

<https://flows.nodered.org/node/node-red-contrib-db2-for-i>

- Noeud [Node-RED](#) pour lire et écrire dans une base de données DB2 for i
- Projet Open Source sur [GitHub](#) créé en juillet 2017
- Téléchargé 10 000 fois
 - `npm install node-red-contrib-db2-for-i`
- DB2 for i native driver : [idb-connector](#)
 - Plan* : odbc mode (portability) , iToolkit node ...
- Utilisé par tous types de solutions (ERP, CRM,...) et développements en Dev/Test et Production

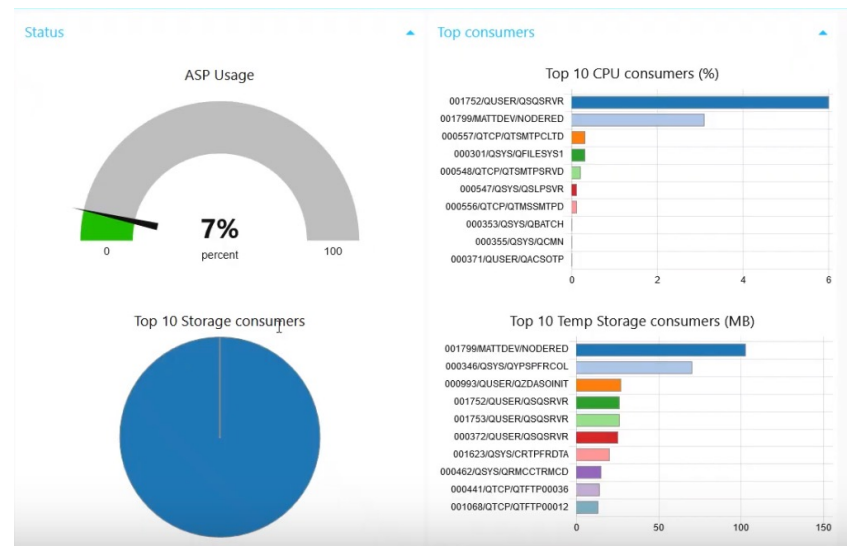
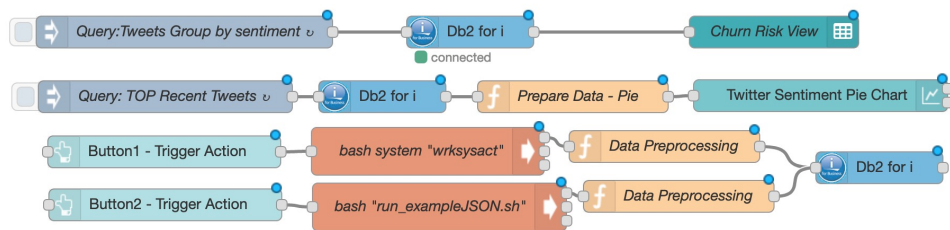


Node-RED & IBM i

Exemple basique

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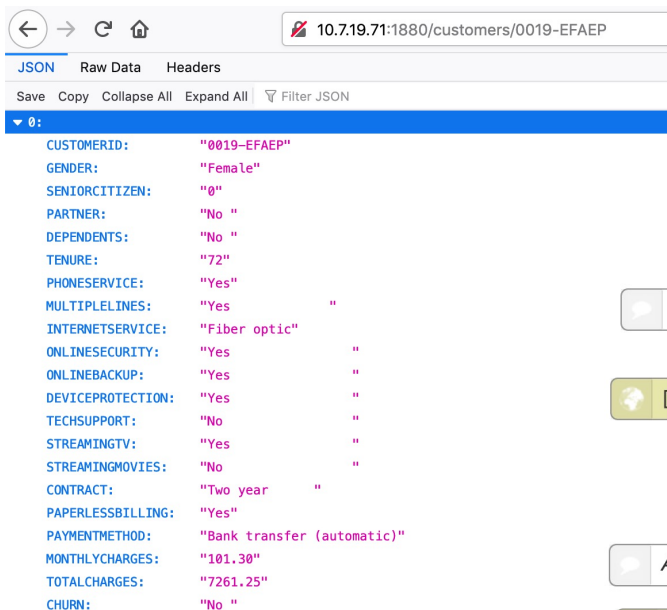
- Requêtes SQL dynamiques
- Utilisation de nodes [node-red-dashboard](#) afin d'afficher les données et des widgets graphiques sur une interface Web (boutons, graphiques, champs texte, etc.)
- Utilisation de node 'exec' afin d'exécuter des commandes CL / shell (PASE -> ILE)



Node-RED & IBM i

Ecrire un Service Web RESTFull en 5 minutes

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10.7.19.71:1880/customers/0019-EFAEP

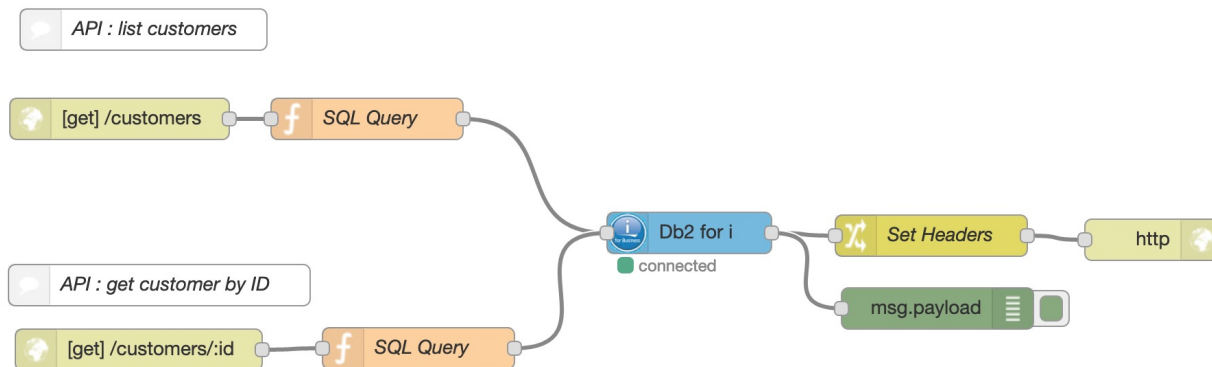
JSON Raw Data Headers

Save Copy Collapse All Expand All Filter JSON

0:

CUSTOMERID:	"0019-EFAEP"
GENDER:	"Female"
SENIORCITIZEN:	"0"
PARTNER:	"No "
DEPENDENTS:	"No "
TENURE:	"72"
PHONESERVICE:	"Yes"
MULTIPLELINES:	"Yes "
INTERNETSERVICE:	"Fiber optic"
ONLINESECURITY:	"Yes "
ONLINEBACKUP:	"Yes "
DEVICEPROTECTION:	"Yes "
TECHSUPPORT:	"No "
STREAMINGTV:	"Yes "
STREAMINGMOVIES:	"No "
CONTRACT:	"Two year "
PAPERLESSBILLING:	"Yes"
PAYMENTMETHOD:	"Bank transfer (automatic)"
MONTHLYCHARGES:	"101.30"
TOTALCHARGES:	"7261.25"
CHURN:	"No "

- Utilisation de nodes "http" pour écouter sur un port et passer les paramètres d'entrée (dans l'URL, ou body...)
- Node "DB2 for i" pour executer les requêtes SQL dynamiques
- Construction de la réponse et réponse HTTP
- Node-RED / Node.js process + DB2 Server job QSQSRVR

