



LinuxONE® Emperor™ II

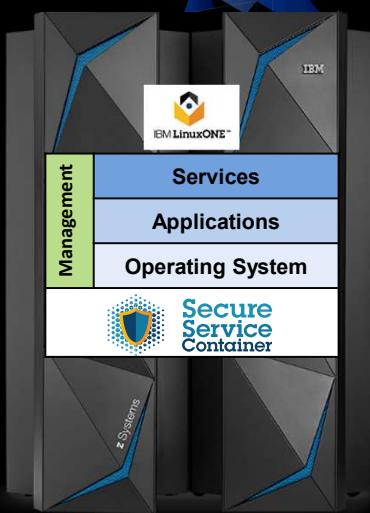


LinuxONE® Rockhopper™ II

IBM z14 & LinuxONE Transformation Digital des Entreprises

IBM Z

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Agenda



IBM z14™ & LinuxONE™ pour la Transformation Digitale

1. Introduction on zStack
2. Key concepts of SOA
3. SOA Solutions on z/OS
 - ✓ Transaction environments
 - ✓ SOA Foundation products
 - ✓ SOA Integration solutions
 - ✓ Development and full SOA cycle solutions
 - ✓ System Management Tools for z/OS Applications
4. LinuxONE
5. Digital Transformation : Solutions on Z System & LinuxONE
6. Conclusion



Linux on IBM Z



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NOTES :

What is a mainframe?

- A mainframe is a computing system that businesses use to host the commercial databases, transaction servers, and applications that require a greater degree of security and availability than is commonly found on smaller-scale machines.

- Central data repository
- Self-contained computing environment



- The power of a mainframe provides computing speed and capacity, enabling it to perform high volumes of processing.
- The mainframe can process a workload mix of jobs from different time zones and of different types.



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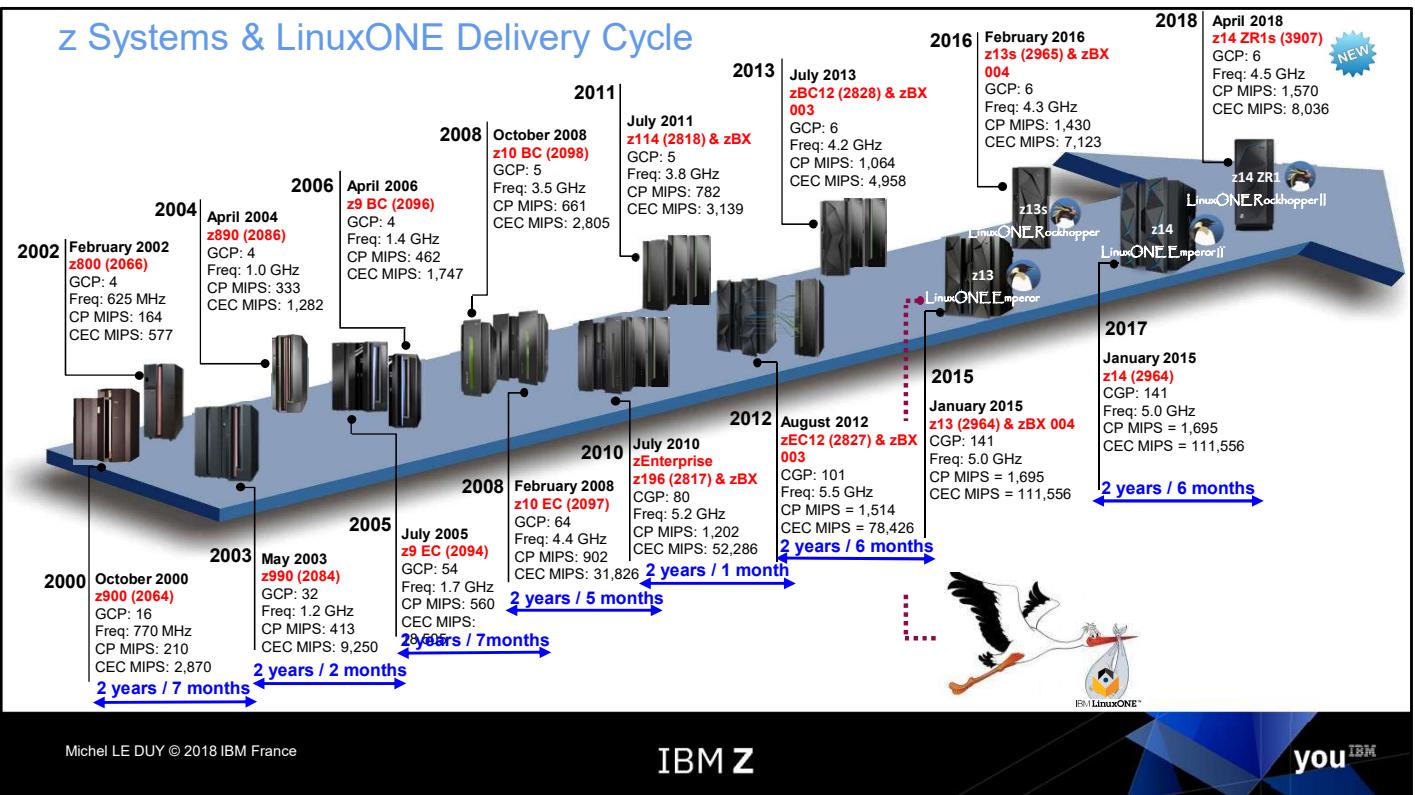
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NOTES :

z Systems & LinuxONE Delivery Cycle



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NOTES :

IBM Z & LinuxONE – Le Processeur (GHz, Cores, Mémoire)



Rappel de la Roadmap technologique



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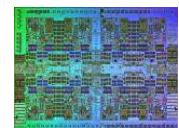
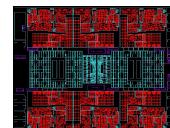
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NOTES :

Les processeurs



	Intel Westmere EX	IBM LinuxONE	IBM POWER8
Size	513 mm ²	696 mm ²	650 mm ²
Transistors	2.6 billion	6.1 billion	4.2 billion
Cores	4 / 6 / 8 / 10	10	12
Threads per Core	2	2	8
Maximum Frequency	3.46 GHz	5.2 GHz	4.35 GHz
L3 Cache	24 MB SRAM	128 MB eDRAM	256 MB eDRAM
Scalability	8 Sockets	24 Sockets	8 Sockets

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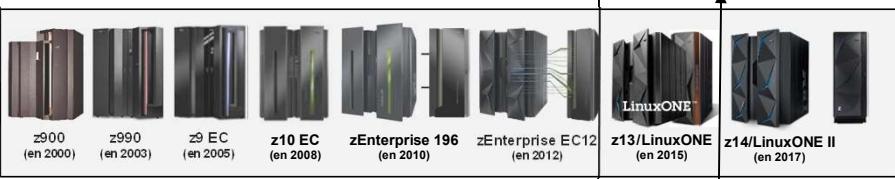
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NOTES :



– d'hier à aujourd'hui



Hardware

S/360 S/370 S/370XA – 31 bits ESA/390 CMOS – Parallel Sysplex z/Architecture – 64 bits zEnterprise 196 zEnterprise EC12 z Systems IBM Z



Software

MVT, PCP MFT MVS - VTAM MVS/XA MVS/ESA OS/390 USS - TCP/IP z/OS Linux zManager Pervasive Encryption
IMS CICS VM DB2 WebSphere z/VM SMT SIMD KVM OpenSource OpenStack

Application Investment Protection

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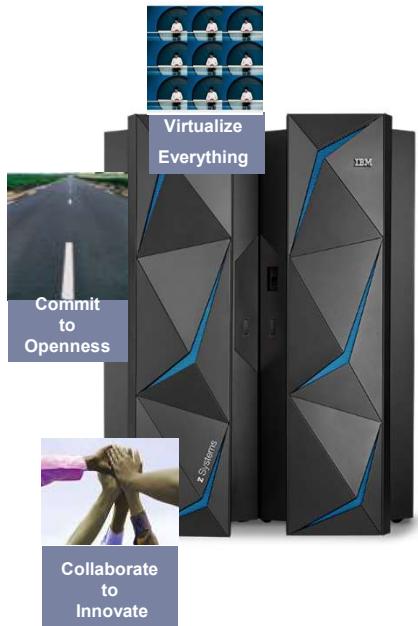
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NOTES :

IBM's Systems Strategy and the mainframe



■ Reliability



■ Dynamic Logical Partitioning



■ On/off Capacity On Demand



■ Automation

■ Security

■ Virtualization



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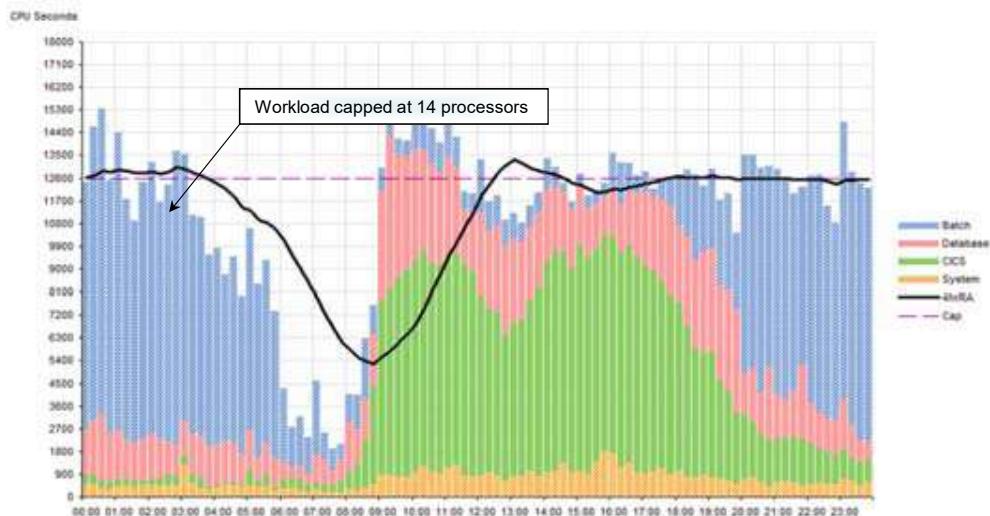
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NOTES :

The Result – High Utilization on a Mainframe



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NOTES :

IBM zEnterprise EC12 and zBC12 – September 2013

IBM zEnterprise EC12 (2827)	IBM zEnterprise BladeCenter Extension (2458)	IBM zBC12 (2828)
 <ul style="list-style-type: none">Announced 08/12 – Server w/ up to 120 PU cores5 models – Up to 101-wayGranular Offerings for up to 20 CPsPU (Engine) Characterization<ul style="list-style-type: none">CP, SAP, IFL, ICF, zAAP, zILP, IFPOn Demand Capabilities<ul style="list-style-type: none">CoD, CIU, CBU, On/Off CoD, CPE, FoDMemory – up to 3 TB for Server and up to 1 TB per LPAR<ul style="list-style-type: none">32 GB Fixed HSAChannels<ul style="list-style-type: none">PCIe busFour LCSSs3 Subchannel SetsFICON Express8 and 8SzHPFOSA 10 GbE, GbE, 1000BASE-TInfiniBand Coupling LinksFlash ExpresszEDC Express10GbE RoCE ExpressConfigurable Crypto Express4SParallel Sysplex clusteringHiperSockets – up to 32Up to 60 logical partitionsEnhanced AvailabilityIBM zAwareUnified Resource ManagerOperating Systems<ul style="list-style-type: none">z/OS, z/VM, z/VSE, z/TPF, Linux on System z	 <ul style="list-style-type: none">First Announced 7/10Model 003 for zEC12 – 08/12zBX Racks with:<ul style="list-style-type: none">BladeCenter ChassisN+1 componentsBladesTop of Rack Switches8 Gb FC SwitchesPower UnitsAdvance Management ModulesUp to 112 Blades<ul style="list-style-type: none">POWER7 BladesIBM System x BladesIBM WebSphere DataPower Integration Appliance X50 for zEnterprise (M/T 24x2-4BX)Operating Systems<ul style="list-style-type: none">AIX 5.3 and higherLinux for Select IBM x BladesMicrosoft Windows for x BladesHypervisors<ul style="list-style-type: none">PowerVM Enterprise EditionIntegrated Hypervisor for System x	 <ul style="list-style-type: none">Announced 07/132 models – H06 and H13<ul style="list-style-type: none">Up to 6 CPsHigh levels of Granularity available<ul style="list-style-type: none">156 Capacity IndicatorsPU (Engine) Characterization<ul style="list-style-type: none">CP, SAP, IFL, ICF, zAAP, zILP, IFPOn Demand Capabilities<ul style="list-style-type: none">CoD, CIU, CBU, On/Off CoD, CPEMemory – up to 512 GB for Server<ul style="list-style-type: none">16 GB Fixed HSAChannels<ul style="list-style-type: none">PCIe busTwo LCSSs2 Subchannel SetsFICON Express8 and 8SzHPFOSA 10 GbE, GbE, 1000BASE-TInfiniBand Coupling LinksFlash ExpresszEDC10GbE RoCE ExpressConfigurable Crypto Express 4SParallel Sysplex clusteringHiperSockets – up to 32Up to 30 logical partitionsIBM zAwareUnified Resource ManagerOperating Systems<ul style="list-style-type: none">z/OS, z/VM, z/VSE, z/TPF, Linux on System z

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IBM z13 and z13s – March 2016

IBM z13 (2964)	IBM zBX Model 004 (2458)	IBM z13s (2965)
<ul style="list-style-type: none"> ▪ Announce – 02/16, GA1 – since 01/15 ▪ 5 models – NE1, NC9, N96, N63, N30 <ul style="list-style-type: none"> – Up to 141 customer configurable engines ▪ Sub-capacity Offerings for up to 30 CPs ▪ PU (Engine) Characterization <ul style="list-style-type: none"> – CP, IFL, ICF, zIIP, SAP, IFP (No zAAPs) ▪ SIMD Instructions, SMT for IFL and zIIP ▪ On Demand Capabilities <ul style="list-style-type: none"> – CoD: CIU, CBU, On/Off CoD, CPE ▪ Memory – up to 10 TB <ul style="list-style-type: none"> – Up to 10 TB per LPAR (if no FICON Express8) – 96 GB Fixed HSA ▪ Channels <ul style="list-style-type: none"> – PCIe Gen3 16 Gbps channel buses – Six LCSSs, up to 85 LPARs – Four Subchannel Sets per LCSS – FICON Express16S or 8S (8 Carry forward) – OSA ExpressSS (4S carry forward) – HiperSockets – up to 32 – Flash Express ▪ zEnterprise Data Compression (zEDC) <ul style="list-style-type: none"> – RDMA over CE (RoCE) with SR-IOV Support ▪ Shared Memory Communications - Direct Memory Access (SMC-D) ▪ Crypto ExpressSS ▪ Parallel Sysplex clustering, PCIe Coupling, InfiniBand Coupling ▪ IBM Aware: z/OS and Linux on z Systems ▪ Operating Systems <ul style="list-style-type: none"> – z/OS®, z/VME, z/VSE, z/TPF, Linux on z Systems, KVM for IBM z ▪ IBM Dynamic Partition Manager (DPM) ▪ z Appliance Container Infrastructure (zACI) 	<ul style="list-style-type: none"> ▪ Announce – 01/15 ▪ Upgrade ONLY stand alone Ensemble node converted from an installed zBX Model 2 or 3 ▪ Doesn't require a 'owning' CPC ▪ Management – Unified Resource Manager ▪ zBX Racks (up to 4) with: <ul style="list-style-type: none"> – Dual 1U Support Elements, Dual INMN and IEDN TOR switches in the 1st rack – HMC LAN attached (no CPC BPH attachment) – 2 or 4 PDUs per rack ▪ Up to 8 BladeCenter H Chassis <ul style="list-style-type: none"> – Space for 14 blades each – 10 GbE and 8 Gbps FC connectivity – Advanced Management Modules – Redundant connectivity, power, and cooling ▪ Up to 11 single width z blades <ul style="list-style-type: none"> – IBM BladeCenter PS700 Express – IBM BladeCenter HX5 7273 – IBM WebSphere® DataPower® Integration Appliance X160 for zEnterprise (MT 2462-BX) – IBM WebSphere DataPower® Integration Appliance X152 Virtual Edition on System x ▪ Operating Systems <ul style="list-style-type: none"> – AIX 5.3 and higher – Linux on IBM System x® – Microsoft Windows on System x ▪ Hypervisors <ul style="list-style-type: none"> – KVM Hypervisor on System x – PowerVM™ Enterprise Edition 	<ul style="list-style-type: none"> ▪ Announced 02/16 ▪ 2 models – N10, N20 <ul style="list-style-type: none"> – Up to 20 customer configurable engines. Max 6 CPs ▪ Higher levels of granularity available <ul style="list-style-type: none"> – 156 Capacity Indicators ▪ PU (IFL, ICF, zIIP, SAP, IFP (No zAAPs) ▪ SIMD Instructions, SMT for IFL and zIIP ▪ On Demand Capabilities <ul style="list-style-type: none"> – CoD, CIU, CBU, On/Off CoD, CPE ▪ Memory – up to 4 TB for Server <ul style="list-style-type: none"> – 40 GB Fixed HSA ▪ Channels <ul style="list-style-type: none"> – PCIe Gen3 16 Gbps channel bus – Three LCSSs, up to 40 LPARs – Three Subchannel Sets per LCSS – FICON Express16S or 8S (8 Carry forward) – OSA ExpressSS (4S carry forward) – HiperSockets – up to 32 – Flash Express ▪ zEnterprise Data Compression (zEDC) <ul style="list-style-type: none"> – RDMA over CE (RoCE) with SR-IOV Support ▪ Shared Memory Communications - Direct Memory Access (SMC-D) ▪ Crypto ExpressSS ▪ Parallel Sysplex clustering, PCIe Coupling, InfiniBand Coupling ▪ IBM zAware: z/OS and Linux on z Systems ▪ Operating Systems <ul style="list-style-type: none"> – z/OS, z/VM, z/VSE, z/TPF, Linux on z Systems, KVM for IBM z, ▪ IBM Dynamic Partition Manager (DPM) ▪ z Appliance Container Infrastructure (zACI)