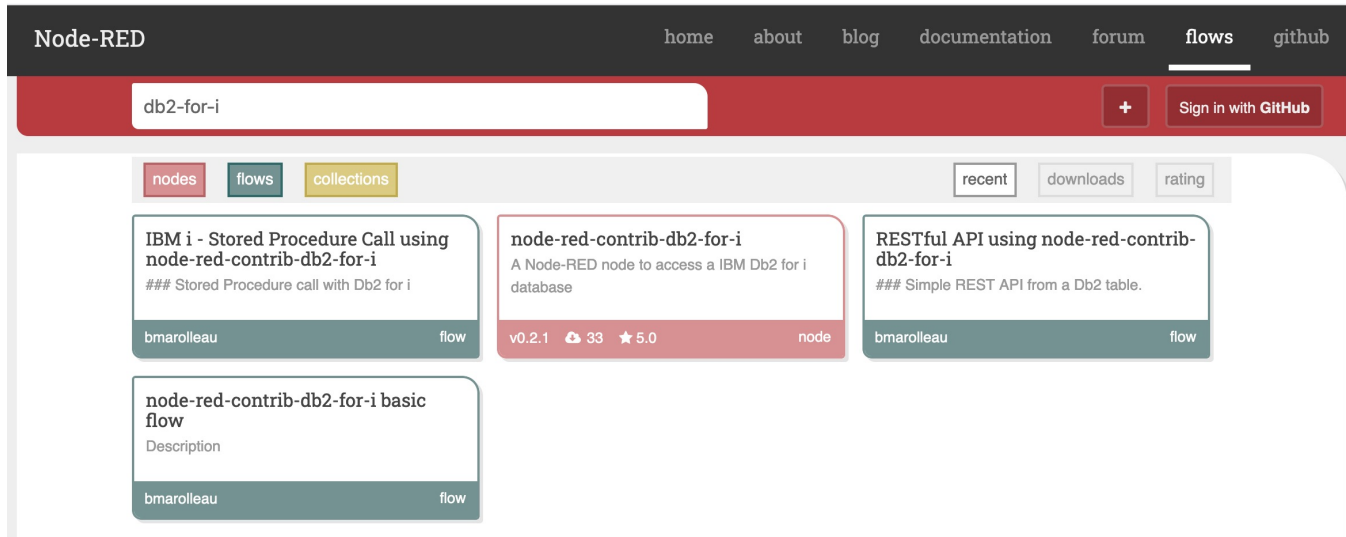


Node-RED & IBM i

Comment démarrer ?

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- <https://github.com/IBM/ibmi-oss-examples/tree/master/nodejs/node-red>
- [Nodered.org](https://nodered.org) (Nodes à installer et Flows à importer)
- Exemples sur IBM Developer : Premier flow avec [Db2 for i](#), [Helpdesk Chatbot](#)



The screenshot shows the Node-RED website interface. At the top, there is a navigation bar with links for 'home', 'about', 'blog', 'documentation', 'forum', 'flows', and 'github'. Below the navigation bar is a search bar containing the text 'db2-for-i'. To the right of the search bar is a '+ Sign in with GitHub' button. Below the search bar, there are three tabs: 'nodes', 'flows', and 'collections'. To the right of these tabs are three buttons: 'recent', 'downloads', and 'rating'. The main content area displays three search results:

- IBM i - Stored Procedure Call using node-red-contrib-db2-for-i**
Stored Procedure call with Db2 for i
bmarolleau flow
- node-red-contrib-db2-for-i**
A Node-RED node to access a IBM Db2 for i database
v0.2.1 33 5.0 node
- RESTful API using node-red-contrib-db2-for-i**
Simple REST API from a Db2 table.
bmarolleau flow

Below these results, there is a fourth result partially visible:

- node-red-contrib-db2-for-i basic flow**
Description
bmarolleau flow

IBM i

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IBM i Everywhere

IBM

7. Ansible

Ansible – Introduction

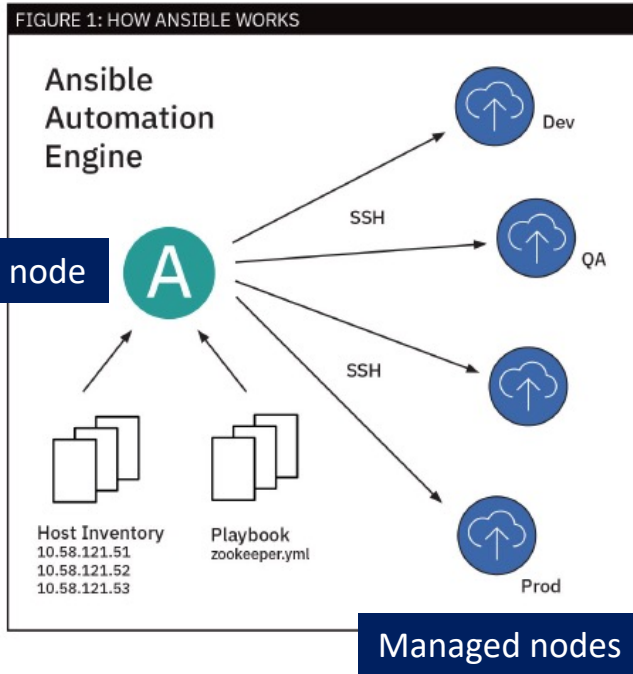
- Ansible est une plateforme d'automatisation qui facilite le déploiement des applications et systèmes
 - C'est une application Open source
 - Agent-less – Pas besoin d'installation et de gestion d'agents
 - Basé sur Python / YAML
 - Grande flexibilité et gestion de la configuration des systèmes
 - Rétablissement de la configuration en cas d'erreur
- Il prend en charge la gestion de la configuration :
 - Configuration des serveurs
 - Déploiement d'applications
 - Intégration continue / Test continu (CI / CD)
 - Provisioning
 - Orchestration
 - Automatisation des tâches





ANSIBLE


Ansible – Terminologie


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



 **Control node** – any machine with Ansible installed and is used to run playbooks

 **Managed node (a.k.a. endpoints)** – endpoint devices (e.g., AIX, IBM i, Linux, Windows, etc.) that are managed with Ansible

 **Inventory** – a list of managed nodes so that Ansible understands the overall IT landscape

 **Modules** – units of code that Ansible executes; [hundreds of modules provided out-of-box](#); thousands of community modules also available

 **Tasks** – units of action in Ansible (invoke a set of modules to do something useful)

 **Playbooks** – ordered list of tasks and written in YAML

Plugins – modules complémentaires aux modules de base (extensions)

Rôles – composants réutilisables et autonomes à intégrer dans les playbooks

Ansible pour IBM i – Cas d'usage

- Tâches d'administration
 - Téléchargement et installation de PTF
 - Déploiement de programmes et d'applications
 - Installation de modules open source
 - Gestion des travaux, de la sécurité
 - Exécution de tâches spécifiques par commandes CL et scripts SQL
- Tâches de développement
 - Intégration continue, automatisation des builds...
 - Déploiement d'un environnement applicatif Dev > Test > QA > Prod
- Tâches Cloud
 - Clonage / provisionnement de VM et déploiement dans le Cloud (public / privé)
- Vérification de conformité de configuration et de sécurité
 - Vérification d'attributs système, de droits, de profils utilisateur...

















Ansible pour IBM i – Quelques exemples de modules

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IBM i Everywhere























<code>ibmi_at</code>	Schedule a batch job on a remote IBMi node.	<code>ibmi_sql_query</code>	Executes a SQL DQL(Data Query Language) statement.
<code>ibmi_cl_command</code>	Executes a CL command.	<code>ibmi_start_subsystem</code>	Start a subsystem.
<code>ibmi_copy</code>	Copy a save file from local to a remote IBMi node.	<code>ibmi_sync</code>	Synchronize a save file from current ibm i node A to another ibm i node B.
<code>ibmi_display_subsystem</code>	Display all currently active subsystems or currently active jobs in a subsystem.	<code>ibmi_synchronize</code>	Synchronize a save file from ibm i node A to another ibm i node B.
<code>ibmi_end_subsystem</code>	End a subsystem.	<code>ibmi_uninstall_product</code>	Delete the objects that make up the licensed program(product).
<code>ibmi_fetch</code>	Fetch objects or a library from a remote IBMi node and store on local.	<code>ibmi_user_and_group</code>	Create, Change and Display a user(or group) profile.
<code>ibmi_install_product_from_savf</code>	Install the the licensed program(product) from a save file.	<code>ibmi_device_vary</code>	Vary on or off target device on a remote IBMi node
<code>ibmi_lib_restore</code>	Restore one library on a remote IBMi node.	<code>ibmi_host_server_service</code>	Manage host server on a remote IBMi node
<code>ibmi_lib_save</code>	Save one library on a remote IBMi node.	<code>ibmi_tcp_server_service</code>	Manage tcp server on a remote IBMi node
<code>ibmi_object_authority</code>	Grant, Revoke and Display the Object Authority.	<code>ibmi_iasp</code>	Control IASP on target IBMi node
<code>ibmi_object_restore</code>	Restore one or more objects on a remote IBMi node.	<code>ibmi_message</code>	Search message on a remote IBMi node
<code>ibmi_object_save</code>	Save one or more objects on a remote IBMi node.	<code>ibmi_fix</code>	Load from save file, apply, remove or query PTF(s).
<code>ibmi_reboot</code>	Reboot IBMi machine.	<code>ibmi_fix_imgclg</code>	Install fixes from virtual image.
<code>ibmi_save_product_to_savf</code>	Save the the licensed program(product) to a save file.	<code>ibmi_job</code>	Returns job information per user request.
<code>ibmi_script</code>	Execute a local cl/sql script file on a remote ibm i node.	<code>ibmi_object_find</code>	Find specific IBM i object(s).
<code>ibmi_script_execute</code>	Execute a cl/sql script file on a remote ibm i node.	<code>ibmi_submit_job</code>	Submit an IBM i job.
<code>ibmi_sql_execute</code>	Executes a SQL non-DQL(Data Query Language) statement.	<code>ibmi_tcp_interface</code>	Manage IBM i tcp interface. You can add, remove, start, end or query a tcp interface.