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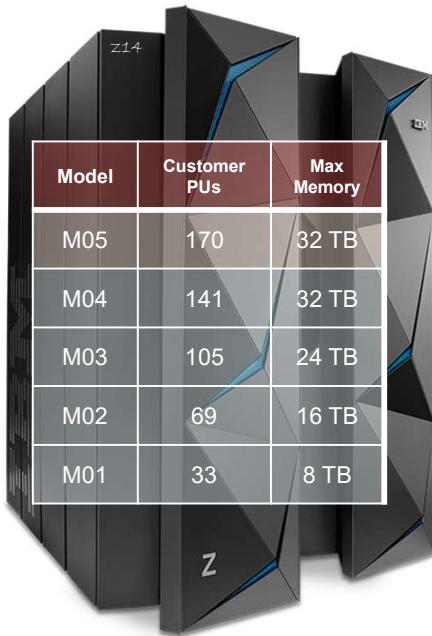
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NOTES :

z14 At a Glance



- Machine Type
 - 3906
- 5 Models
 - M01, M02, M03, M04 and M05
- Processor Units (PUs)
 - 41 (49 for M05) PU cores per CPC drawer
 - Up to 39 SAPs per system
 - 2 spares designated per system
 - Dependent on the H/W model - up to 33, 69, 105, 141,170 PU cores available for characterization
 - Central Processors (CPs), Internal Coupling Facility (ICFs), Integrated Facility for Linux (IFLs), IBM Z Integrated Information Processor (zIIP), optional - additional System Assist Processors (SAPs) and Integrated Firmware Processor (IFP)
 - 85 LPARs,
 - Sub-capacity available for up to 33 CPs
 - 3 sub-capacity points (4xx, 5xx, 6xx)
- Memory
 - RAIM Memory design
 - System Minimum of 64 GB
 - Up to 8 TB per drawer
 - Up to 32 TB for System and up to 16 TB per LPAR (OS dependent)
 - 192 GB Fixed HSA, standard
 - 32/64/96/128/256/512 GB increments
 - Virtual Flash Memory
- I/O
 - Up to 40 PCIe Gen3 Fanouts @ 16 GBps each and Integrated Coupling Adapters @ 2 x 8 GBps per System
 - Up to 16 InfiniBand Fanouts for HCA3-O and HCA3-O LR features
 - 6 Logical Channel Subsystems (LCSSs)
 - 4 Sub-channel sets per LCSS
 - Server Time Protocol (STP) Optional (No ETR)



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NOTES :

Scale: Workload Consolidation

zEnterprise 114



26 MIPS (entry)

IBM z14



146 462 MIPS

5 633 x Scalability

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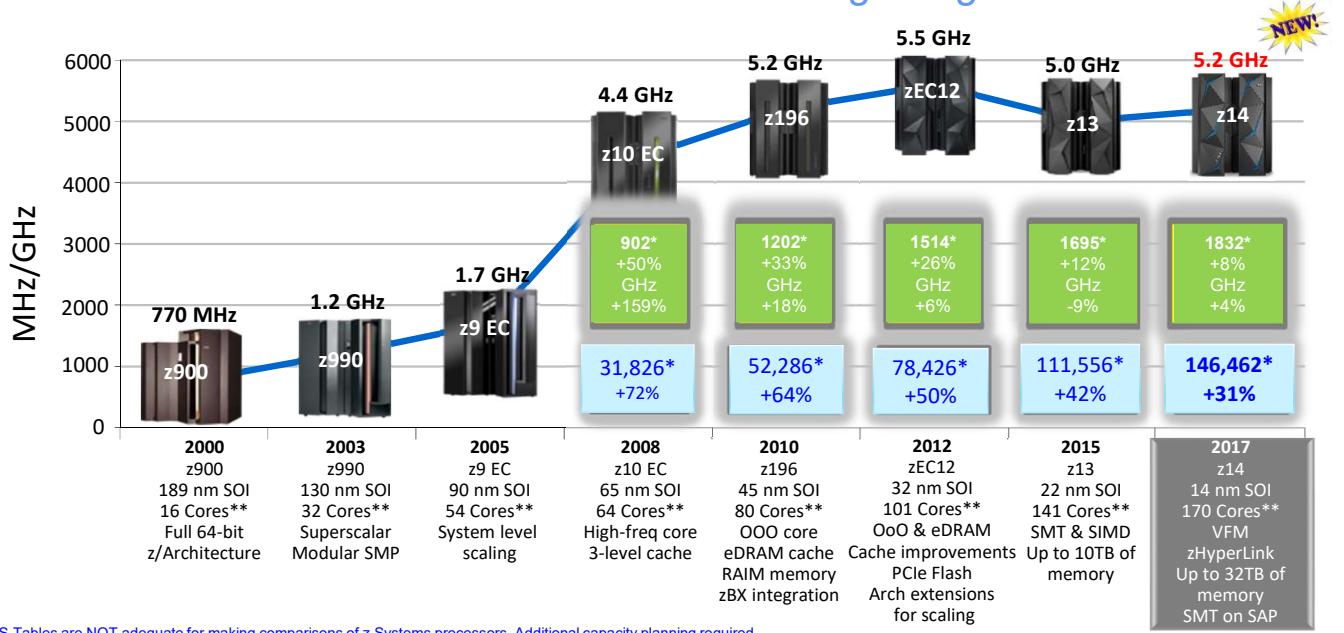
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NOTES :

z13 Continues the CMOS Mainframe Heritage Begun in 1994



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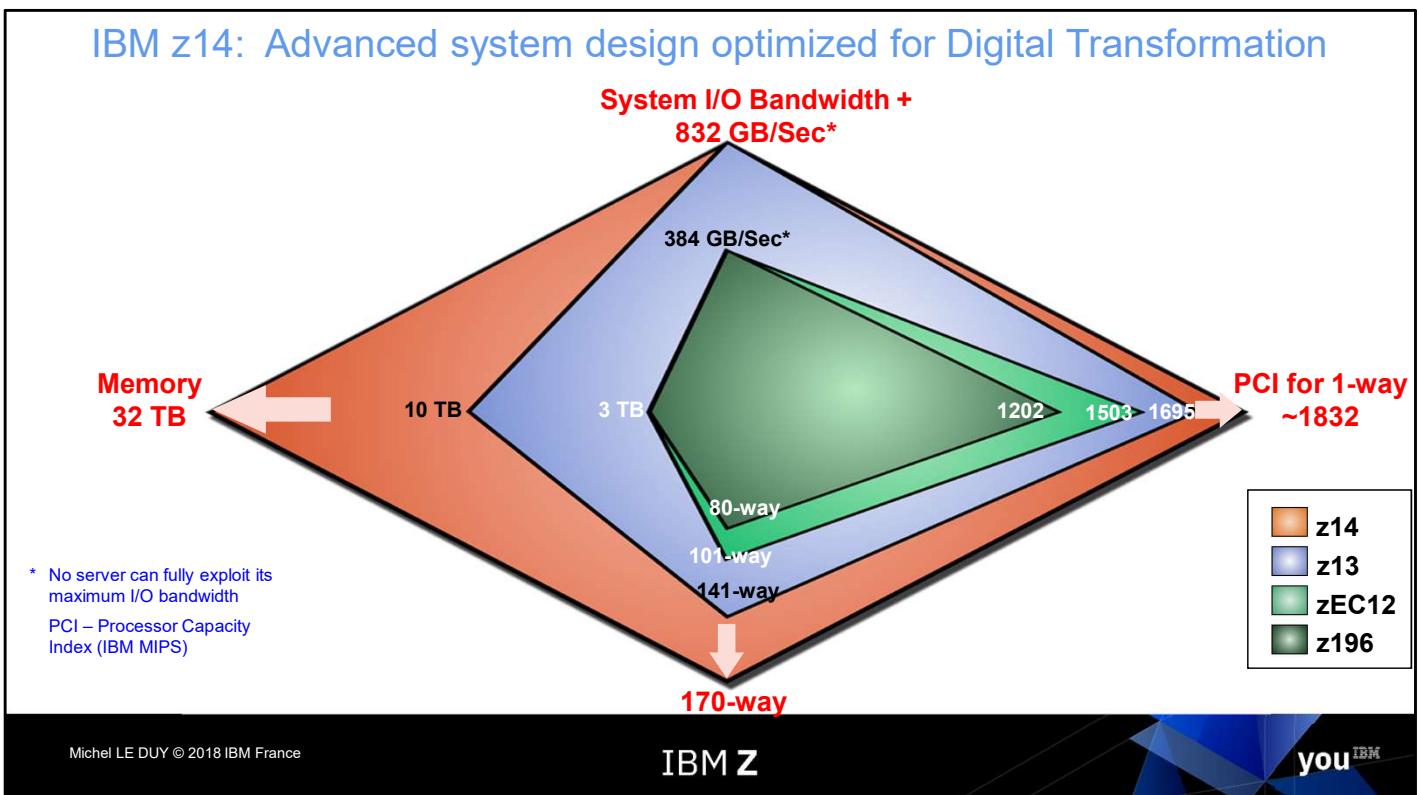
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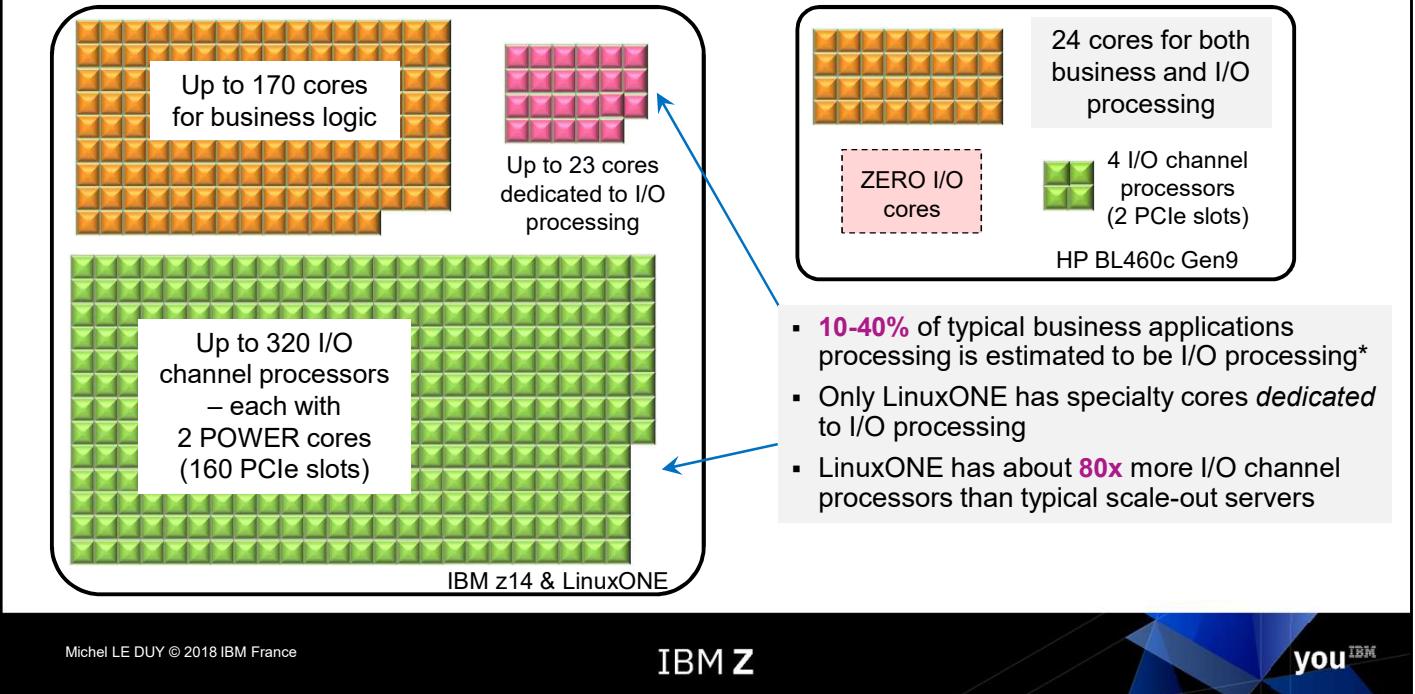
NOTES :

IBM z14: Advanced system design optimized for Digital Transformation



NOTES :

IBM z14 & LinuxONE - high I/O bandwidth business workloads



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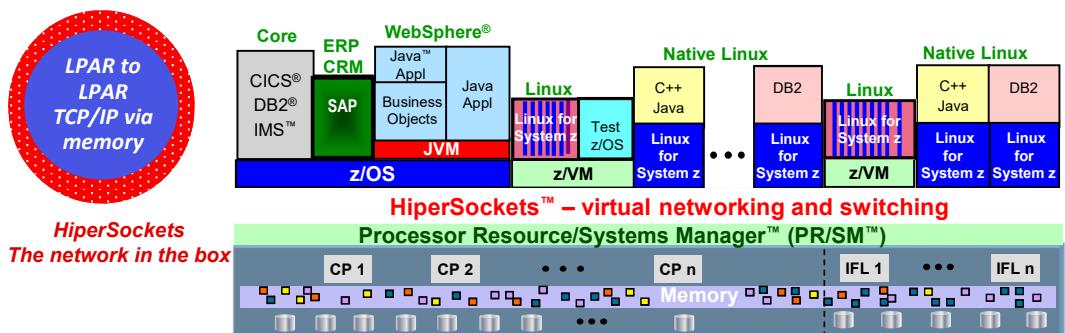
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NOTES :

Connectivity : within the server - HiperSockets



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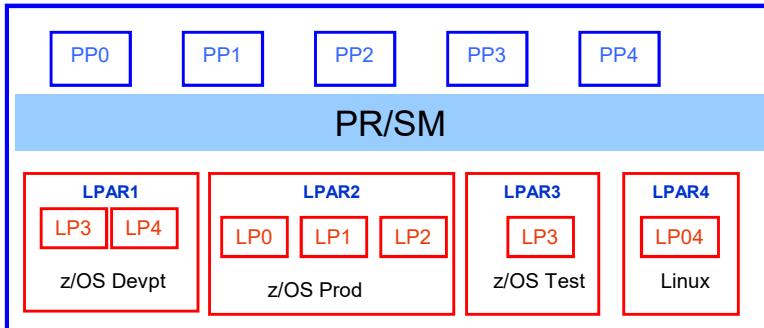
NOTES :

- Répartition des ressources par PR/SM entre partitions
 - ✓ Processeurs :
 - ✧ Dédiés,
 - ✧ Partagés (en % non figé),
 - ✧ Partagés avec capping (en % figé),
 - ✓ Mémoire centrale (en MB),
 - ✓ Mémoire d'arrière plan, éventuellement (en MB),
 - ✓ Canaux :
 - ✧ Dédiés (accessibles par une seule partition),
 - ✧ Reconfigurables (accédés par une seule partition à la fois),
 - ✧ Partagés (accessibles par plusieurs partitions)



NOTES :

PR/SM : Processor Resource / System Manager



■ Example

- ❖ 1 physical machine with 5 processing units
 - ✓ 5 physical processors managed by PR/SM : PP0 to PP4
- ❖ 4 Logical partitions
 - ✓ Different OS, may be different z/OS levels
 - ✓ Each LPAR has a different number of Logical resources : Logical Processors
- ❖ PR/SM manages logical to physical mapping and resource allocation

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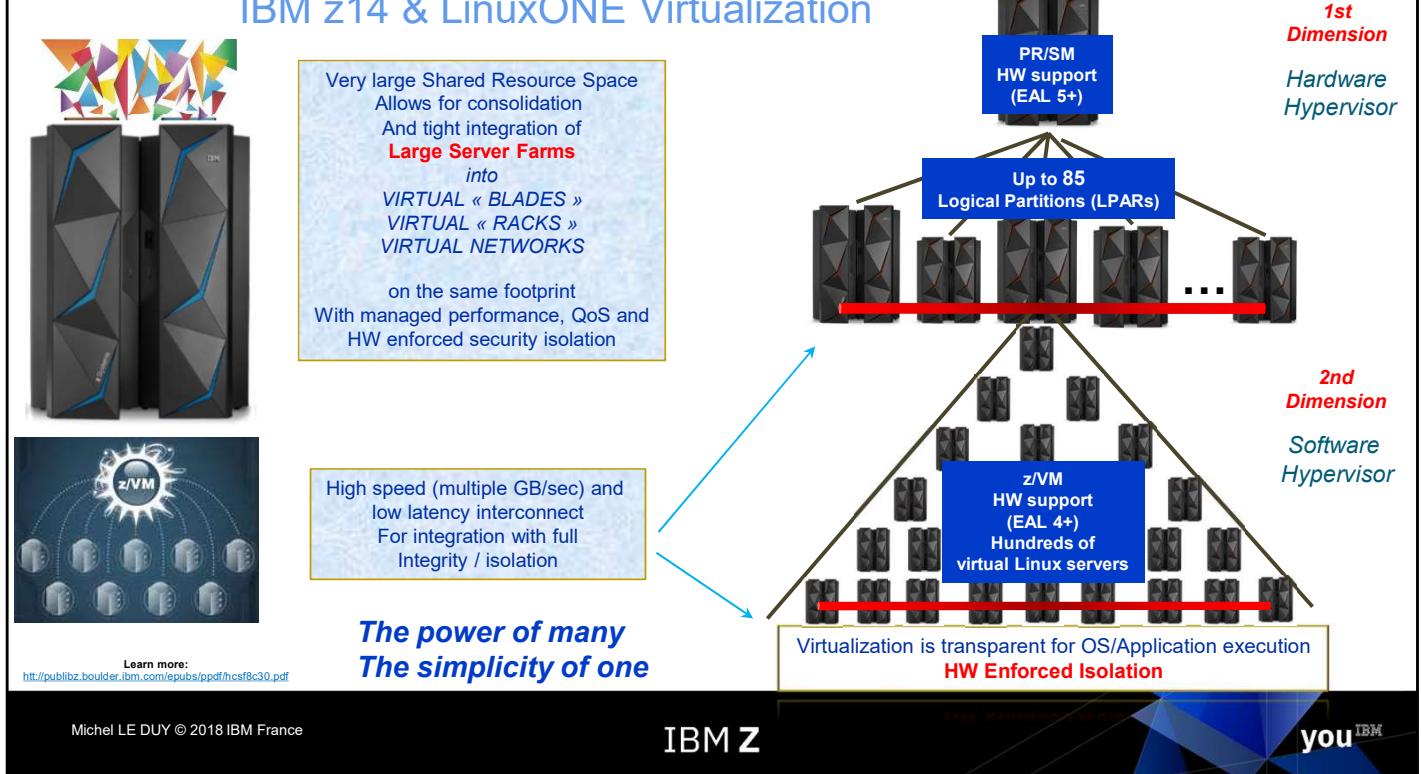
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NOTES :

IBM z14 & LinuxONE Virtualization

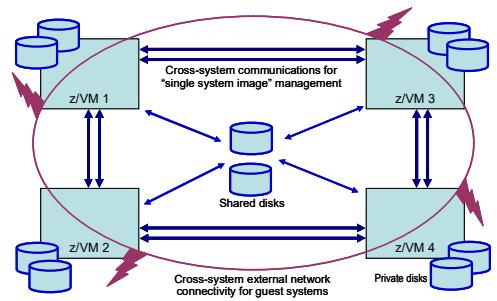


NOTES :

z/VM : Clustered Hypervisor Support and Guest Mobility Overview



- Clients can cluster up to four z/VM systems in a **Single System Image (SSI)**
- Provides a set of shared resources for the z/VM systems and their hosted virtual machines
- Users can run z/VM system images on the same and/or different z Systems servers
- Simplifies systems management of a multi-z/VM environment
 - Single user directory
 - Cluster management from any system
 - Apply maintenance to all systems in the cluster from one location
 - Issue commands from one system to operate on another
 - Built-in cross-system capabilities
 - Resource coordination and protection: network and disks
- Dynamically move Linux guests from one z/VM system to another with **Live Guest Relocation**
 - Reduce planned outages; enhance workload management
 - Non-disruptively move work to available system resources **and** non-disruptively move system resources to work



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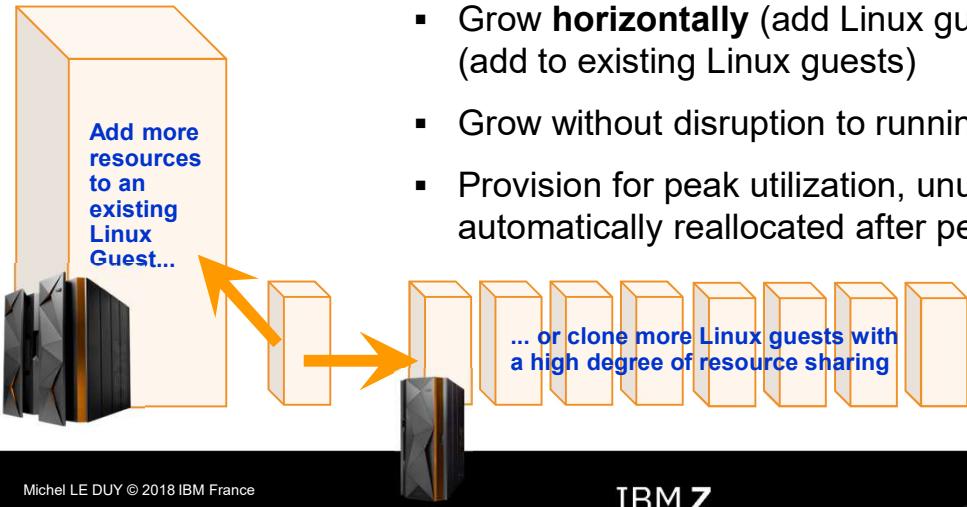


NOTES :

IBM z14 & LinuxONE has multi-dimensional growth and scalability options

- From **1** to **170** cores
- Up to **32 TB** memory
- Up to **160** PCIe slots

- Dynamically add cores, memory, I/O adapters, devices and network cards
- Grow **horizontally** (add Linux guests) and **vertically** (add to existing Linux guests)
- Grow without disruption to running environment
- Provision for peak utilization, unused resources automatically reallocated after peak



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NOTES :

Synergie z Systems avec les systèmes d'exploitation

z/OS



- Distribution des charges de travail intelligente pour optimiser les performances
- Processus simplifié de vérification et d'installation de service
- Synchronisation de mot de passe à l'échelle de l'entreprise
- Amélioration de disponibilité et de performance avec *Flash Express*
- Facilité la détermination des anomalies applicatives avec *IBM zAware*
- Evolutivité extrême de l'espace de stockage
- Plus d'utilisations du zIIP
- Support des pages 2 GB
- Jusqu'à 101 voies
- Provisionnement de capacité

Linux on z Systems



- Performances améliorées pour les applications avec de besoins importants en mémoire
- Temps d'attente réduit et meilleures performances réseau pour les applications avec de gros besoins en bande passante
- Meilleures performances avec Intelligent Dispatching
- Prise en charge de HiperSockets Layer 2 pour faciliter la configuration IP et le diagnostic de problèmes
- Prise en charge d'une technologie de chiffrement améliorée

z/TPF



- Jusqu'à 86 processeurs
- Facturation à l'utilisation de la capacité de la partition
- Tire parti de la technologie de chiffrement



z/VSE™



- Interopérabilité avec Linux on System z
- Tirez parti de la technologie de chiffrement
- Tarif MWLC avec option de sous-capacité

z/VM



- Evaluation Edition z/VM
- Exploitation de nouvelles partitions en mode z/VM pour une flexibilité accrue dans l'hébergement d'applications
- Ajout dynamique de processeurs et de mémoire à des partitions z/VM et à des serveurs virtuels
- Fonctions de gestion de systèmes étendues utilisant la HMC
- Connectivité réseau plus sécurisée
- Temps d'attente réduit et meilleures performances réseau pour les applications avec de gros besoins en bande passante

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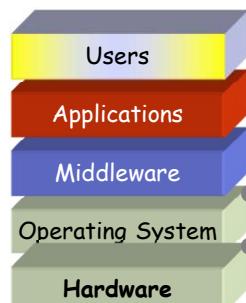
NOTES :

z/OS - A Set of Services

- **64-bit operating system for mainframe computers**

- **Designed for**

- Serving 1000s of users concurrently
- I/O intensive computing
- Processing very large workloads
- Running mission critical applications securely



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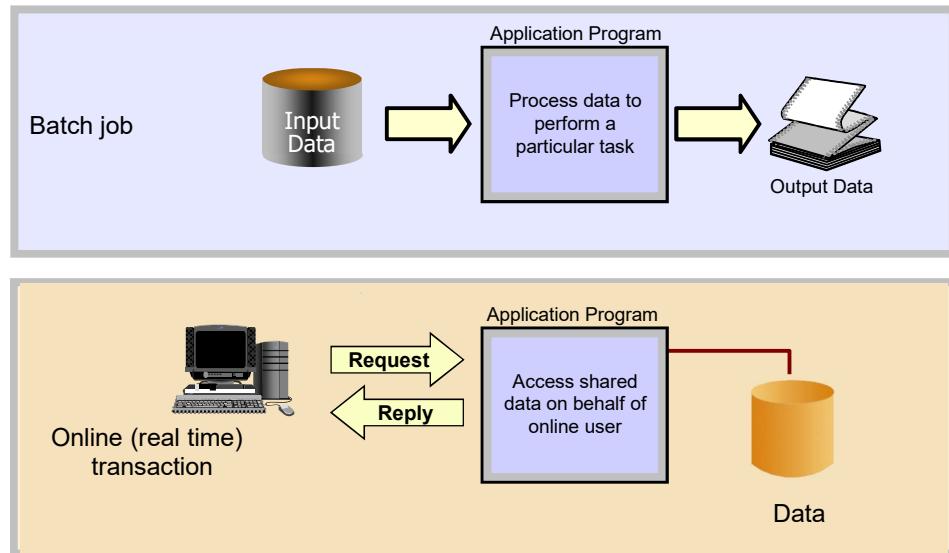
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NOTES :

Typical mainframe workload types



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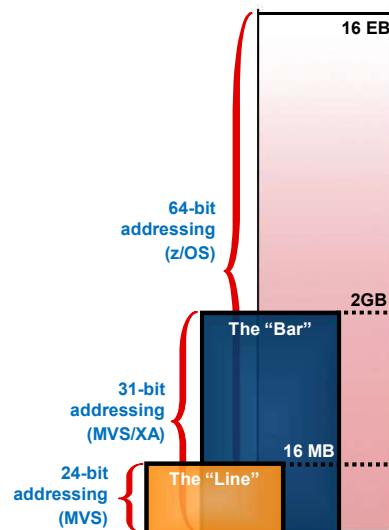
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NOTES :

Virtual storage concepts

- Virtual storage is an “illusion” created through z/OS management of real storage and auxiliary storage
- The running portions of a program are kept in **real** storage; the rest is kept in **auxiliary** storage
- Range of addressable virtual storage available to a user or program is an **address space**
- Each user or separately running program is represented by an address space



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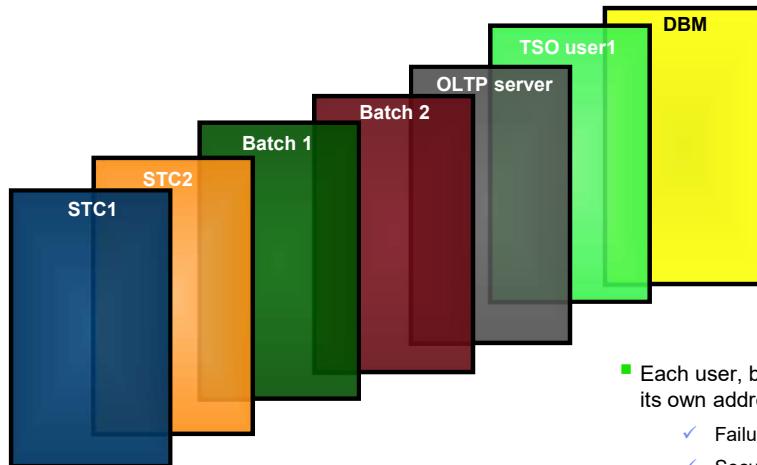
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NOTES :

MVS = Multiple Virtual Storage !



- Each user, batch job or system function runs in its own address space
 - ✓ Failure isolation
 - ✓ Security
 - ✓ Scalability

- z/OS provides facilities for address spaces communications
 - ✓ Requires authorization

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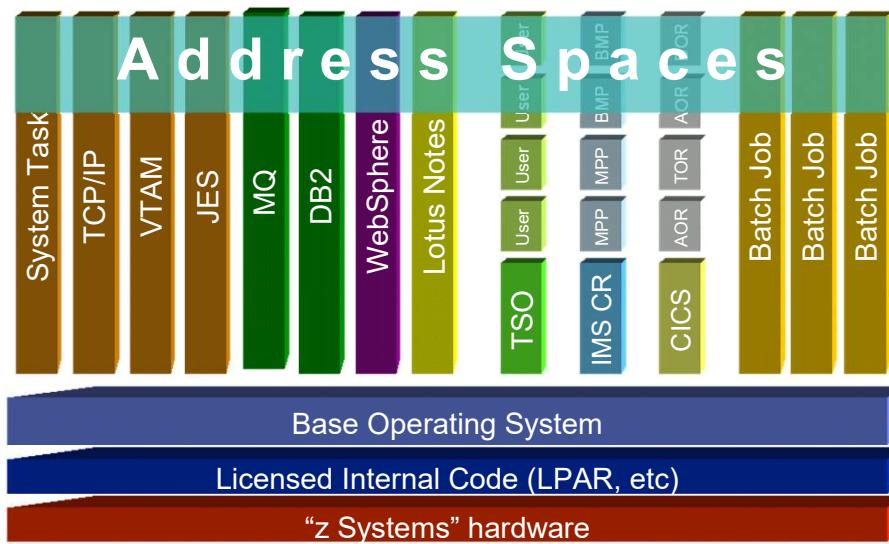
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NOTES :

z/OS – The ultimate OS – Components ...



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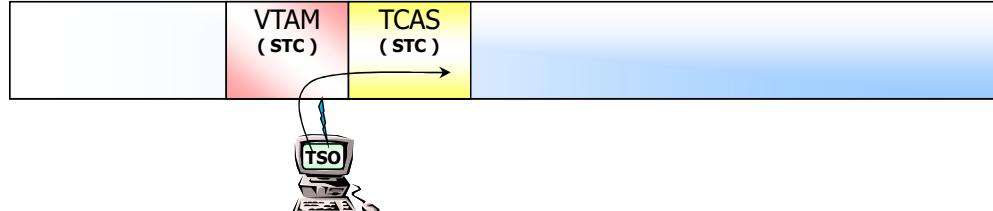
NOTES :

Les utilisateurs TSO



TSO/E permet l'exécution d'un travail sous z/OS en mode interactif :

- ◆ L'accès à toutes les ressources MVS à partir d'un terminal,
- ◆ L'interface interactive avec de nombreux produits exécutables sous MVS,
- ◆ Un jeu de commandes de base pour :
 - Allouer un dataset ou un membre d'un PDS,
 - Éditer,
 - Visualiser,
 - Maintenir (Rename, Delete, ...),
 - ...



- ◆ Un terminal TSO peut être connecté à distance ou en local,
- ◆ VTAM réalise le transfert des données,
- ◆ TCAS reçoit la demande de logon.

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NOTES :

Interactive System Productivity Facility (ISPF)

A - zLight V2.1.WS - [32 x 80]

File Edit View Communication Actions Window Help

Menu Utilities Compilers Options Status Help

z/OS Primary Option Menu

Option ==>

```
0 Settings   Terminal and user parameters
1 View       Display source data or listings
2 Edit        Create or change source data
3 Utilities   Perform utility functions
4 Foreground  Interactive language processing
5 Batch       Submit job for language processing
6 Command    Enter TSO or Workstation commands
7 Dialog Test Perform dialog testing
8 SDSF       System Console
9 IBM Products IBM program development products
10 SCLM      SW Configuration Library Manager
11 Workplace  ISPF Object/Action Workplace
12 z/OS System z/OS system programmer applications
13 z/OS User   z/OS user applications

Enter X to Terminate using log/list defaults
```

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*ISRÀ390

MA A

Connected to remote server/host 10.9.154.1 using lu/pool L9TC0013 and port 1023

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DevOps

S
M
R

Systems Info... Navigator

Type here to search the tree (Ctrl+F)

zos.dev:2000/JKED/HIST(F00120)-Report

zos.dev:2000/JKED/HIST(F00120)

JKED:00000000000000000000000000000000

Fault Analyzer for z/OS

Browsing History

000120.HIST

Action History

Open Reload Copy to Go Into Refresh

Outline

An outline is not available.

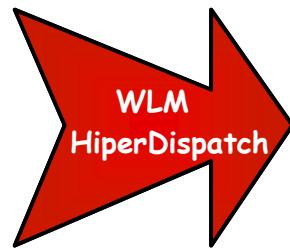
zos.dev:2000/JKED/HIST

FAULT_ID	JOB/TRAN	USER_ID	SYSJOB	ABEND	LABEND	JOB_ID	JOBNAME
F00120	JKED	EMPOT01	CICS52B	ASRA	ASRA	STC00038	CICS52B
F00118	CWBA	IBAMUSER	CICS52B	ASRA	ASRA	STC00036	CICS52B
F00117	JKED	EMPOT01	CICS52B	ASRA	ASRA	STC00035	CICS52B
F00116	CAZZCS	IBAMUSER	SWW1	SECB	SECB	STC00045	CAZZCS
F00115	CAZZCS	IBAMUSER	SWW1	SECB	SECB	STC00046	CAZZCS
F00114	CAZZCS	IBAMUSER	SWW1	SECB	SECB	STC00047	CAZZCS
F00113	CAZZCS	IBAMUSER	SWW1	SECB	SECB	STC00048	CAZZCS
F00112	JKED	FMDDY01	CICS52B	ASRA	ASRA	STC00046	CICS52B

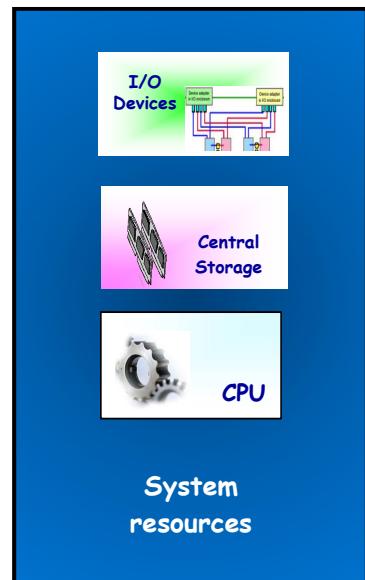


NOTES :

Resource distribution



- Define business goals for the work
- Define importance of achieving the business goals



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NOTES :

z/OS Workload Management (WLM)

■ Prioritizing work in one z/OS image

- "Workload Manager (WLM)" differentiates z/OS in the marketplace with its ability to manage multiple, diverse enterprise workloads

Policy-driven based on customer Quality of Service objectives

Resources are automatically allocated, adjusted and reallocated to meet objectives

WLM will manage LPARs, CPUs, channels, I/O subsystems and DASD, TCP/IP connections, servers, etc.