Ansible pour IBM i – Quelques exemples de playbooks et rôles

Playbooks

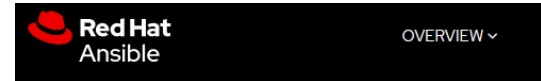
 enable-ansible-for-i	 ibmi-fix-repo-ptf-group.yml
 enable_offline_ibmi	 ibmi-fix-repo-single-ptf.yml
 ibmi-install-nodejs	 ibmi-sql-sample.yml
 hosts_ibmi.ini	 ibmi-sqlite3-sample.yml
 ibmi-check-default-passwords.yml	 ibmi-sysval-sample.yml
 ibmi-cl-command-sample.yml	 query-iasp-sample.yml
 ibmi-fix-group-check.yml	 ssh-addkey.yml
 ibmi-fix-repo-cum-package.yml	
 ibmi-fix-repo-download-status.yml	

Rôles

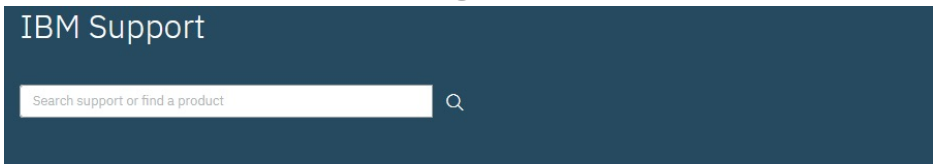
 apply_all_loaded_ptfs	 download_individual_ptfs
 apply_ptf	 fix_repo_check_download_individual_ptfs
 capture_server_via_powervc	 fix_repo_check_ptf_group
 change_server_state_via_powervc	 fix_repo_download_add_ptf_group
 check_ptf	 fix_repo_download_apply_individual_ptfs
 check_ptf_groups_against_fix_repo	 fix_repo_extract_ptf_group_info
 check_ptfs_by_product_against_fix_repo	 load_apply_ptfs
 configure_passwordless_ssh_login	 load_ptf
 deploy_vm_via_powervc	 present_ip_interface
 display_network_info_via_powervc	 sync_apply_individual_ptfs
 display_vm_info_via_powervc	 sync_apply_ptf_group

Ansible pour IBM i – Support

- Modules ansible IBM i installés
 - Sur un serveur Linux x86
 - Support gratuit (communautaire) ou facturable ([Red Hat](#))
 - Sur un serveur IBM i
 - Support gratuit (communautaire) ou facturable ([IBM](#))



CERTIFIED INTEGRATION:
Ansible and IBM Power Systems



Option 2: IBM® TSS (Technology Support Services)

A large percentage of open source issues originates from either a lack of product knowledge or some environmental/setup/configuration issue. IBM® Technology Support Services is structured to aid at any stage of the software development lifecycle. Coverage includes help with usage, diagnostics, configuration, installation, compatibility, and interoperability.

IBM TSS support is a global offering, now available for over 200 open source packages. With this offering, you can get support for open source on multiple operating systems with a single point of contact. The complete Supported Product List (SPL) for the United States is available [here](#). Supported product lists for other regions are available directly through your Business Partner, Account Representative, or TSS Representative. This offering is available for multiple operating systems, so not everything in the complete list (above) can be supported on IBM i. The list below itemizes some of the packages for which you can receive support on IBM i.

Note the following restrictions related to this support offering:

- Support is not available for the obsolete 5733-OPS product
- Support is only available for IBM i releases in standard support. It is not available for releases in extended support.
- Support might not be available for older versions of open source packages no longer supported by the underlying community

The following products can be supported on IBM i (list is updated regularly and might not be exhaustive):

- ActiveMQ

• **Ansible**

Open Source Support for IBM i

Preventive Service Planning

Abstract

This document outlines the options for acquiring open source support on IBM i

Content

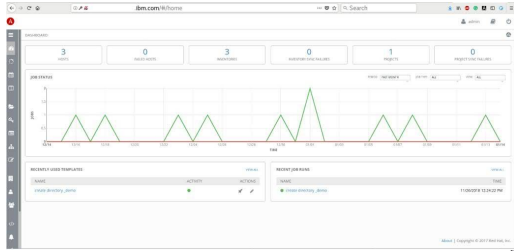
Open Source Support Beyond the Contents of this Document

This document is intended to provide information on obtaining support for open source software delivered by IBM® or third parties in standard formats

Ansible - Gestion des PTFs

Workshop IBM Montpellier / Lab Services

Ops



PTF Repository
SQLite PTF db



Internet/SNDPTFORD

PTF Support Server

Orchestrator

(CloudForms, IBM Cloud Pak, ...)



Ansible Management Node



playbook inventory

[group A]
host 1
[group B]
host 2
host N

ssh

ssh

ssh

ssh

Host 1
(group A)

Host 2
(group B)

Host N
(group B)



openstack.



Anything with an IP address
and Python/ssh installed

Visual Studio Code



Dev

Ansible Tower



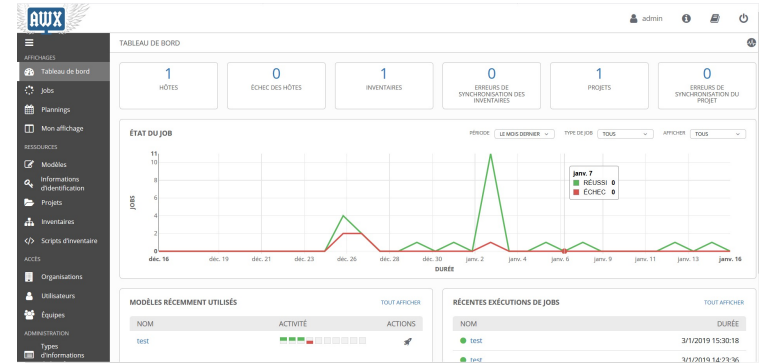
Ansible Tower = Supported Ansible solution for Enterprise

- YOUR ANSIBLE DASHBOARD
- REAL-TIME JOB STATUS UPDATES
- MULTI-PLAYBOOK WORKFLOWS
- WHO RAN WHAT JOB WHEN
- SUPPORT IBM i TASKS

The image displays two screenshots of the Ansible Tower web interface. The top screenshot is the 'DASHBOARD' view, showing a summary of system metrics: 3691 hosts, 83 failed hosts, 3 inventories, 0 inventory sync failures, 3 projects, and 0 project sync failures. Below these metrics is a 'JOB STATUS' line graph showing the number of jobs over time. The bottom screenshot shows the 'RECENTLY USED TEMPLATES' and 'RECENT JOB RUNS' sections. The 'RECENT JOB RUNS' section lists several jobs, including 'Deployment pipeline', 'Rollback deployment', 'Deploy to development', 'Test application', and 'Deploy database'. The bottom screenshot also shows the 'DETAILS' view for a specific job, 'Deploy application', which is in a 'Successful' state. The job details include information about the status, start and finish times, job template, inventory, project, and playbook. The 'PLAYBOOK' section shows the tasks executed, such as 'PLAY [all]', 'TASK [Check required permissions]', 'TASK [Skip permissions if needed]', 'TASK [Deploy updates]', and 'TASK [Restart service]'. The 'PLAY RECAP' at the bottom shows the overall status of the job: 1 ok=3, change=2, unreachable=0, failed=0.