Enables 100% utilization of capacity

- WebSphere components deployed to z/OS can be differentiated and prioritized based on business policy, and managed to meet Service Level Agreements

Transaction type:

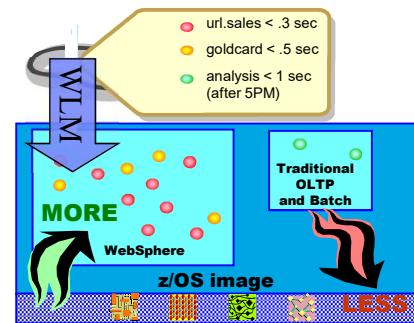
- ↳ Web "buy" vs "browse"
- ↳ B2B
- ↳ Batch payroll
- ↳ Test

User/user type:

- ↳ Top 100 clients
- ↳ Typical clients
- ↳ Executive
- ↳ Design team

Time periods:

- ↳ 1AM - 4AM
- ↳ Mon - Fri
- ↳ Weekends
- ↳ End of quarter



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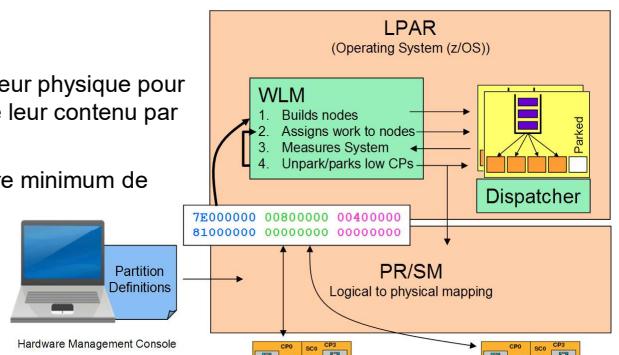


NOTES :

Introduction à HiperDispatch

Objectif de la conception

- ❖ Garder les travaux (autant que possible) « proches » d'un processeur physique pour optimiser l'utilisation des caches processeurs par la réutilisation de leur contenu par redispach du travail sur le même PP
- ❖ Optimise le nombre de processeurs logiques en fonction du nombre minimum de processeurs physiques nécessaires
- ❖ Résultats prévus:
 - Moins de **CACHE RELOAD**



Fonction : HiperDispatch

- ❖ Interaction entre z/OS et l'hyperviseur PR/SM pour optimiser la localisation des « work unit » par rapport aux processeurs logiques et physiques.
- ❖ Est constitué de deux parties:
 - Dans **z/OS** (référencé sous le nom de **Dispatcher Affinity**)
 - Car il essaye de créer une affinité temporaire entre les travaux et les processeurs
 - Dans **PR/SM** (référencé sous le nom de **Vertical CPU Management**)
 - Car il essaye d'affecter exclusivement des processeurs physiques à des processeurs logiques

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NOTES :

Basic Batch Flow

Jobs are needed to execute programs

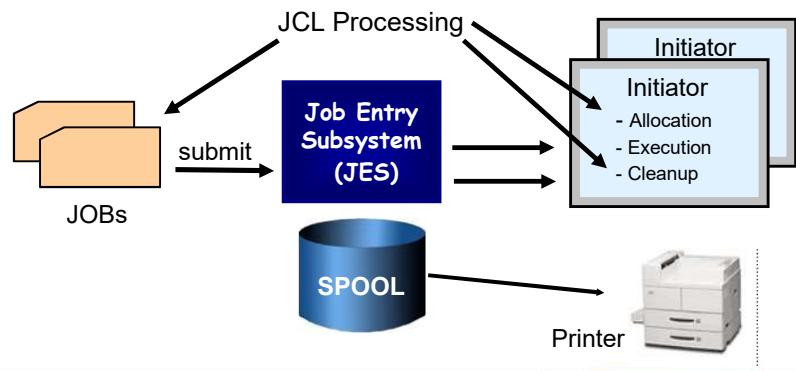
- ✓ Programs created by programmers
- ✓ Programs provided as utilities

Jobs are submitted to and processed by

- ✓ JES2 (or JES3)
- ✓ z/OS Operating System

Jobs are submitted by

- ✓ A human user (TSO User)
- ✓ Another running Job
 - (eg a workload scheduler)



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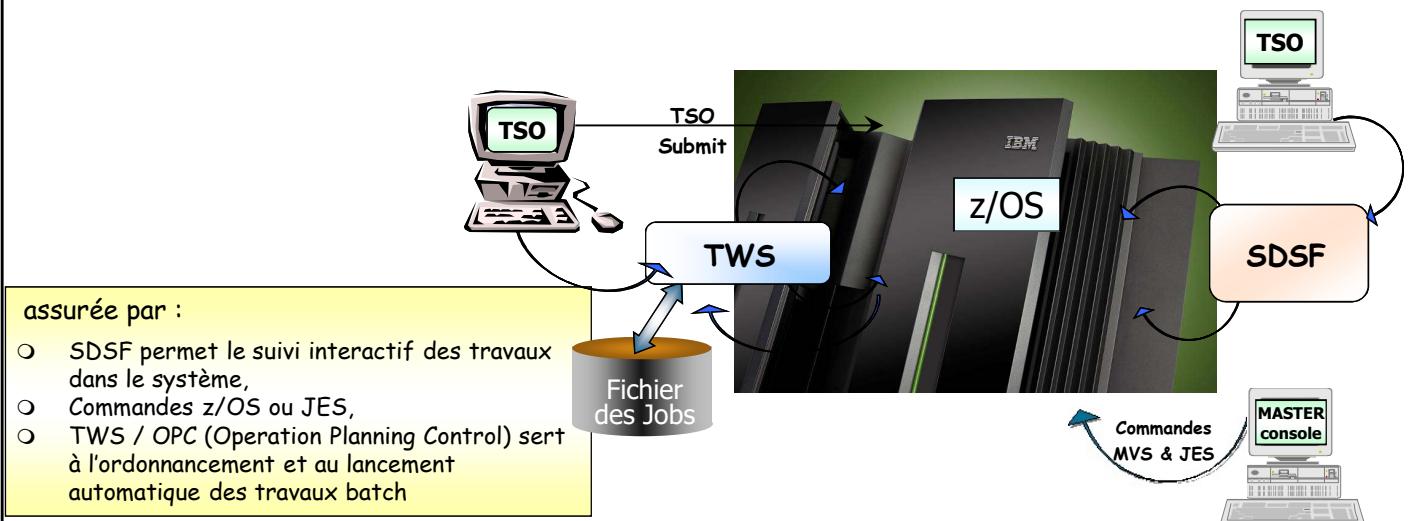
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NOTES :

Gestion des travaux : Ordonnanceur Tivoli Workload Scheduler (ex OPC)



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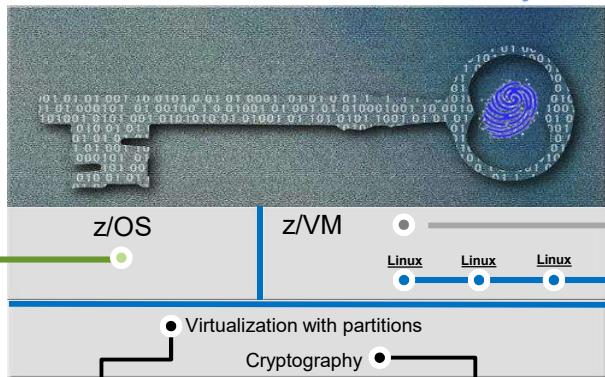
NOTES :

The Common Criteria program establishes an organizational and technical framework to evaluate the trustworthiness of IT Products and protection profiles

z/OS

- Common Criteria **EAL4+**
 - with CAPP and LSPP
 - z/OS V1.7 → V1.10 + RACF
 - z/OS V1.11 + RACF (OSPP)
 - z/OS V1.12, z/OS V1.13,
 - z/OS V2R1, V2R2 and V2R3 (OSPP)
- Common Criteria **EAL5+**
 - RACF V1R12 (OSPP)
 - RACF V1R13 (OSPP)
 - RACF V2R1, V2R2 and V2R3 (OSPP)
- z/OS 1.10 IPv6 Certification by JITC
- IdenTrust™ certification for z/OS PKI Services
- FIPS 140-2
 - System SSL z/OS V1.10 → V1.13
 - z/OS ICSS PKCS#11 Services
 - z/OS V1.11 → z/OS V1.13
- Statement of Integrity

Certifications de sécurité sur Z Systems / LinuxONE



z/VM

- Common Criteria
 - z/VM V6.3 & V6.4 systems are **EAL 4+** for OSPP, SSL FIPS 140-2
- System Integrity Statement

Linux on Z Systems

- Common Criteria
 - SUSE SLES12 SP1 certified at EAL4+ with OSPP
 - Red Hat EL7.1 **EAL4+** with CAPP and LSPP
- OpenSSL - FIPS 140-2 Level 4 Validated
- CP Assist - SHA-1 validated for FIPS 180-1 - DES & TDES validated for FIPS 46-3

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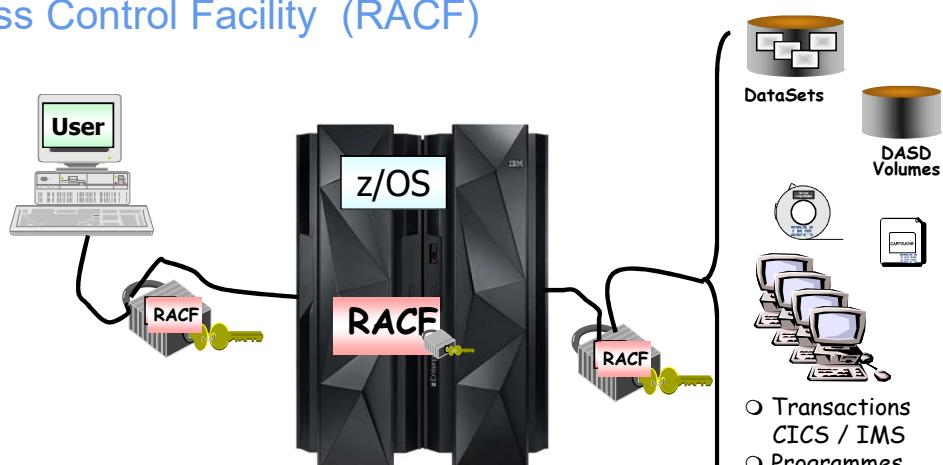
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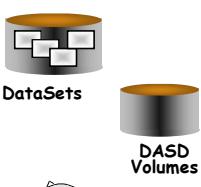


NOTES :

Resource Access Control Facility (RACF)



- Fournit la sécurité logicielle en contrôlant :
 - ✓ L'identification des utilisateurs,
 - ✓ Leur authentification par contrôle du mot de passe
 - ✓ Leur autorisation d'accès aux ressources protégées
- En enregistrant et reportant toutes ces informations



- Transactions CICS / IMS
- Programmes
- Objets non standards IBM

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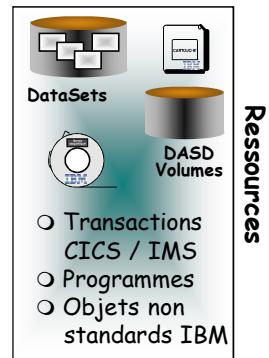
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NOTES :

RACF : authentification d'un utilisateur



Database RACF

- Connexion au système par Logon :
 - Vérification USERID associé à un mot de passe
 - Via 3 profiles RACF :
 - ✓ User profiles,
 - ✓ Group profiles,
 - ✓ Resource profiles.

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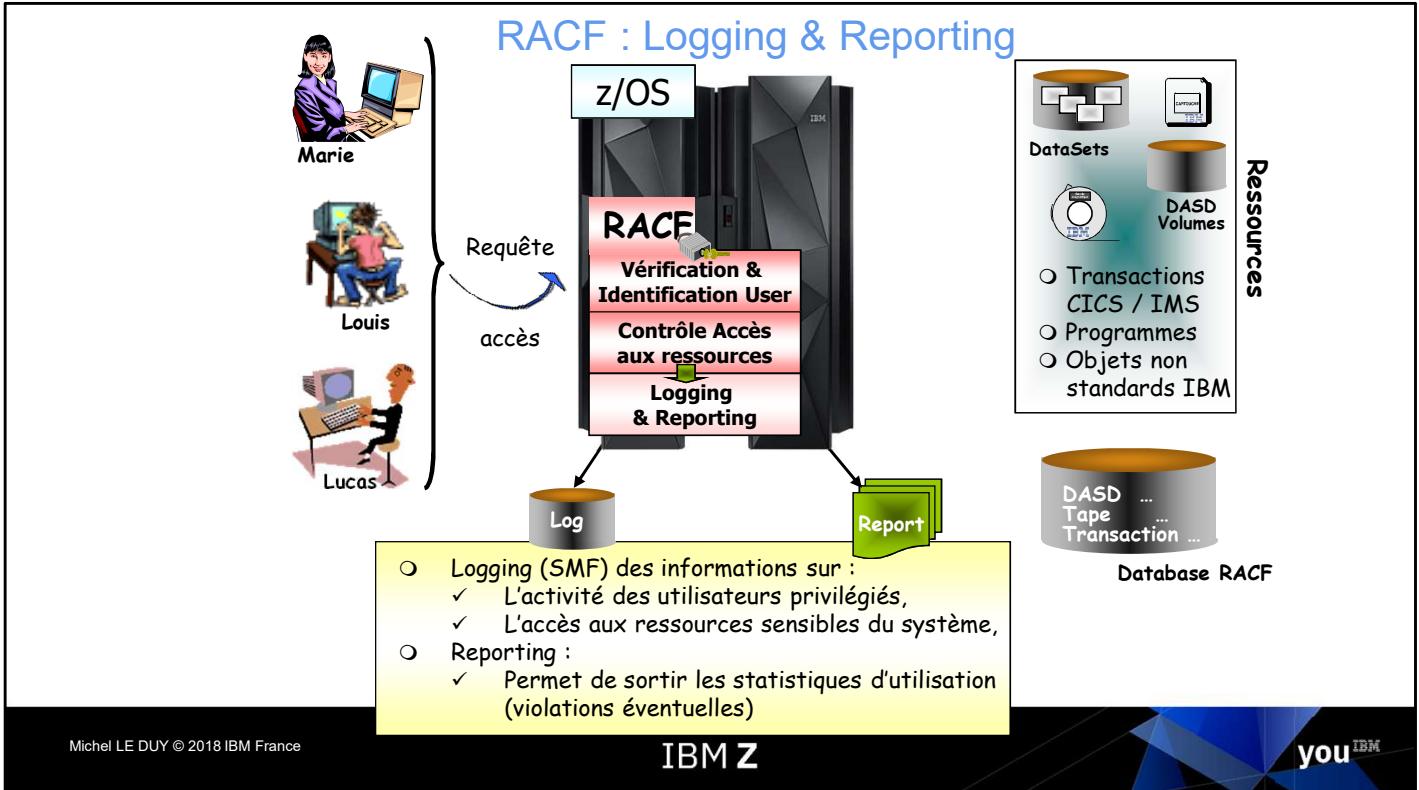
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NOTES :

RACF : Logging & Reporting



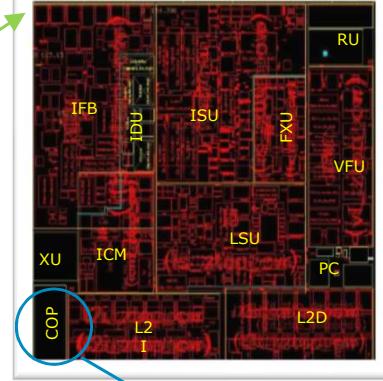
NOTES :

IBM Z & LinuxONE – CRYPTO – CPACF

CPACF – Cryptographie sur le CHIP

- Feature Code 3863, No Charge
- Accélérateur de cryptage Hardware sur chaque Core avec la fonction « Central Processor Assist for Cryptographic Function (CPACF) » qui est conçue pour fournir un cryptage et décryptage plus rapide que sur les serveurs précédents.
- CPACF – **2 à 6x plus rapide** que sur la génération précédente pour les données « in-flight » et « at-rest ».

Permet un cryptage généralisé abordable



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NOTES :

Statement of Direction

"IBM plans to deliver application transparent, policy-controlled dataset encryption in IBM z/OS®. IBM DB2® for z/OS and IBM Information Management System (IMS™) intend to exploit z/OS dataset encryption."

Statement of Direction in the Announcement letter IBM United States Software Announcement 216-392, dated October 4, 2016

Multiple Layers of Encryption

Robust data protection

- z14 CPACF Performance** enables encryption at course scale
- App Encryption** *hyper-sensitive data*
- Database Encryption** *Provide protection for very sensitive in-use (DB level), in-flight & at-rest data*
- File or Dataset Level Encryption** *Provide broad coverage for sensitive data using encryption tied to access control for in-flight & at-rest data protection*
- Full Disk and Tape Encryption** *Provide 100% coverage for at-rest data with zero host CPU cost*

Complexity & Security Control ← → Coverage

August 7, 2017 : z/OS V2.2 Data Set Encryption is now available!!