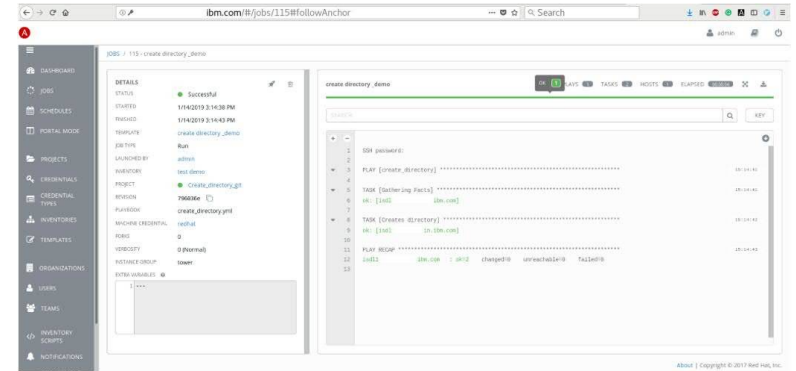
Ansible AWX

<https://github.com/ansible/awx>



Ansible Tower upstream project. Community Support

YOUR ANSIBLE DASHBOARD
REAL-TIME JOB STATUS UPDATES
MULTI-PLAYBOOK WORKFLOWS
WHO RAN WHAT JOB WHEN
SUPPORT IBM i TASKS



<https://developer.ibm.com/technologies/systems/articles/automation-using-ansible-awx-gui/>
<https://www.power-devops.com/post/installing-ansible-awx-on-ibm-aix>

IBM i

IBM i Anywhere
IBM i Everywhere

8. Kafka & Camel

Interopérabilité & Intégration ?

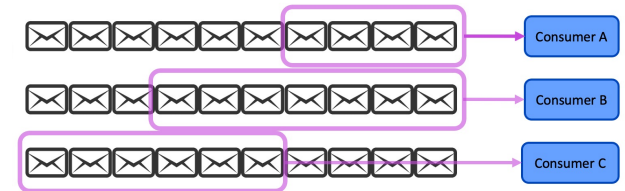
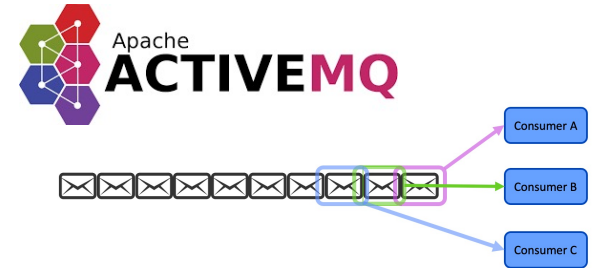
IBM i Anywhere
IBM i Everywhere



ActiveMQ & Kafka

Disponibles sur IBM i, gratuit, Open Source sous licence Apache 2.0

- Apache **ActiveMQ** : implémentation JMS
 - Fédération de systèmes & Intégration asynchrone
 - Message Broker supportant divers protocoles : AMQP, MQTT, etc.
- Apache **Kafka** : high-throughput streaming event engine
 - Conçu par LinkedIn, Scalable++, pour traiter des grands volumes de données
 - S'intègre facilement avec Camel...
 - Streaming = on traite **plusieurs** lots/ séries de données à la fois



Kafka – Architecture

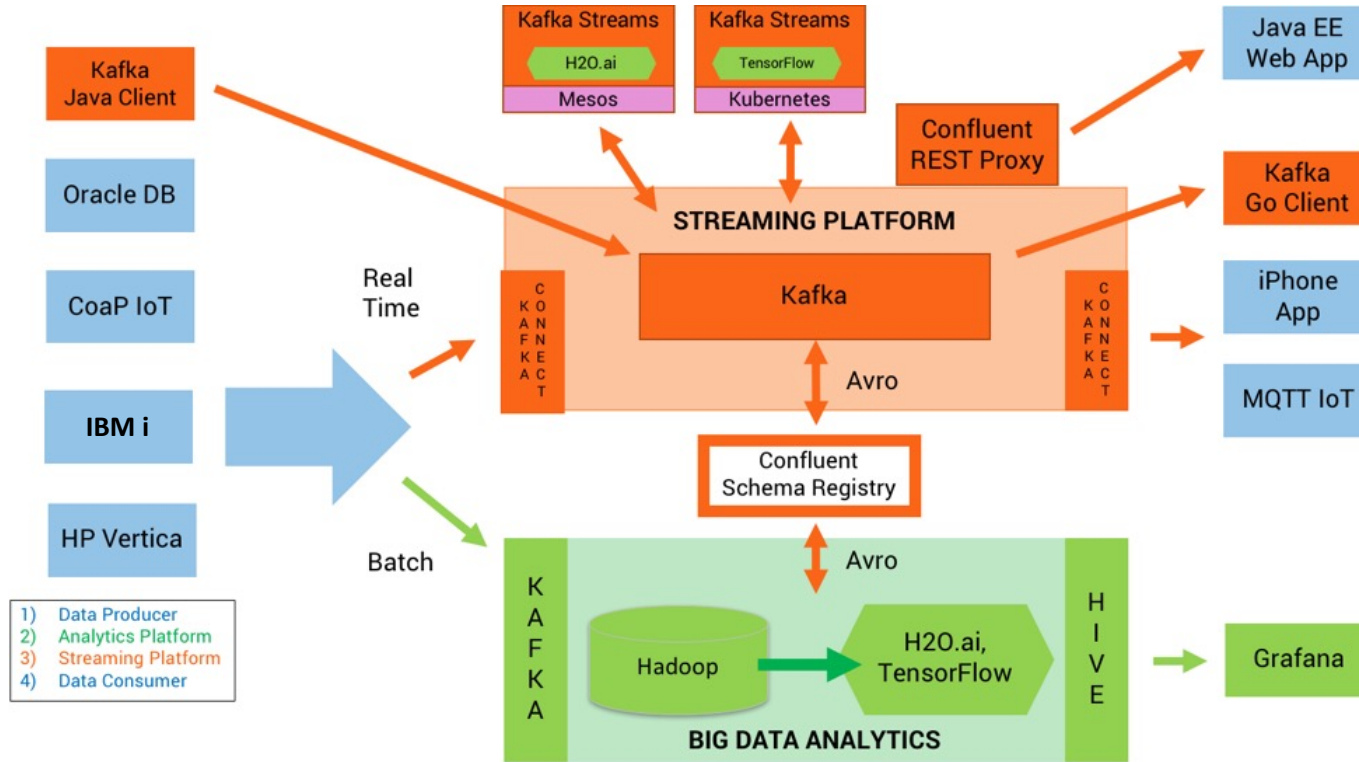


Image source: <https://www.confluent.io/blog/build-deploy-scalable-machine-learning-production-apache-kafka/>

Kafka sur IBM i

Basé sur Java, tout comme Apache Camel

Kafka Client existe aussi en Node.js....

// **Prérequis** : JVM (Openjdk11...)

```
# yum install wget ca-certificates-mozilla  
gzip tar-gnu openjdk-11 coreutils-gnu sed-  
gnu grep-gnu
```

// **Installation du produit (téléchargement)**

```
# wget
```

```
https://apache.osuosl.org/kafka/2.6.0/kafka\_2.13-2.6.0.tgz
```

// **Démarrage Zookeeper** (coordination vs. Brokers & partitions) dans PASE

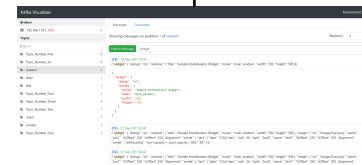
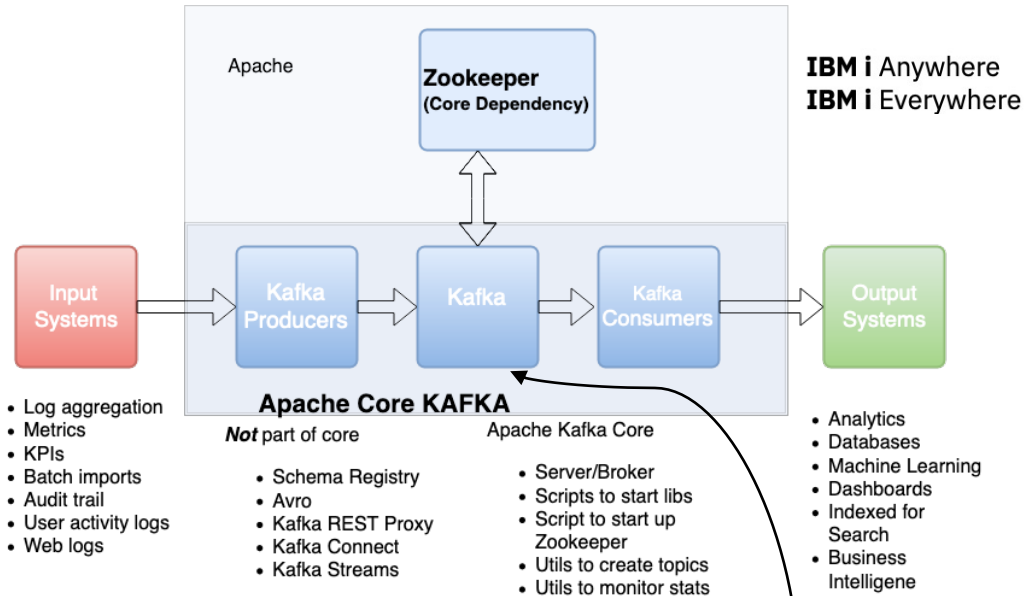
```
# kafka/bin/zookeeper-server-start.sh kafka/config/zookeeper.properties
```

// **Démarrage du serveur** (Broker) dans PASE

```
# kafka/bin/kafka-server-start.sh kafka/config/server.properties
```

// **Test avec un producteur** (ici Application Java) publiant sur un topic "my-topic"

```
# kafka/bin/kafka-console-producer.sh --broker-list localhost:9092 --topic my-topic
```



[Kafka Visualizer](#)
(Graphique)

Kafka, Camel : Service Commander

- Gérer les services IBM i facilement :

```
bash-4.4$ sc check all
RUNNING      | as-database (System *DATABASE Host Server)
NOT RUNNING  | ftp (System FTP server)
NOT RUNNING  | zookeeper (Apache Zookeeper Server using OpenJDK)
NOT RUNNING  | kafka (Apache Kafka bootstrap server)
RUNNING      | as-central (System *CENTRAL Host Server)
RUNNING      | navigator (IBM Navigator for i)
NOT RUNNING  | kafkaviz (Apache Kafka Visualizer)
RUNNING      | gitbucket (GitBucket git web platform)

bash-4.4$ sc start kafka
Performing operation 'START' on service 'kafka'
Attempting to start service dependency 'zookeeper' (Apache Zookeeper Server using OpenJDK)...
Service 'Apache Zookeeper Server using OpenJDK' successfully started
For details, see log file at: /home/JGORZINS/.sc/logs/2021-03-12T13:23:31.093-0500.zookeeper.log
Service 'Apache Kafka bootstrap server' successfully started
For details, see log file at: /home/JGORZINS/.sc/logs/2021-03-12T13:23:31.086-0500.kafka.log
```

- Exemples, code, vidéo :

<https://github.com/ThePrez/ServiceCommander-IBMi>

Qu'est ce que Camel ?

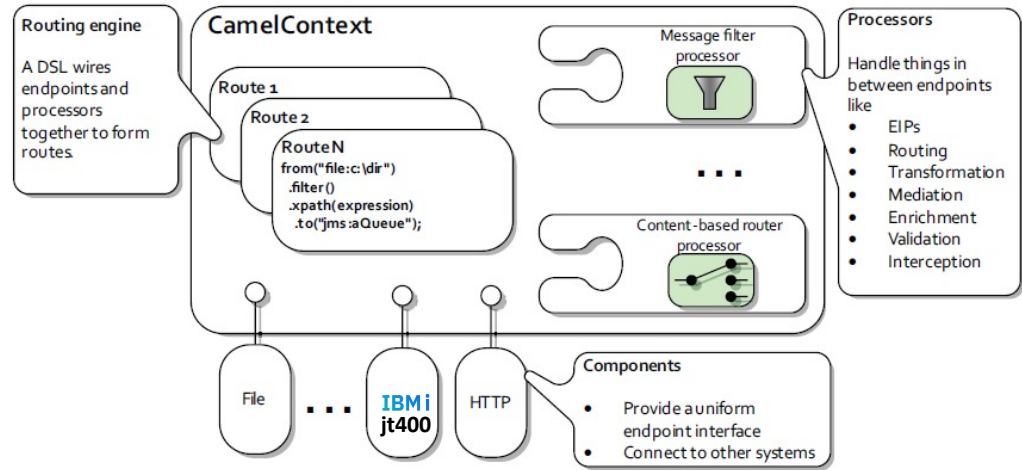
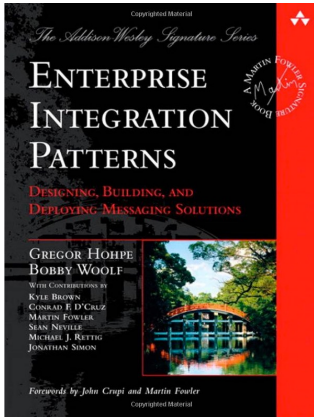
Couteau Suisse de l'intégration, disponible sur IBM i

IBM i Anywhere
IBM i Everywhere

- Projet Open Source Apache fondé sur les "Enterprise Integration Patterns" (EIP)
- Centré autour de 60+ patterns que l'on rencontre dans des projets "Enterprise integration"
- Fournit un langage afin d'implémenter ces patterns (style UNIX pipeline)



APACHE
Camel



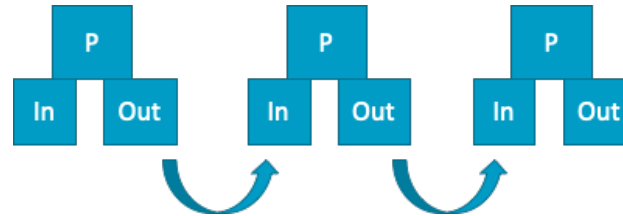
Qu'est ce que Camel ?



APACHE
Camel

IBM i Anywhere
IBM i Everywhere

- Bibliothèques Java → Une application Camel est une application Java
D'autres langages peuvent être utilisés pour décrire des « Expressions »
- Prérequis : JVM sur IBM i (JV1, Openjdk etc.)
- Camel utilise une concaténation répétable et normalisée d'objets "Processor" et de "Messages" groupés dans un ensemble appelé "Exchange"
 - Message "In"
 - "Processor"
 - Message "Out"



- Note : Camel peut être considéré comme un Node-RED en version programmatique Java : simple, beaucoup de connecteurs, passe-plat entre applications

Synergie entre IBM i et Apache Camel

- Documentation : Apache Camel Component
<https://camel.apache.org/components/latest/jt400-component.html>

To send or receive data from a data queue

```
jt400://user:password@system/QSYS.LIB/LIBRARY.LIB/QUEUE.DTAQ[?options]
```

To send or receive messages from a message queue



```
jt400://user:password@system/QSYS.LIB/LIBRARY.LIB/QUEUE.MSGQ[?options]
```

To call remote program

```
jt400://user:password@system/QSYS.LIB/LIBRARY.LIB/program.PGM[?options]
```

You can append query options to the URI in the following format, `?option=value&option=value&...`

PATH PARAMETERS (5 PARAMETERS):

Name	Description
userID	Required Returns the ID of the IBM i user.
password	Required Returns the password of the IBM i user.
systemName	Required Returns the name of the IBM i system.

QUERY PARAMETERS (33 PARAMETERS):

Name	Description
ccsid (common)	Sets the CCSID to use for the connection with the IBM i system.
format (common)	Sets the data format for sending messages. There are 2 enums a binary
guiAvailable (common)	Sets whether IBM i prompting is enabled in the environment run
keyed (common)	Whether to use keyed or non-keyed data queues.
searchKey (common)	Search key for keyed data queues.