- Provides full function on V2.2; Coexistence on z/OS V2.1 (Can access encrypted data sets, but cannot create new encrypted data sets)

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IBM Z / August 7, 2017 / © 2017 IBM Corporation

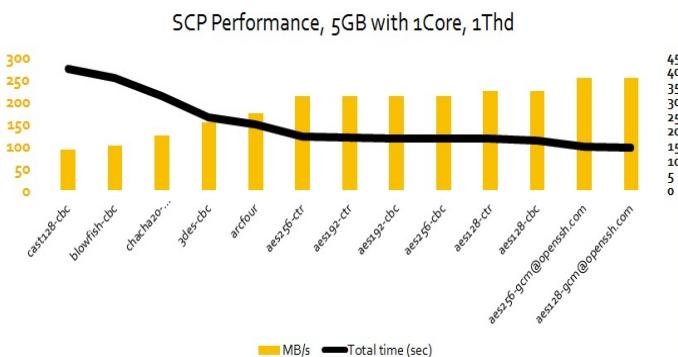
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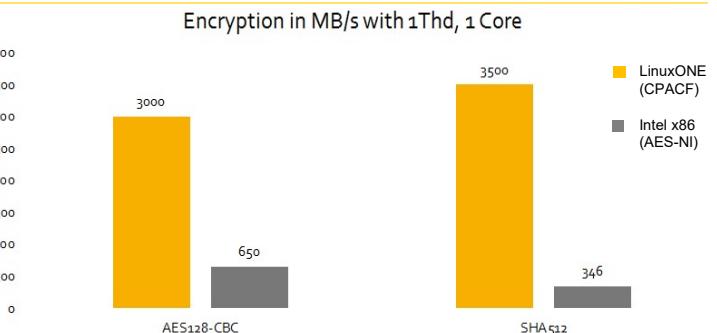
NOTES :

Security at speed !



Time is money. Linux can take benefits of hardware encryption. For a wide variety of algorithms. The choice of the right algorithm has an impact !

On the left, you can see the time required to transfer securely a 5GB File from one machine to another.



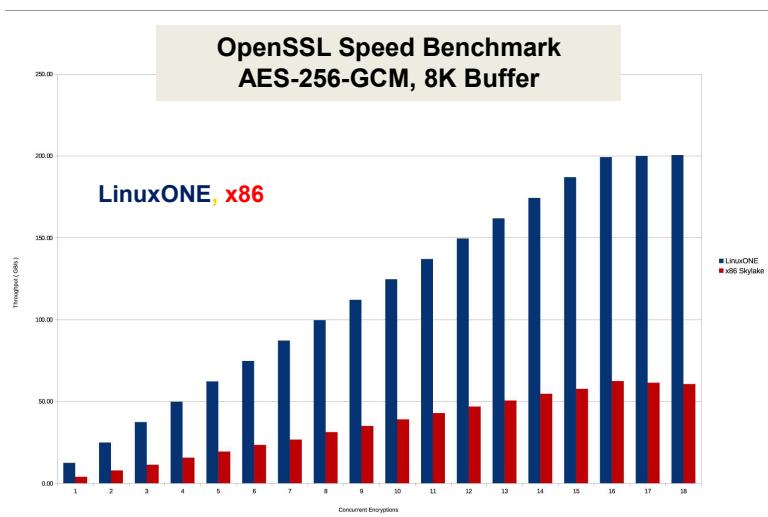
On the right, you can see the performance for this algorithm, on IBM LinuxONE System versus a x86 server on a public cloud service provider.
(note the name « AES-NI », it gives an indication on the type of algorithms supported versus the wide range available on IBM LinuxONE Systems)

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NOTES :

Chiffrement avec LinuxONE est nettement plus rapide que x86



- ~ 4x meilleur en débit
- La vitesse de chiffrement est essentielle pour la cybersécurité, car TOUTE DONNEE SENSIBLE DOIT ÊTRE CHIFFREE
- Tests exécutés sur :
 - LinuxONE sous RHEL avec 16 cores w/SMT
 - Skylake sous RHEL avec 16 cores w/HT

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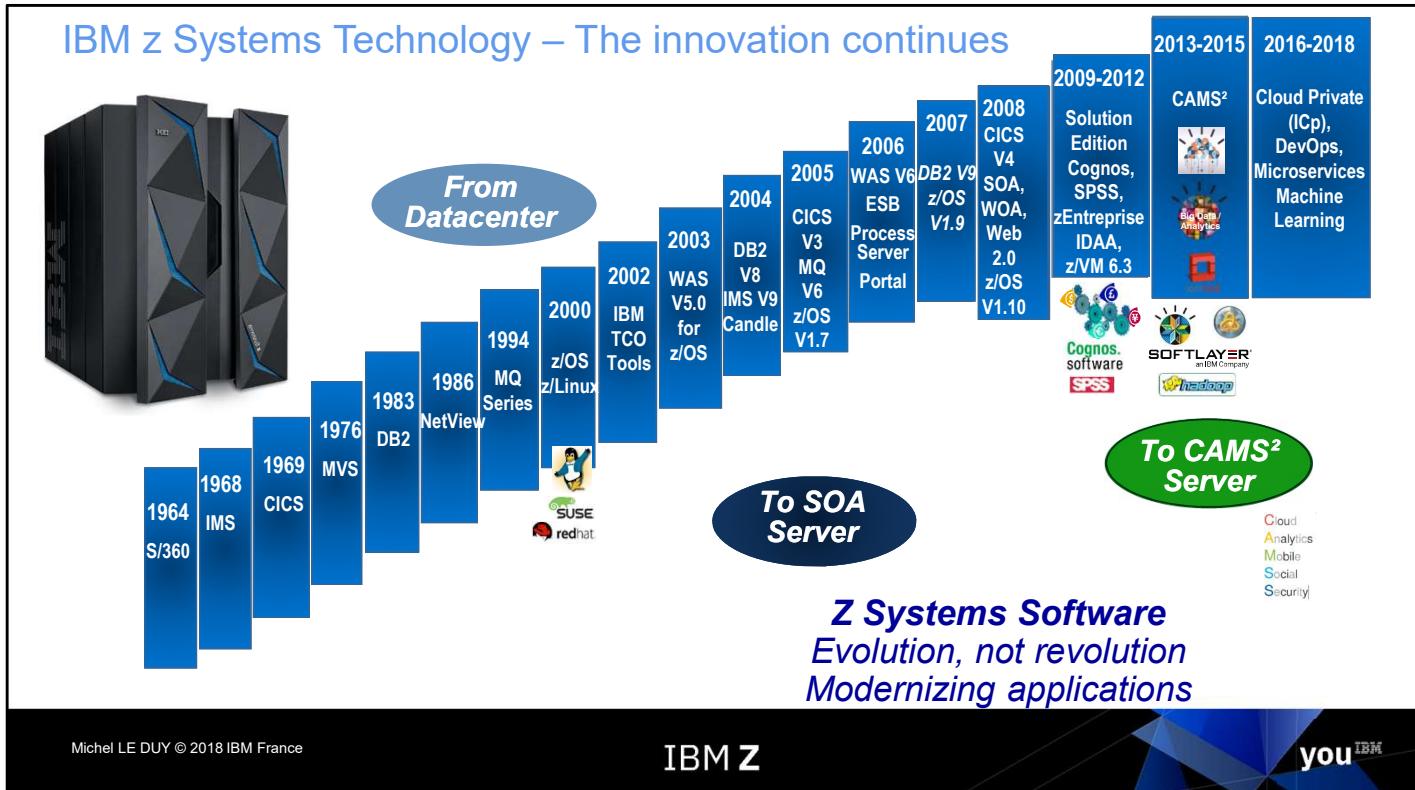
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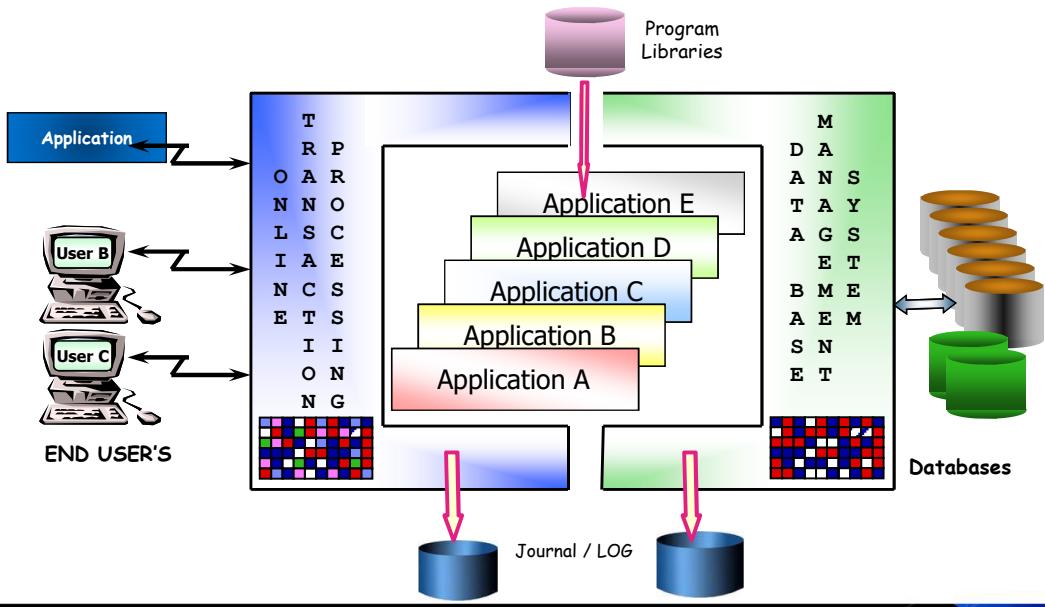
NOTES :

IBM z Systems Technology – The innovation continues



NOTES :

zMiddleware – Transaction and Database



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NOTES :

Access to Data and Databases

- **Traditional data access methods & formats on z/OS**
 - ✓ VSAM, Sequential, Partitioned
- **Hierarchical File System for Unix System Services**
- **Database**
 - ✓ A collection of interrelated data items, stored once and organized in a form for easy retrieval.
- **z/OS Database Management System**
 - ✓ A collection of programs for storing, organizing, selecting data
 - Hierarchical – IMS Database Manager, also called DL/I*
 - Relational – DB2*
 - 3rd Party Vendors – IDMS, CA-Datacom, Adabas, Oracle Database*
- **Information integration with existing z/OS data sources**
 - ✓ Via “Websphere Classic Federation for z/OS”
 - ✓ Via “Websphere Event Publisher for z/OS”

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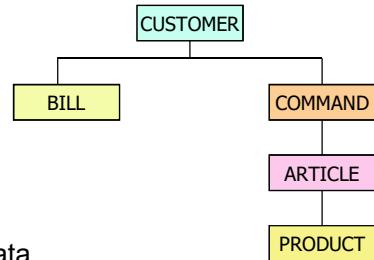


NOTES :

IBM z/OS DBMS Comparison

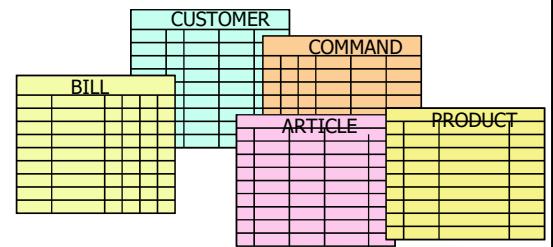
IMS DB

- ✓ Hierarchical model
- ✓ Relative static
- ✓ Navigational - Need to know the structure to get to the right data



DB2

- ✓ Relational model
- ✓ Change in structure - no impact on existing application
- ✓ Non-Navigational
 - *No need to know the structure to get to the right data*



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NOTES :

Synergie avec z Systems & z/OS : Compression de données

The diagram shows a flow from 'Applications' (represented by a blue bar with 'd / a / t / a') to a 'Database' (green box). The database is shown within a 'z/OS' environment, which contains a grid of data blocks. A red arrow points from the database to a server rack, labeled 'data'. Below the database, a note says 'Compression des données intégrée dans les processeurs'. To the right, a pair of scissors cuts through a stack of servers, with the text 'Réduire l'espace de stockage' below it. A yellow arrow points from the database to the server rack.

- Compression hardware dans chaque “chip”
- Compression moyenne de 50% (20-80%)
- Amélioration performances
 - Accès à plus de données dans les Buffers
 - Temps de réponse plus rapide pour requêtes complexes
- Sauvegarde, restauration plus rapide
- Fenêtre Batch plus courte

• Les autres systèmes ne peuvent se comparer :

- Compression de données logicielle
- Ajout de cycles CPU, dégradation potentielle de performances

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DB2 software

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NOTES :



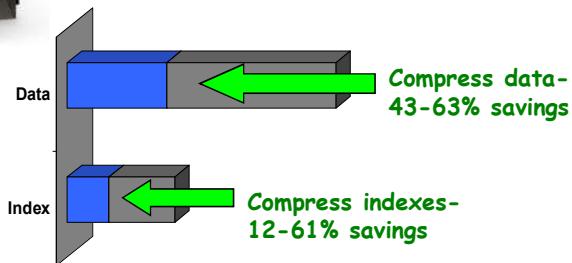
Compression Benefits :

Compressing data can have its benefits – are there hidden costs?

While reducing the amount of disk has benefits, minimize the processing costs of compressing the data

- Reduce disk
- Minimal CPU impact

Hardware compression does not consume significant CPU resource, offering a more efficient implementation than software compression.



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NOTES :

Transactional Workload

■ Transaction monitor

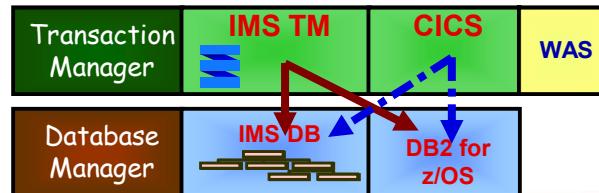
- ✓ A program or subsystem that manages or oversees the sequence of events that are part of a transaction
- ✓ Makes sure the ACID properties of a transaction are maintained
Atomicity, Consistency, Isolation, Durability
- ✓ Includes functions such as interfacing to databases and networks and transaction commit/rollback coordination
- ✓ Provides an API so applications can exploit the services of the transaction monitor

A key strength of the z/OS platform is support for high-volume, high-performance transaction management using transaction monitors

■ IBM's z/OS-based transaction monitors:

- ✓ IMS TM - Information Management System Transaction Manager
- ✓ CICS - Customer Information Control System
- ✓ WebSphere Application Server for z/OS

z/OS and Core Business Applications



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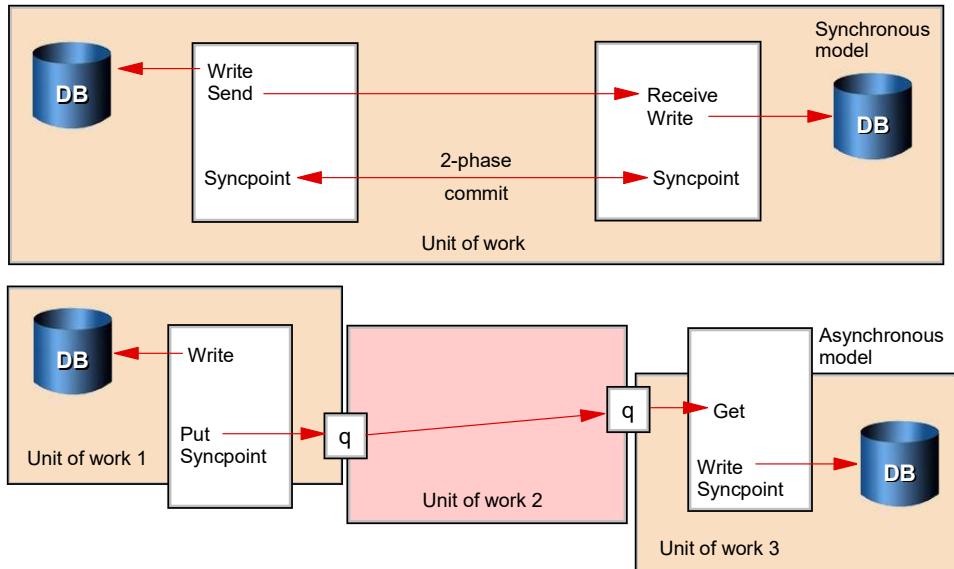
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NOTES :

Transactional support – Synchronous versus Asynchronous



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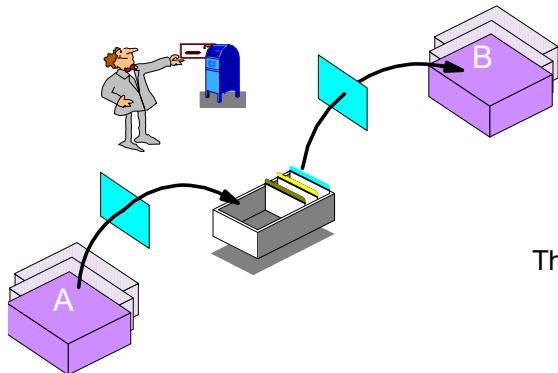


NOTES :

What's a Message Oriented Middleware (MOM)?

■ Messaging software

- ✓ Allows two applications to exchange data asynchronously via « queues »



The advantages of decoupling applications:

1. Maximum utilization of each platform
2. Fault-tolerance
3. Simplified development

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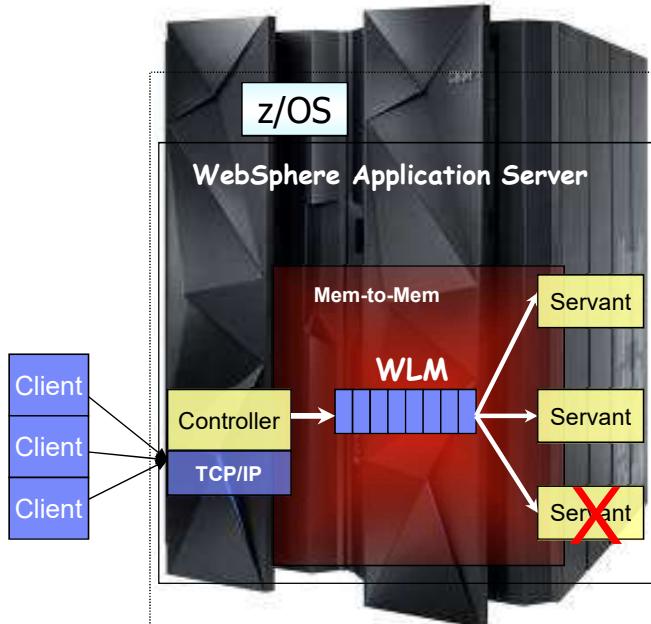
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NOTES :

D'où vient la fiabilité de WAS z/OS ?