Camel

Exemple : Bridge Data Queue vers Kafka

- In, Process, Out – Avec URI spécifiques
- Cas d'usage : stream de transactions DB2 vers Apache Kafka

```
final String dtaqUri = conf.getDtaQUri(); //something like -> jt400://username:password@localhost/qsys.lib/mylib.lib/myq.DTAQ?keyed=false&format=binary&guiAvailable=false
final String kafkaUri = conf.getKafkaUri(); //something like -> kafka:mytopic?brokers=mybroker:9092
context.addRoutes(new RouteBuilder() {
    @Override
    public void configure() {
        from(dtaqUri)
        .wireTap("log:msgq_to_email?showAll=true&level=INFO") // This is just for debugging data flowing through the route
        .to(kafkaUri);
    }
});
```


Améliorations DB2 utiles avec Apache Camel

- Les fonctions SQL de publication JSON renvoient les données d'une façon compréhensible pour les consommateurs Kafka/ActiveMQ

```
SELECT JSON_OBJECT(  
    KEY 'Department' VALUE  
    JSON_ARRAYAGG(JSON_OBJECT(  
        KEY 'Id' VALUE X.DEPTNO,  
        KEY 'Name' VALUE X.DEPTNAME)))  
    AS DEPT_JSON  
FROM TOYSTORE.DEPT X;
```

```
call qsys2.send_data_queue_utf8(  
    message_data      => scottf.dq_json,  
    data_queue        => 'HANDOFF_DQ',  
    data_queue_library => 'BANKONOSS');
```

- Les fonctions SQL de gestion des Data Queue permettent une intégration avec les files d'attente (ainsi qu'Apache Camel) directement depuis la base de données

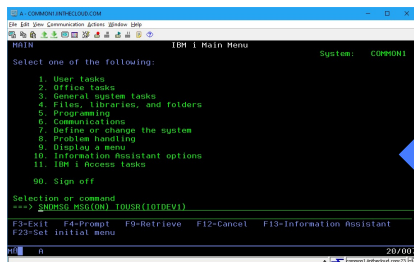
Exemple d'usage

Robustesse & Standardisation

IBM i Anywhere
IBM i Everywhere

IBM i & Internet of Things

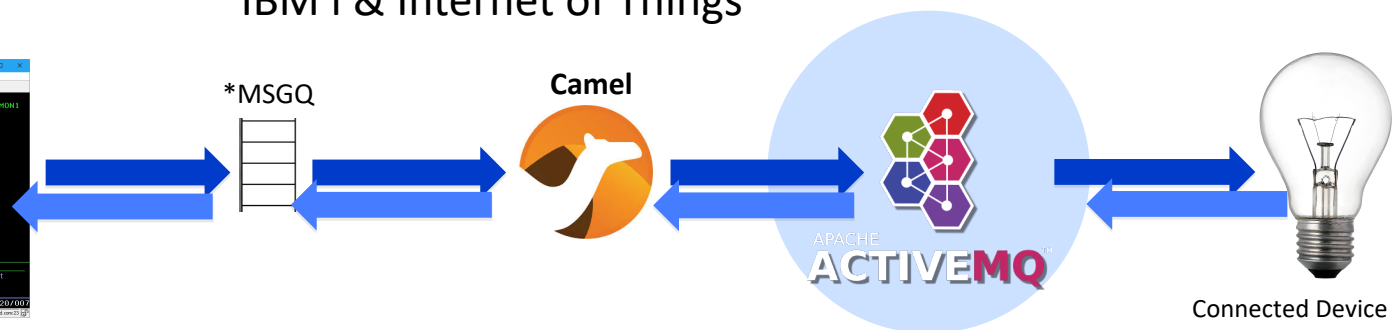
IBM i SNDMSG Command



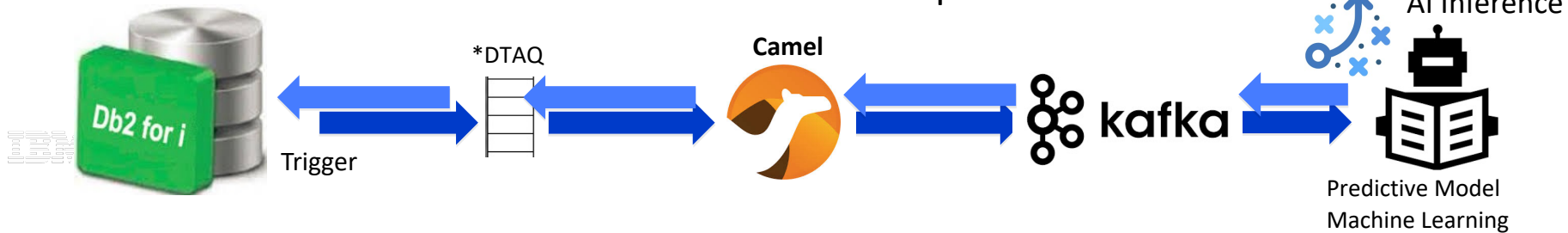
```
IBM i Main Menu
System: COPIONI

Select one of the following:
1. User tasks
2. Office tasks
3. General system tasks
4. Files, libraries, and folders
5. Programming
6. Communications
7. Define or change the system
8. Problem handling
9. Display a menu
10. Information Assistant options
11. IBM i Access tasks
90. Sign off

Selection of command
=>> SNDMSG MSG(0) TRMSB(10TRV1)
F23-Exit F4-Prompt F9-Retrieve F12-Cancel F13-Information Assistant
F23-Set initial menu
```



IBM i & Real time AI predictions



Kafka, Camel, Comment démarrer?

- Exemples "IBM i OSS" <https://github.com/IBM/ibmi-oss-examples/>
 - Dossier « [Camel](#) »
 - Bridge entre data queue & Kafka (Db2->Kafka bridge)
 - Nécessite Kafka
 - Bridge Message queue to email
 - Nécessite un SMTP server
 - Monitoring Disque avec email
 - Nécessite un SMTP server
 - Monitoring Disque avec message queue
 - envoi de messages via message queue *SYSOPR
- Workshop Camel / Kafka en ligne:
 - <https://github.com/ThePrez/FOCUS2020-Workshop/>

Support Open Source par IBM TSS

Exemples IBM i

IBM i Anywhere
IBM i Everywhere

- Git
- Jenkins
- Rsync
- **Ansible**
- **Node.js**
- PHP
- Apache Tomcat
- WordPress
- Python
- R
- **Apache ActiveMQ**
- **Apache Camel**
- **Apache Kafka**
- **Apache Zookeeper**



APACHE
Camel



<http://ibm.biz/ibmi-oss-support>

9. IBM i – Next Gen Apps, Cloud, Containers

IBM Power Community

Connect, learn, share, and engage with the IBM Power Community.

[Steve Will](#)



<https://community.ibm.com/community/user/power/blogs/steven-will1/2021/02/26/you-and-i-ibm-i-and-cloud>

[IBM i Next Gen Apps Presentation \(Oct 2021\)](#)

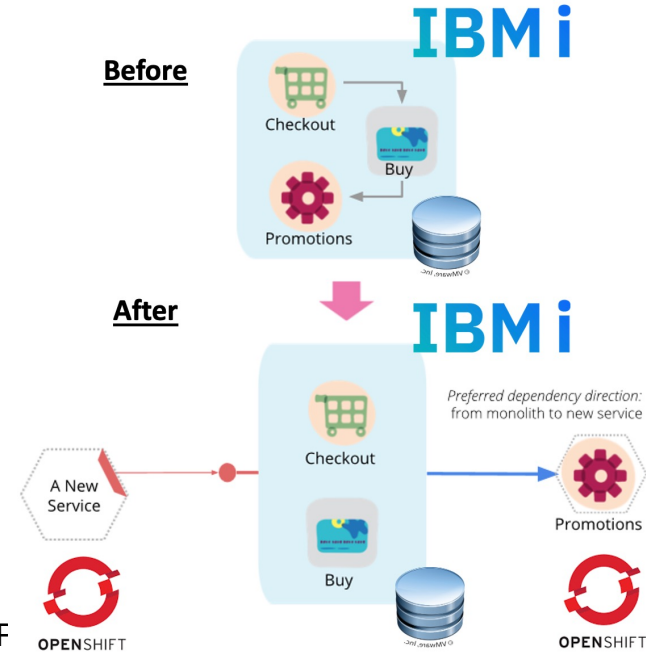
Application Modernization Journey

Extending Traditional Apps with Cloud Native

IBM i Anywhere
IBM i Everywhere

1. Take benefits of DB2 for i & SQL – unrivalled Performance/Security/Reliability
2. Get rid of RPG code from the 90's and use modern IDE's
3. Develop with today's languages
 - RPG Free , Open Source stack on IBM i
4. Expose existing logic with standard protocols & connectors
5. Use POWER9 & Power10 capabilities
 - CoD, Power Private Cloud, IaaS Power Virtual Server on IBM Cloud
6. Explore solutions available on the platform – Open Source
 - IoT , Analytics (Web Query) & AI (ML on IBM i/Db2 for i), DevOps & Automation...
7. Need Cloud Native technologies you don't find (yet) on IBM i ?
 1. Integration with **Red Hat OpenShift Container Platform (OCP)**
 2. Need full support on containerized middleware? IBM Cloud Paks on OCP

Inspiring examples on [IBM i Stories](#)



Application Modernization Journey

Extending Traditional Apps with Cloud Native



Stateless & Distributed Front-end Apps

Unleash: Build new cloud-native solutions

OpenShift : Enterprise Kubernetes for Cloud Native

- ✓ OCP on Power: 2.5 X more container density vs. x86 and Unequaled Reliability
- ✓ IBM Cloud Pak for Apps for easy Re-platforming & DevOps

Stateful & Transactional Apps

IBM i

Unlock: Modernize and leverage existing investments

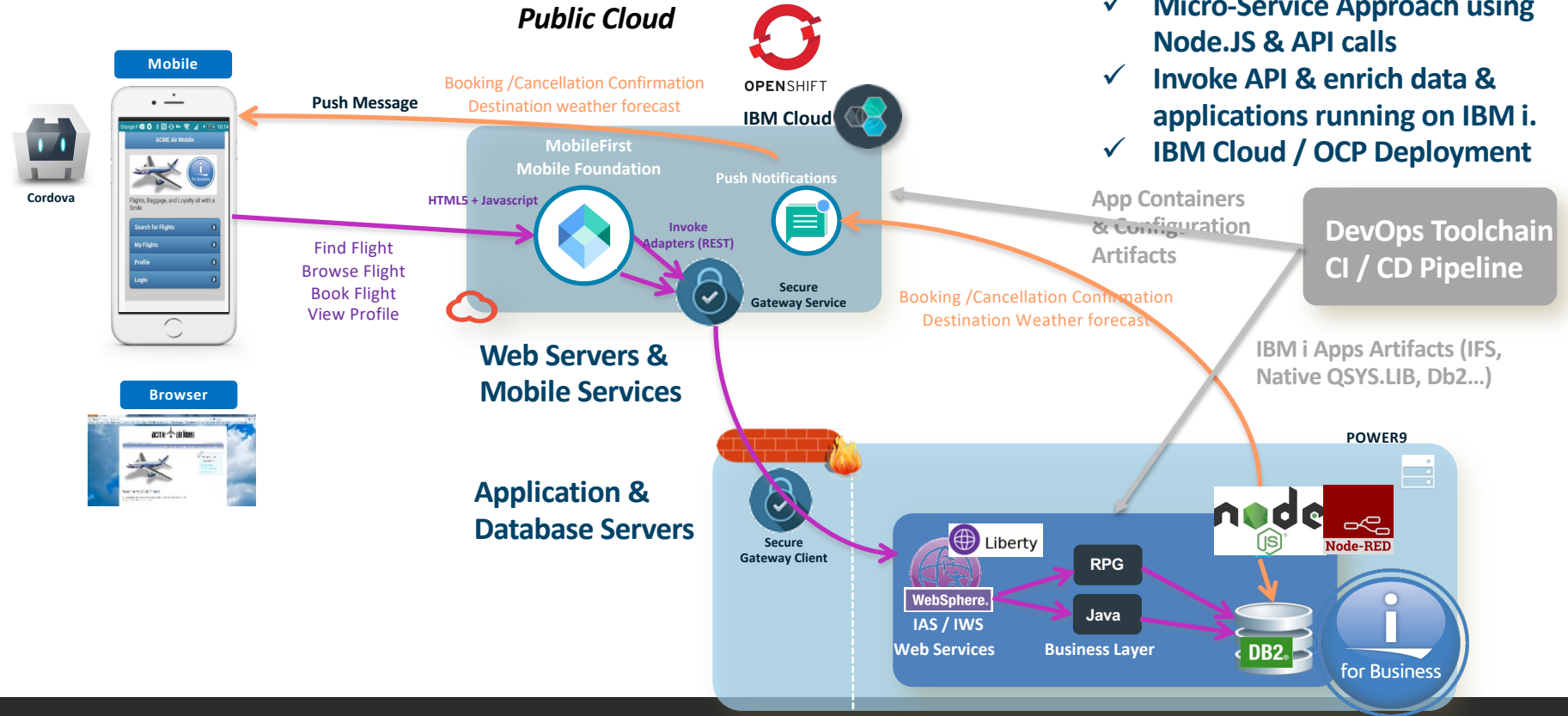
IBM i : Unrivaled Application & Database Server

- ✓ Real time replication w/ **PowerHA**
- ✓ Zero downtime with **Db2 Mirror for i**
- ✓ Maximum Resilience, Security (CVS Reports)
- ✓ Modernize and Expose existing Business Logic (RPG, COBOL, Node.js, Python etc.)



Modernization Examples : Application Modernization on IBM i

Hybrid Application – DevOps & Microservices



- ✓ **Micro-Service Approach using Node.JS & API calls**
- ✓ **Invoke API & enrich data & applications running on IBM i.**
- ✓ **IBM Cloud / OCP Deployment**

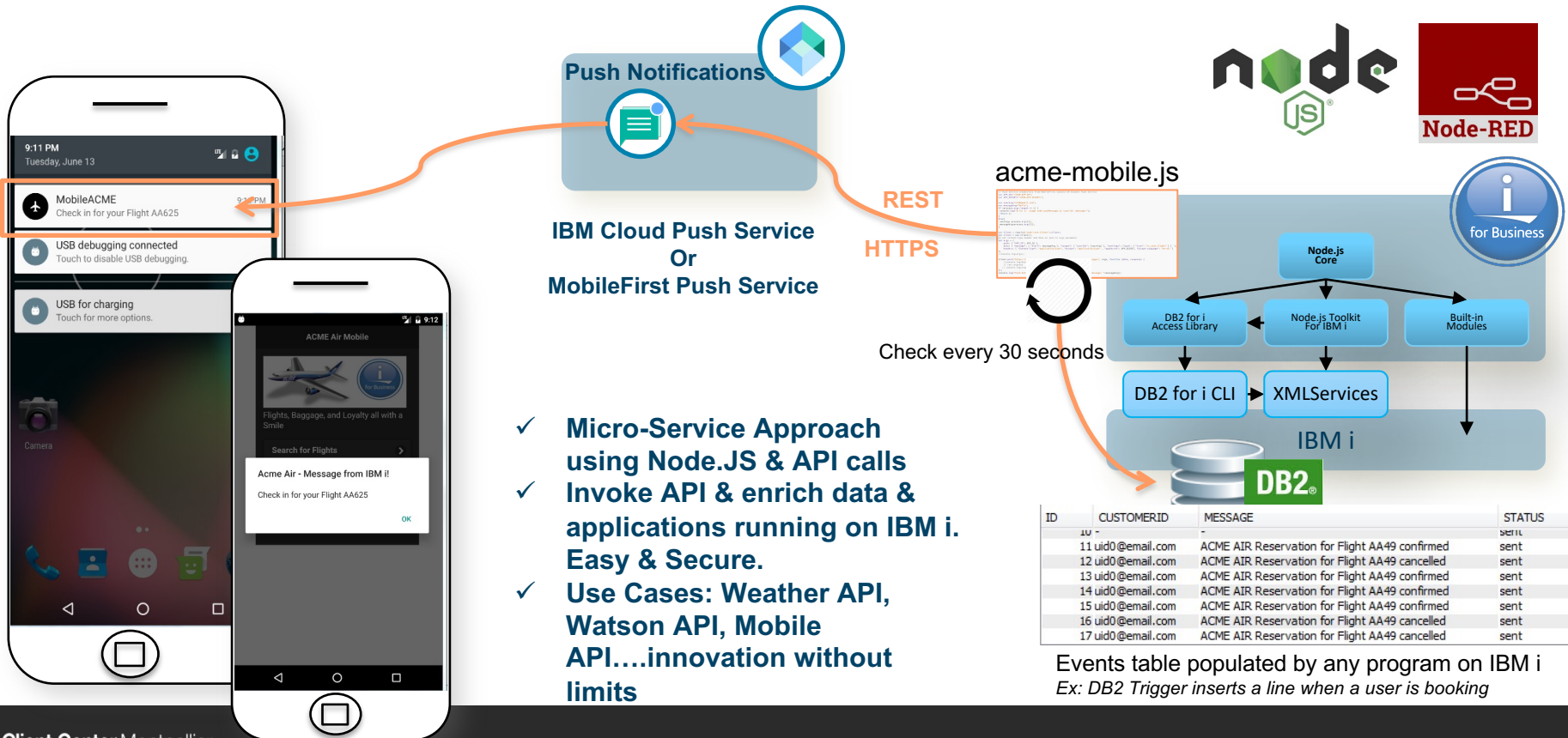
DevOps Toolchain
CI / CD Pipeline

IBM i Apps Artifacts (IFS, Native QSYS.LIB, Db2...)