• Isolation

- ◆ Code système tourne dans le Controller
- ◆ Code applicatif tourne toujours dans le(s) Servant(s)
- ◆ WLM démarre automatiquement les Servants (paramétrage)
- En cas d'échec d'un Servant, le Controller le détecte, un autre Servant peut traiter les demandes
- Le Controller peut lancer une nouvelle instance d'un Servant

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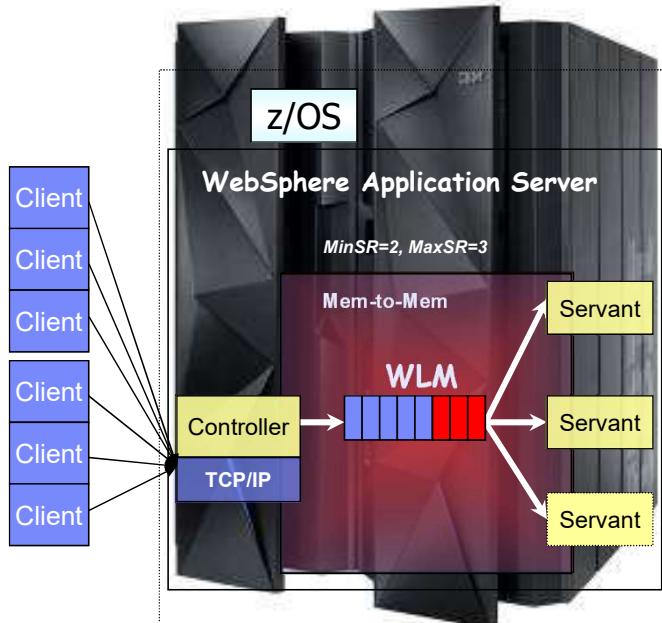
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NOTES :

En quoi WAS z/OS est-il « scalable » ?



- Administrateur détermine le nombre minimum et maximum des Servants
- En cas de besoin, WLM peut démarrer des Servants supplémentaires
- Et si la charge diminue.... WLM peut arrêter des Servants pour économiser vos ressources

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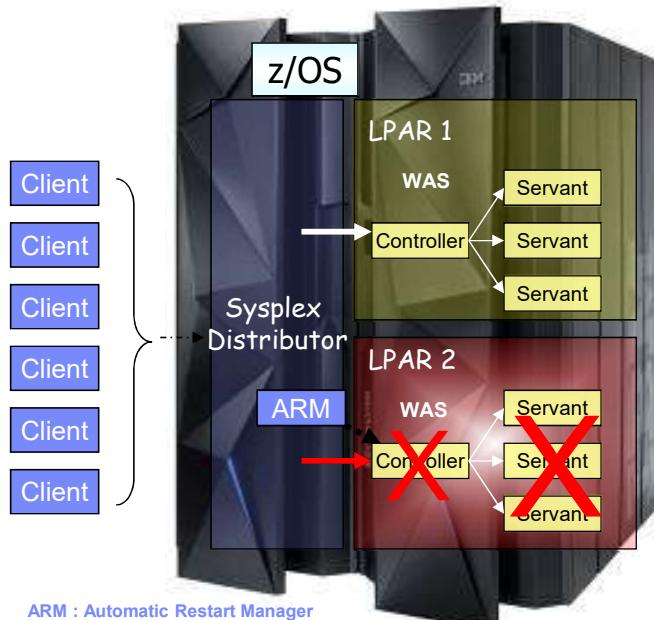
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NOTES :

Comment WAS z/OS gère-t-il la haute disponibilité ?



- Afin de fournir une vraie haute-dispo, on peut avoir multiples AppServers dans les LPARs différentes, chacun avec son propre Controller, typiquement en WAS Cluster.
- Si un Controller est arrêté, Sysplex Distributeur peut envoyer les requêtes à un autre Controller.
- ARM peut détecter qu'un WAS est arrêté, et le relancer automatiquement.

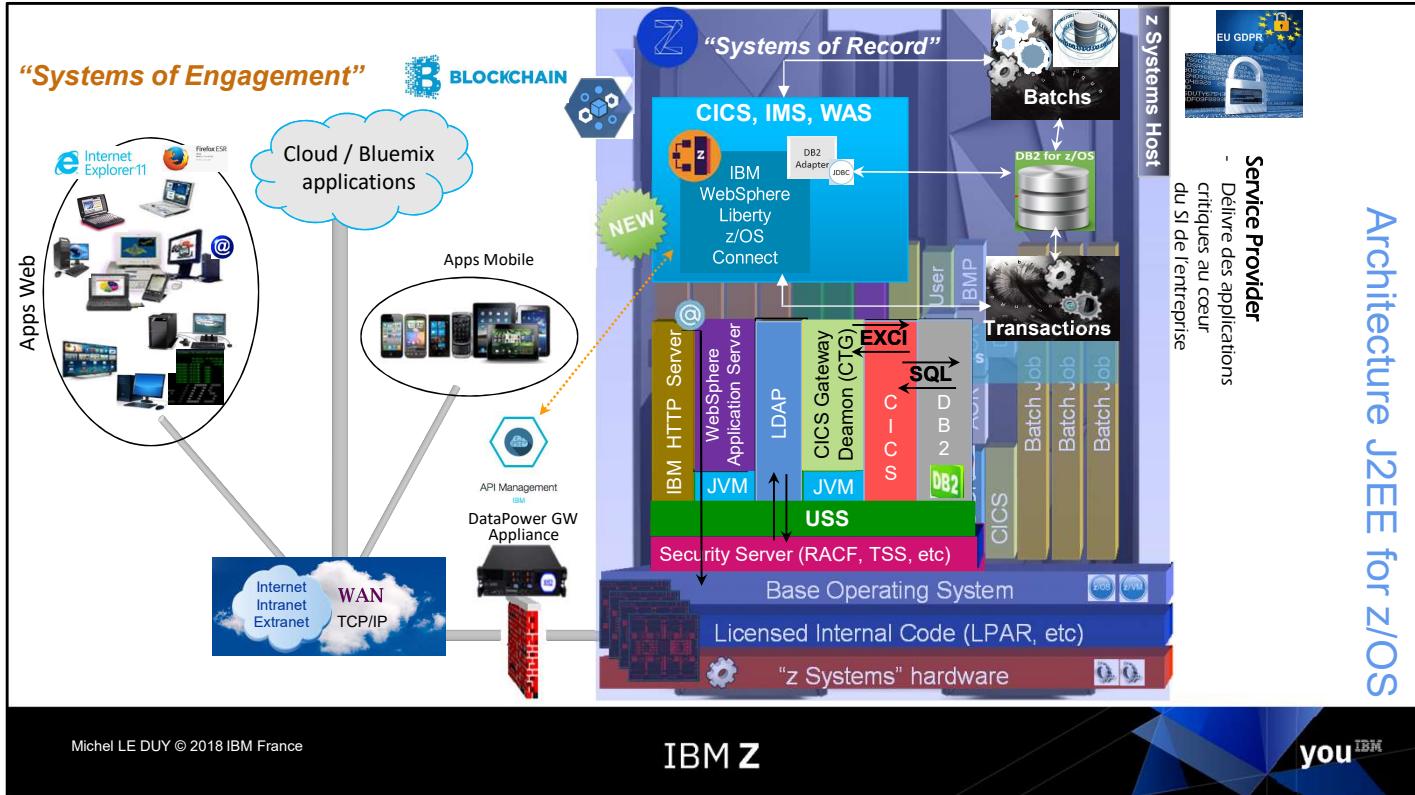
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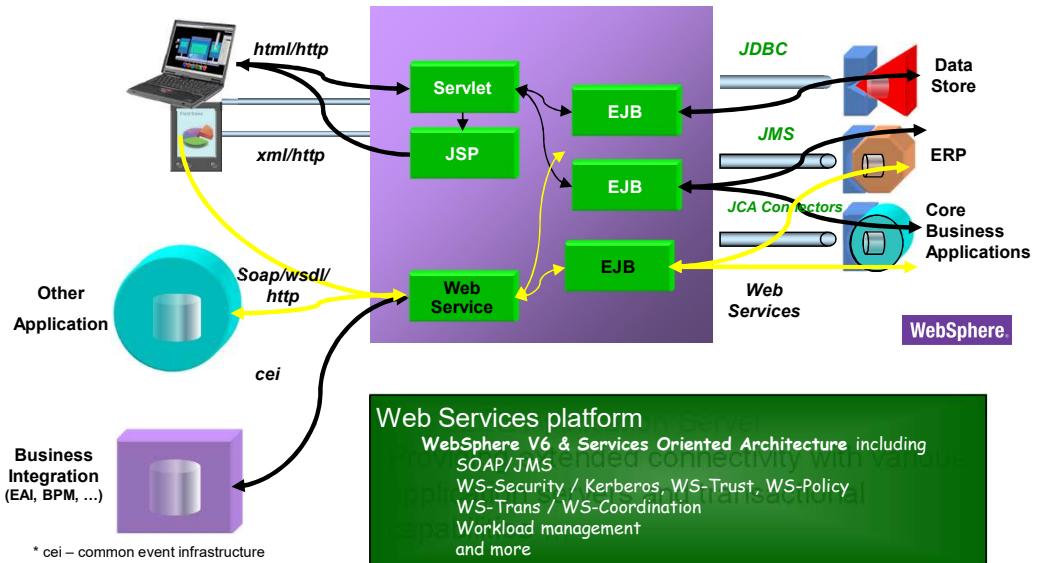


NOTES :



NOTES :

IBM WebSphere Application Server - the Core Engine



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NOTES :

Continuous Availability / Disaster Recovery with z Systems

Single System



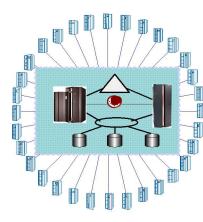
- MTBF – in decades
- Built-In Redundancy
- Capacity Upgrade on Demand
- Capacity Backup
- Hot Pluggable I/O

Clustering in a Box



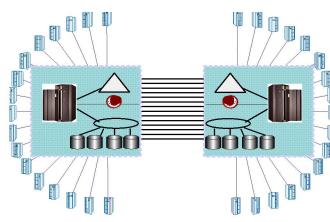
- Using an ICF, a single CEC Parallel Sysplex can be defined
- Maintenance on LPAR without loss of data
- Protection from s/w outages

Parallel Sysplex



- Addresses Planned and Unplanned HW/SW Outages
- Flexible, non-disruptive Growth
- Capacity beyond largest CEC
- Scales better than SMPs
- Dynamic Workload/Resource Management

GDPS



- Addresses Site Failure/Maintenance
- Metro/Global/zGlobal Data Mirroring
 - ▶ Sync (PPRC) – 100km
 - ▶ Async (XRC) – any distance
- Eliminates Tape/Disk SPOF
- No/Some Data Loss
- Application Independent

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NOTES :



Agenda

Mainframe (IBM z14™) & Digital Transformation

1. Introduction on zStack
2. Key concepts of SOA
3. SOA Solutions on z/OS
 - ✓ Transaction environments
 - ✓ SOA Foundation products
 - ✓ SOA Integration solutions
 - ✓ Development and full SOA cycle solutions
 - ✓ System Management Tools for z/OS Applications
4. LinuxONE
5. Digital Transformation : Solutions on Z System & LinuxONE
6. Conclusion



Service Oriented Architecture (SOA) helps customers increase the flexibility of their business processes, strengthen their underlying IT infrastructure and retain and reuse their existing assets. z/OS is THE platform of choice where the main enterprise assets reside. This session will define the basics of SOA and will highlight the solution available under z/OS.

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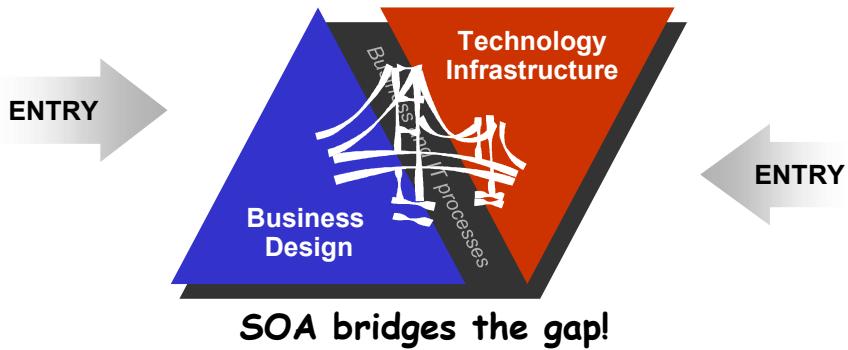
you IBM



NOTES :

Becoming an On Demand Business

An On Demand Business is an enterprise whose **business processes** — **integrated end-to-end** across the company and with key partners, suppliers and customers — **can respond with speed** to any customer demand, market opportunity or external threat.



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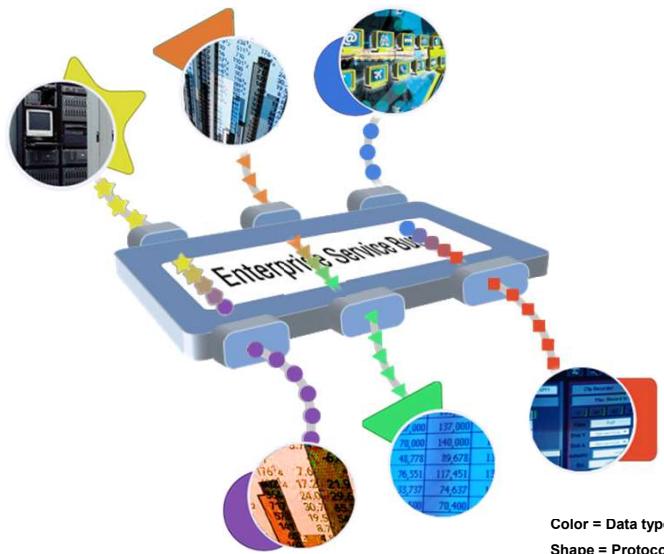


NOTES :

Enterprise Service Bus – the centerpiece of a SOA

- Flexible connectivity infrastructure for integrating applications and services to power your SOA

- ▶ ROUTING messages between services
- ▶ CONVERTING transport protocols between requestor and service
- ▶ TRANSFORMING message format between requestor and service
- ▶ HANDLING business events from disparate sources



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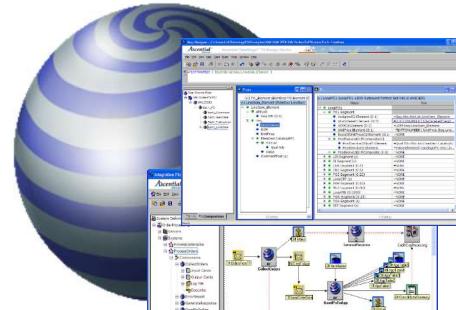


NOTES :

WebSphere Transformation Extender (WTX)

- Lecture des données dans leur format natif

TOUTES
données
structurées



- Transformation sans programmation

Intégration N à N
(n origines, n destinations, n formats)
Fichiers, bases de donnée, etc.

- Ecriture des données dans leur format cible

Hierarchical Data , Binary Data, Packed Data, Tabular Data,
Relational Data, Nested Structures, Mixed-Type Data, etc...



TOUTES
structures
des données

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NOTES :



Agenda

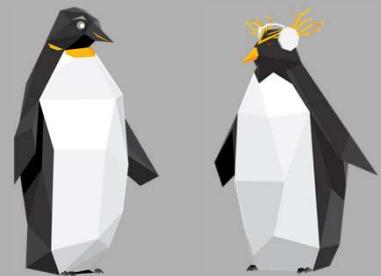


Mainframe (IBM z14™) & Digital Transformation

1. Introduction on zStack
2. Key concepts of SOA
3. SOA Solutions on z/OS
 - ✓ Transaction environments
 - ✓ SOA Foundation products
 - ✓ SOA Integration solutions
 - ✓ Development and full SOA cycle solutions
 - ✓ System Management Tools for z/OS Applications
4. LinuxONE
5. Digital Transformation : Solutions on Z System & LinuxONE
6. Conclusion

IBM LinuxONE
Emperor™

IBM LinuxONE
Rockhopper™



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NOTES :

IBM investit très fortement : écosystèmes, Open innovation & compétences

+19 années d'investissement d'IBM dans les solutions ouvertes

+50K IBMers participent à +180 Open Organisations

2018



5 IBMers participent aux projets Linux & Apache

1999



IBM LINUXONE : UN OPEN ECOSYSTEM

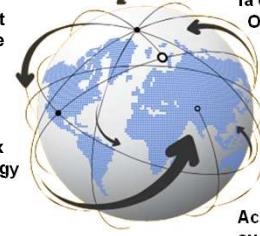
pour alimenter l'innovation et le progrès

Le projet Open Mainframe

Centres IBM Linux Technology

Projets IBM Research: DREAM ALS Challenge

Contributions à la communauté Open-Source



Academic Initiative & Training Programs

Accès libre au Cloud communautaire LinuxONE

<https://www.openmainframeproject.org>



NOTES :

IBM z Systems supports the digital transformation of enterprises



IBM z Systems

Designed for digital transformation

A **hybrid cloud infrastructure** that serves as the backbone of your enterprise

Discover, deliver and act on **real time insight** within the current business transaction

Enables **rapid and high quality app creation** through open and collaborative methodologies

End-to-end security to **combat cyber threats** for privacy and protection

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NOTES :

Enterprise-grade Linux

The best of **ENTERPRISE COMPUTING**

- Dynamic Resource Allocation™
- Non-Disruptive Scalability
- Continuous Business Availability
- Operational Efficiency
- Trusted Security
- Data and Transaction Serving

The best of **LINUX & OPEN**

- Freedom & Agility
- Standards Based
- Speed to Innovate
- Developer Productivity
- Community Collaboration
- Quality of Software

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NOTES :



IBM LinuxONE Rockhopper™

LinuxONE Rockhopper™

IBM LinuxONE Emperor™

LinuxONE Emperor™

IBM LinuxONE Rockhopper

Entry point into LinuxONE family

All the same great capabilities in a smaller package

2 to 13 LinuxONE Cores

40 to 600 Virtual Machines

IBM LinuxONE Emperor

6 to 141 LinuxONE Cores

350 to 8,000 Virtual Machines

The world's fastest processor

Massive I/O throughput

Large memory pools with 4 levels of Cache

IT analytics to avoid future outages

Dedicated cryptographic processors

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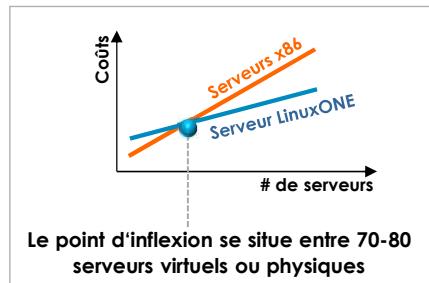
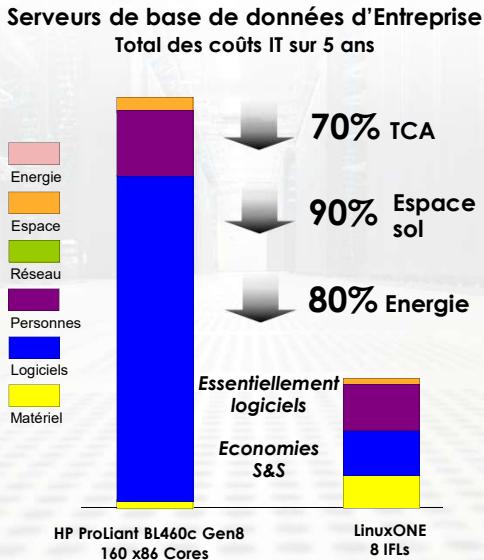
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NOTES :

Consolidation des serveurs sur LinuxONE



Augmentation des transactions

- 600% Mobile
- 200% Internet
- 60% Branche



\$46M d'économie en Capex / Opex grâce à l'optimisation d'infrastructure

Capacités additionnelles pour l'Entreprise:

- Niveau de sécurité pour l'Entreprise
- Niveau d'élasticité pour l'Entreprise

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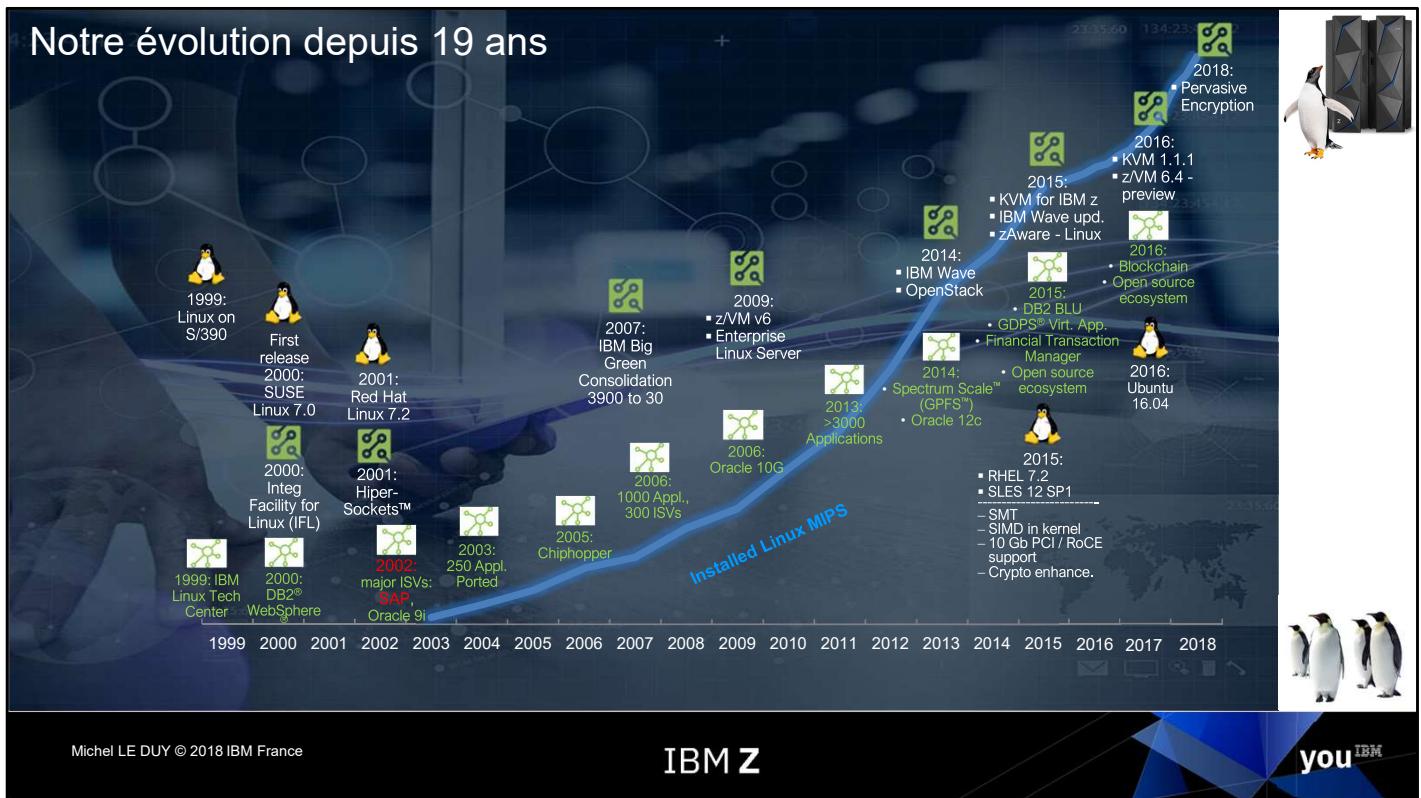
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NOTES :

Notre évolution depuis 19 ans



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NOTES :

Linux distribution certifications on Linux on z Systems



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Distribution	LinuxONE Emperor II	LinuxONE Emperor	LinuxONE Rockhopper	zEnterprise - zBC12 and zEC12	zEnterprise - z114 and z196	System z10 and System z9
	z14	z13	z13s			
RHEL 7	✓ (**) (1)	✓ (1)	✓ (1)	✓ (3)	✓ (3)	✗
RHEL 6	✓ (**) (2)	✓ (2)	✓ (1)	✓ (4)	✓	✓
RHEL 5	✗	✓ (1)	✗	✓ (5)	✓	✓
RHEL 4 (*)	✗	✗	✗	✗	✓ (8)	✓
SLES 12	✓ (**) (2)	✓ (2)	✓ (2)	✓	✓	✗
SLES 11	✓ (**) (2)	✓ (2)	✓ (2)	✓ (6)	✓	✓
SLES 10 (*)	✗	✗	✗	✓ (7)	✓	✓
SLES 9 (*)	✗	✗	✗	✗	✓ (9)	✓
Ubuntu 16.04	✓ (**) (10)	✓ (10)	✓ (10)	✓ (10)	✗	✗

ClefOS Version

[Version 7.2 \(Build 7.2.1511\)](#)

[Version 7.1 \(Build 7.1.1503\)](#)

[Version 6.7](#)

[Version 6.6](#)

[Version 6.5](#)

[Version 6.3](#)

[Version 6.2](#)

[Version .7 \(Build .7.2.1511\)](#)

[Version .7 \(Build .7.1.1503\)](#)

[Version .6 \(Build .6.7\)](#)

[Version .6 \(Build .6.6\)](#)

[Version .6 \(Build .6.5\)](#)

[Version .6 \(Build .6.3\)](#)

[Version .6 \(Build .6.2\)](#)

✓ Indicates that the distribution (version) has been tested by IBM on the hardware platform, will run on the system, and is an IBM supported environment. Updates or service packs applied to the distribution are also supported. Please check with your service provider which kernel-levels are currently in support.

(**) IBM is working with the Linux vendor to support selected levels of the distribution on z14.

RHEL 6.6 is planned to be based on a service update of RHEL 6.5 SP4.

SLES 11 support is planned to be based on a service update of SLES11 SP4.

Note: required patch levels and additional details will be provided soon.

(1) Red Hat Hardware Certification statements are available for RHEL 7.0, RHEL 6.6, and RHEL5.11 at:

<https://hardware.redhat.com/quicksrch?search=z13>

The following kernel-levels are the currently known required minimum-levels for z13:

RHEL 7.0 uses RHEL 7.0-3.10.0-229.14.1.el7

RHEL 5.11-2.6.18-400.el6

(2) SUSE YES CERTIFIED Bulletins are available for SLES 12 and SLES 11 SP3 at:

<https://www.suse.com/research/SResults.jsp?bulletinNumber=&keywords=z13>

The following kernel-levels are the currently known required minimum-levels for z13:

SLES 12 - 3.12.44-53.1.el8

SLES 11 SP3-3.0.101-0.40.1

(10) Canonical Ubuntu Server certified hardware is available

for z13 at: <https://certification.ubuntu.com/server/models/?query=z13&vendors=IBM&release=16.04%20LTS>

for z12: <https://certification.ubuntu.com/server/models/?query=z12&vendors=IBM&release=16.04+LTS>

for z9: <https://certification.ubuntu.com/server/models/?query=z9&vendors=IBM&release=16.04+LTS>

The following kernel-level are the currently known required minimum-levels for z13/z13/zEC12/zBC12:

Ubuntu 16.04.1 - 4.4.0.21.22

(3) RHEL 7.1 replaces RHEL 7.0

(4) Minimum level: RHEL 6.3

(5) Minimum level: RHEL 5.8

(6) Recommended level: SLES 11 SP3

(7) Recommended level: SLES 10 SP4 with latest maintenance updates

(8) RHEL 4.8 only. Some functions have changed or are not available with the z196, e.g. the Dual-port OSA cards support to name one of several. Please check with your service provider regarding the end of service.

(9) SLES 9 SP4 with latest maintenance updates only. Some functions have changed or are not available with the z196, e.g. the Dual-port OSA cards support to name one of several. Please check with your service provider regarding the end of service.

✗ Indicates that the distribution is not supported by IBM on this server.

(*) The distribution is out of service, extended support is required.

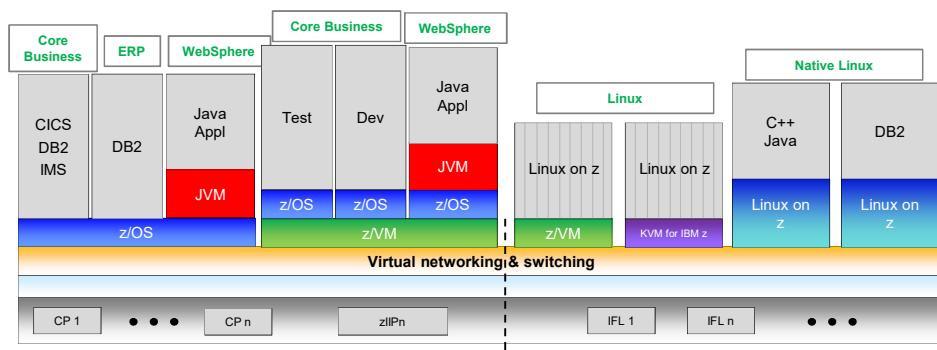
Reference : <http://www-03.ibm.com/systems/z/os/linux/resources/testedplatforms.html>



NOTES :

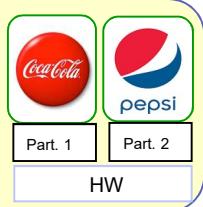
IBM z Systems – Reliable, Scalable, Secure and Virtualized

An integrated, highly scalable computer system that allows many different pieces of work to be handled at the same time, sharing the same information as needed with protection, handling very large amounts of information for many users with security, without users experiencing any failures in service



- Large scale, robust consolidation platform
- Hypervisor partitioning built into firmware
- Complete isolation – EAL 5+
- Supports as many as 85 hypervisor instances
 - z/VM or KVM
- Up to 8,000 Linux Guests supported (up to 50 per core)
- Intelligent and autonomic management of diverse workloads and system resources

EAL 5+ means you can put the recipe for Coke next to the recipe for Pepsi on the same physical infra and keep the two complete isolated



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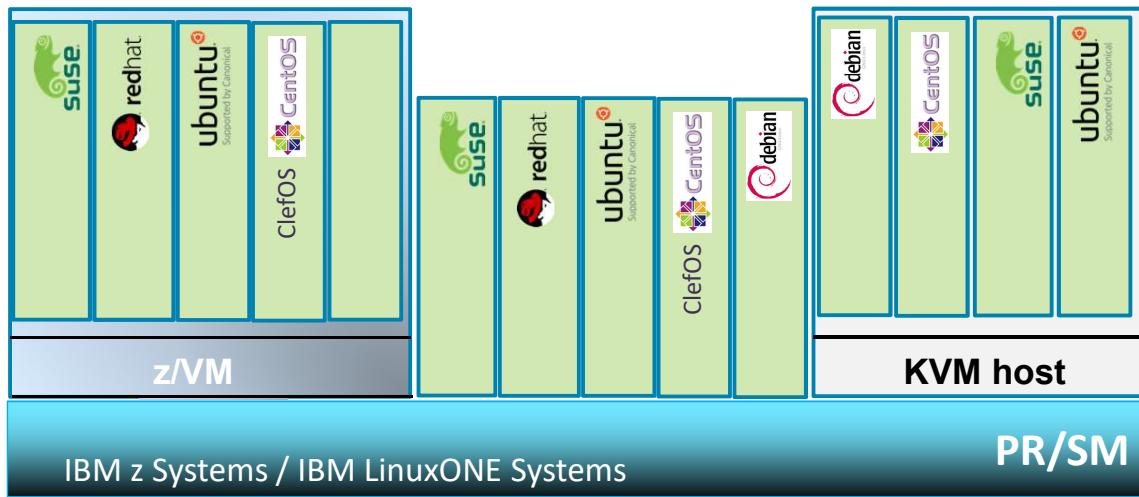
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NOTES :

Support de Linux distribution par Hyperviseur



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NOTES :

Le meilleur de Linux & Open Source

Expansion de l'Ecosystem Open Source

Distributions	Virtualization / Container	Langages Open Source	Runtimes	Administration Hybrid Cloud	Base de Données	Analytics	Autre
Supported Versions	KVM LPAR DPM zAppliance Container Infrastructure LXD (Ubuntu)	python php R Ruby ERLANG Scala JS Clojure ANTLR Java XMLSec Library OCaml Apache Maven maven doxygen WORDPRESS fluentd	node Rails ZFS CHEF Mono OpenJDK LLVM APACHE SERVER Jenkins LIBERTY PROFILE	docker openstack Cloud Manager zVMM KVM VRA saltstack Apache JMeter™ cAdvisor Apache ZooKeeper™	PostgreSQL MariaDB mongoDB cassandra Apache DB2 MySQL IBM Cloudant™ redis Apache GEODE	Spark hadoop elasticsearch logstash Apache Solr IBM InfoSphere BigInsights SPSS IBM SPSS Statistics COGNOS AN IBM COMPANY WildFly	Drupal kafka RabbitMQ Joomla! Apache Solr SUGARCRM Magento Open Source e-commerce
Canonical unveils 6th LTS release of Ubuntu with 16.04							
For the latest view of packages, see URL							

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Agenda

Mainframe (IBM z14™) & Digital Transformation

1. Introduction on zStack
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3. SOA Solutions on z/OS
 - ✓ Transaction environments
 - ✓ SOA Foundation products
 - ✓ SOA Integration solutions
 - ✓ Development and full SOA cycle solutions
 - ✓ System Management Tools for z/OS Applications
4. LinuxONE
5. Digital Transformation : Solutions on Z System & LinuxONE
6. Conclusion

Cloud
Analytics
Mobile
Social
Security



IBM Z Solutions for “ C A M S² ”

How are IBM zEnterprise Solutions relevant to Cloud, Big Data/Analytics, Mobile and Social & Security?