POWER9

for Business

Interact with ~~Mobile~~ users your Customers from IBM i



- ✓ **Micro-Service Approach using Node.JS & API calls**
- ✓ **Invoke API & enrich data & applications running on IBM i. Easy & Secure.**
- ✓ **Use Cases: Weather API, Watson API, Mobile API....innovation without limits**

ID	CUSTOMERID	MESSAGE	STATUS
10			sent
11	uid0@email.com	ACME AIR Reservation for Flight AA-49 confirmed	sent
12	uid0@email.com	ACME AIR Reservation for Flight AA-49 cancelled	sent
13	uid0@email.com	ACME AIR Reservation for Flight AA-49 confirmed	sent
14	uid0@email.com	ACME AIR Reservation for Flight AA-49 confirmed	sent
15	uid0@email.com	ACME AIR Reservation for Flight AA-49 confirmed	sent
16	uid0@email.com	ACME AIR Reservation for Flight AA-49 cancelled	sent
17	uid0@email.com	ACME AIR Reservation for Flight AA-49 cancelled	sent

Events table populated by any program on IBM i
Ex: DB2 Trigger inserts a line when a user is booking

Interact with ~~Mobile users~~ your Customers from IBM i

Ex: pushMessage.js

- ✓ **20 lines of code can make the difference...pushing customized information to your end-users...**
- ✓ **For ACME Air: booking & cancellation confirmations, destination weather (API) information, sales campaigns (broadcast or to particular users) , etc.**

```
// Push Service Credentials from MobileFirst Console OR Bluemix Push Service
var APP_ID="<YOUR-APP-ID>;
var APP_SECRET="<YOUR-APP-SECRET>;

if (process.argv.length <= 2) {
  console.log("Error 1: Usage node pushMessage.js <userid> <message>");
  return;
}
userArg= process.argv[2];
messageArg=process.argv[3];

var Client = require('node-rest-client').Client;
var client = new Client();
// set content-type header and data as json in args parameter
var args = {
  path: { "APP_ID": APP_ID },
  data: { "message": { "alert": messageArg }, "target": { "userIds": [userArg] }, "settings": { "gcm": { "icon": "ic_stat_flight" } } },
  headers: { "Content-Type": "application/json", "Accept": "application/json", "appSecret": APP_SECRET, "Accept-Language": "en-US" };
};

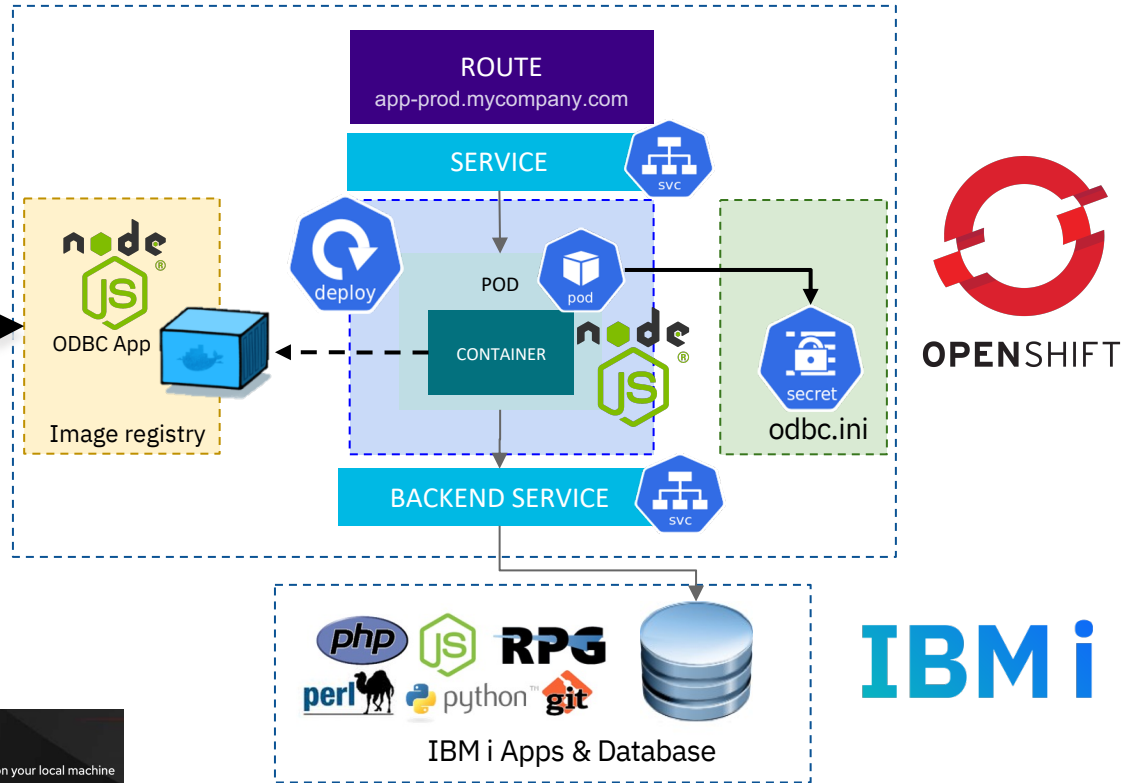
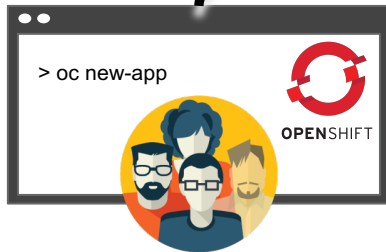
client.post("https://mobile.ng.bluemix.net/imfpush/v1/apps/${APP_ID}/messages", args, function (data, response) {});
console.log("Sending Push Notification from IBM i to user "+userArg+" with message: "+messageArg);
```

Demo: Node.js App on OpenShift & IBM i

- Get Started quickly with Red Hat OpenShift
- Red Hat CRC CodeReady Container for Dev/Test

<https://github.com/bmarolleau/ocp-nodejs-ibmi/>

**BUILD &
DEPLOY**



Red Hat CodeReady Containers

OpenShift on your laptop. CodeReady containers gets you up and running with an OpenShift cluster on your local machine in minutes.

[Install OpenShift on your laptop](#)

[Try OpenShift in our free sandbox](#)

[More ways to use](#)

<https://developers.redhat.com/products/codeready-containers/overview>

soon available on IBM Developer

Ressources

IBM i RPMs (RedHat Technology) <http://ibm.biz/ibmi-rpms>

IBM i Open Source Support <http://ibm.biz/ibmi-oss-support>

Jesse Gorzinski's blog. <http://ibm.biz/open-your-i>
<https://ibmsystemsmag.com/Power-Systems/06/2020/common-open-source-questions-answered>

Exemples Open Source <http://github.com/IBM/ibmi-oss-examples>

IBM i customer stories <http://ibm.biz/ibmistories>

Community chat <http://ibm.biz/ibmiooss-chat> (join at <http://ibm.biz/ibmiooss-chat-join>)

Open Source , ILE , git

- <https://github.com/OSSILE>
- <https://github.com/richardschoen/iforgit>
- [GIT source control on IBM i](#) (presentation par Nathanael Bonnet, Common France)

Quel IDE choisir ? RDi mais également....

- <https://gist.github.com/kskuhlman/d2cc089a95bae04431b1c231de488a18>
- [vscode - Code for IBM i](#)