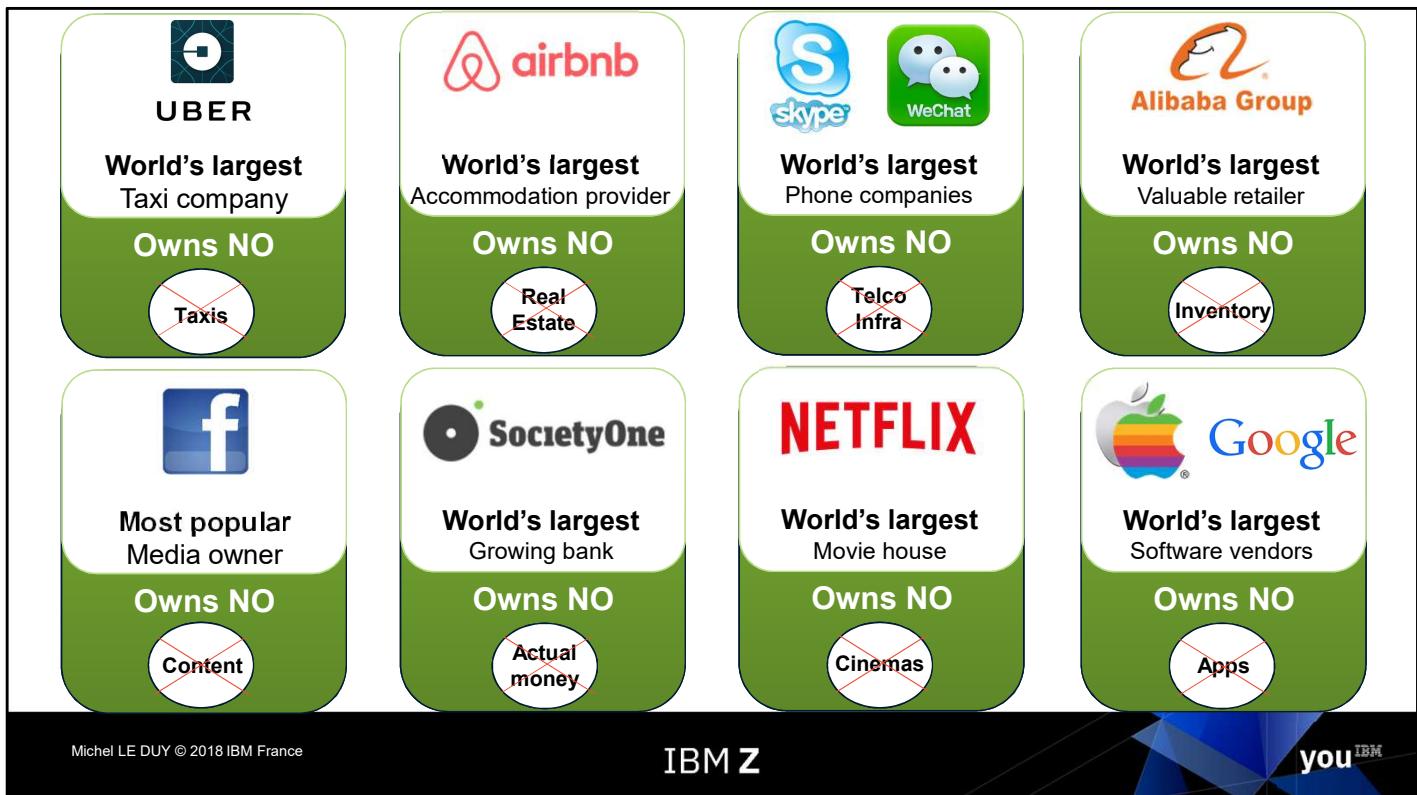
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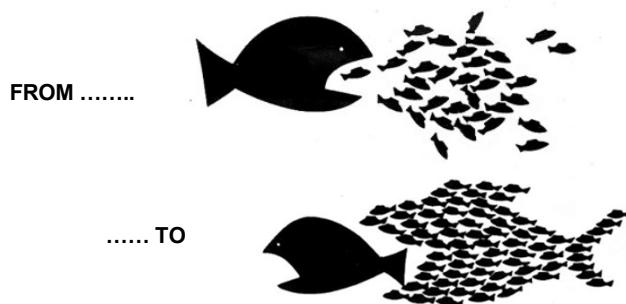


NOTES :



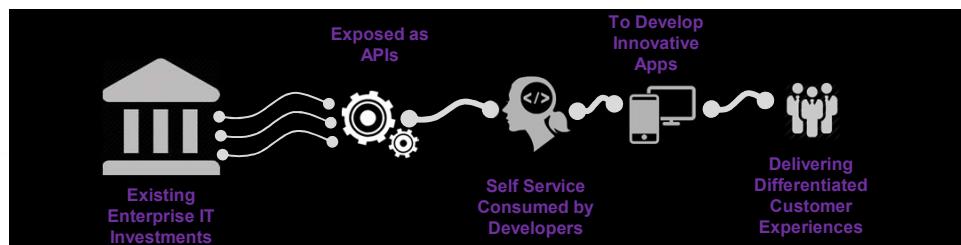
NOTES :

Enterprises doivent apprendre à “Innover comme un Startup”



“The ‘Uber syndrome’ – where a competitor with a completely different business model enters your industry and flattens you.” Judy Lemke, CIO, Schneider, United States

“52% of the Fortune 500 firms since 2000 are gone.” – R. Ray Wang
<http://blog.softwareinsider.org/2014/02/18/research-summary-sneak-peeks-from-constellations-futurist-framework-and-2014-outlook-on-digital-disruption/>



NOTES :

Le monde de l'Entreprise subit une tempête ... sur IBM Z aussi !



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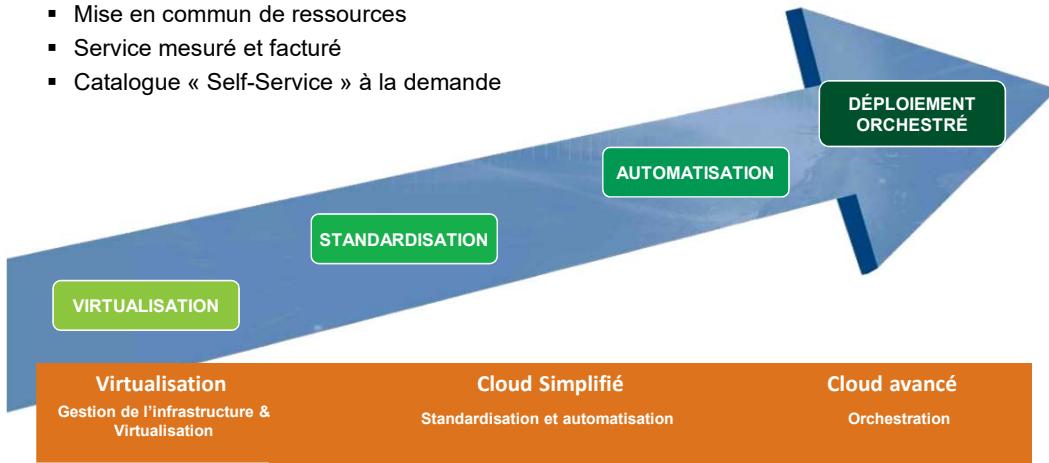


NOTES :

Cloud Computing – Basé sur la virtualisation et la standardisation

Cloud Computing – Caractéristiques :

- Elasticité rapide
- Large accès réseau
- Mise en commun de ressources
- Service mesuré et facturé
- Catalogue « Self-Service » à la demande



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NOTES :

There are multiple delivery models for cloud



Flexible Delivery Models

Private ...

- Privately owned and managed
- Access limited to client and its partner network
- Drives efficiency, standardization & best practices, while retaining control

Value drivers ...

.... Customization, efficiency, availability, resiliency, security and privacy

Cloud Services

Cloud Computing Model

Hybrid ...

- Access to client, partner network, and third party resources
- Industrialization

Public ...

- Owned and managed by service provider
- Subscription based offering
- Offers standardized business process, application and/or infrastructure services
- Flexible price on utility basis

Value drivers ...

.... Standardization, capital preservation, flexibility and time to deploy

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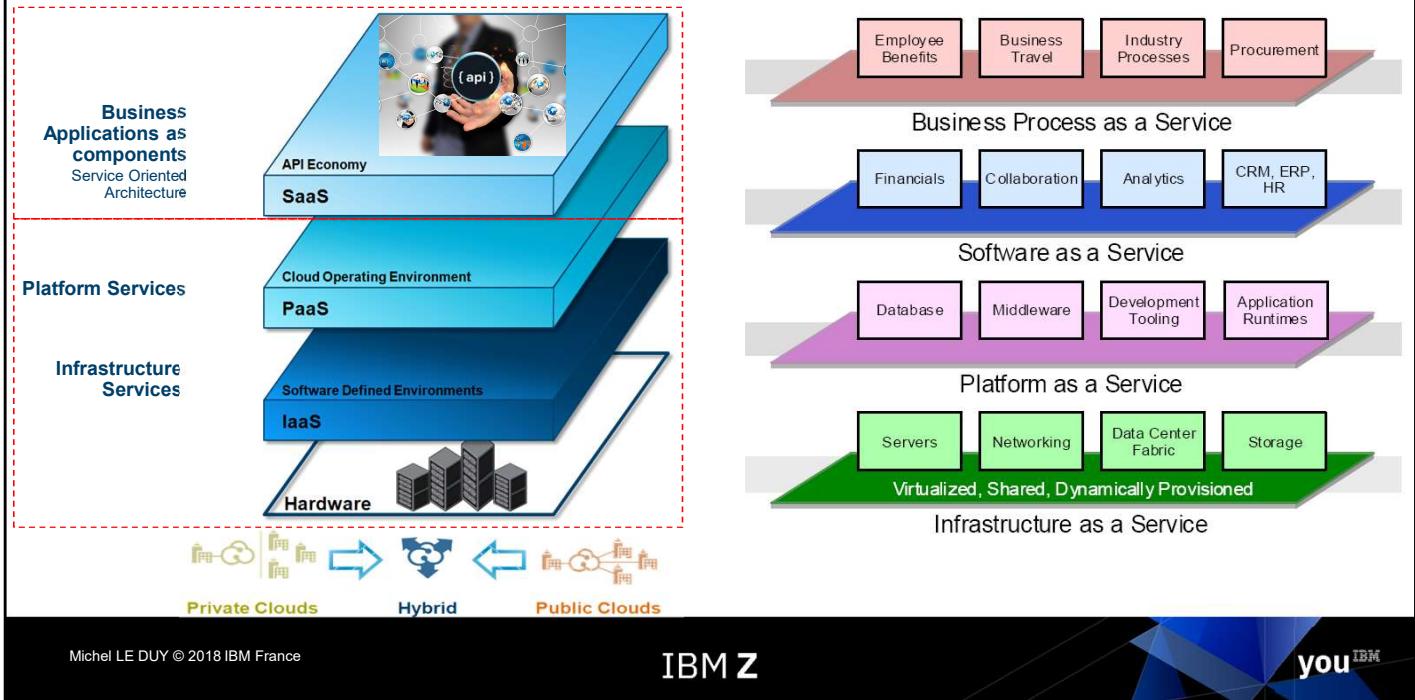
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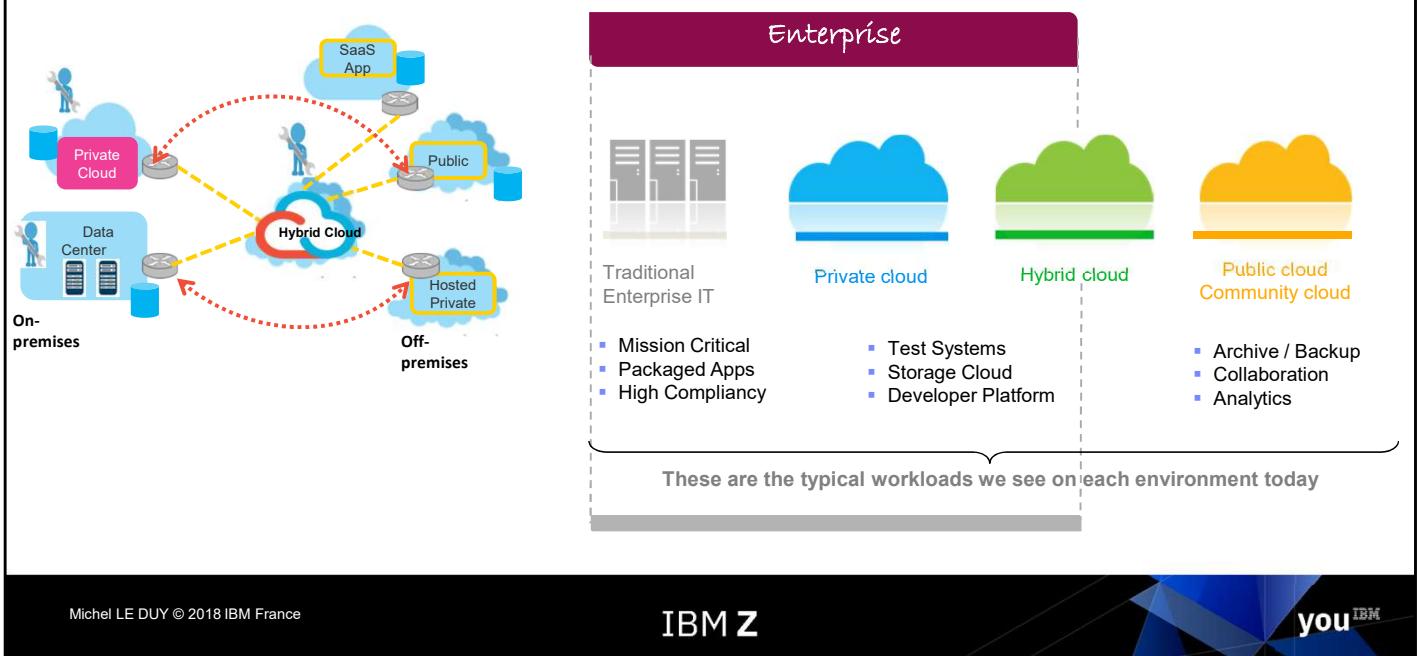
NOTES :

Architecture Cloud avec composants de service & Systèmes d'Entreprise



NOTES :

Traditional IT, Private and Public Clouds will co-exist and be integrated



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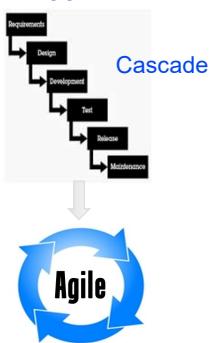
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NOTES :

Développement & Agilité Infrastructure

Process de Développement



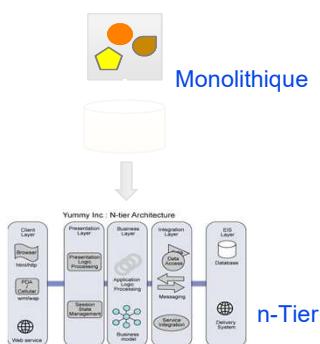
Agile

DevOps



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Application Architecture



Monolithique

n-Tier

Microservices



Déploiement Packaging



Servers physiques



Machines Virtuelles

Containers



Docker DATACENTER

Infrastructure Application



Datacenter



Hébergé

Hybrid Cloud



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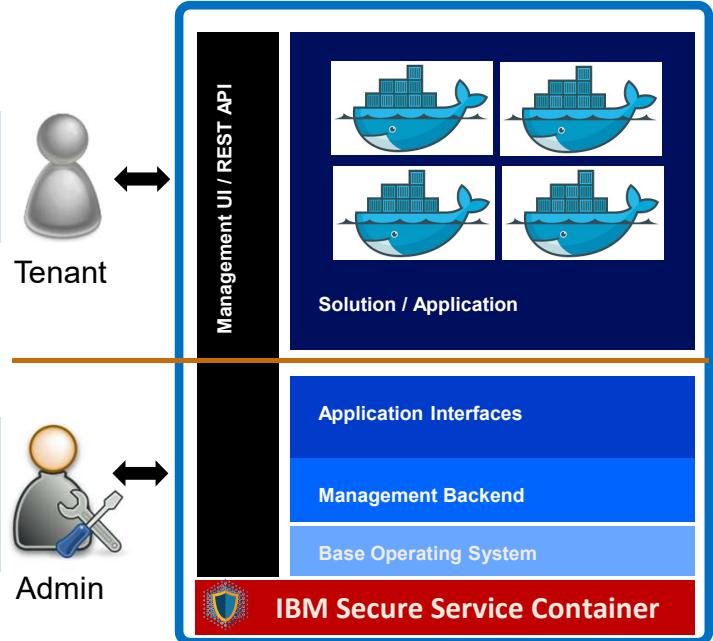


NOTES :

IBM Secure Service Container

IBM Secure Service Container
Appliance

- Data and code in-flight, in-use and at-rest are inherently and pervasively encrypted by hypervisor
- Keys are held and managed in firmware
 - ✓ The System Admin is not required to be trusted
- No code changes to apps required
- Tamper proof application install
- No direct host or OS level interaction
 - ✓ Only well-defined bound and auditable interfaces



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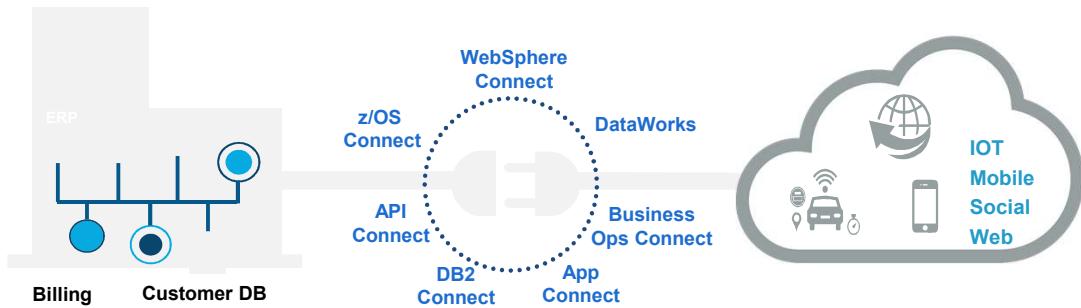
you IBM



NOTES :

Connect the Enterprise to the Cloud

Unlock the value in your existing apps & data on Cloud



Create

Create new mobile, IoT and Web apps using APIs that connect to enterprise applications.



Connect

Enhance existing apps by connecting them with Bluemix cloud services, like IBM Watson



Optimize

Optimize your infrastructure by "lifting and shifting" your applications into the cloud, to take advantage of provisioning, flexible "pay-as-you-go" pricing models & more.

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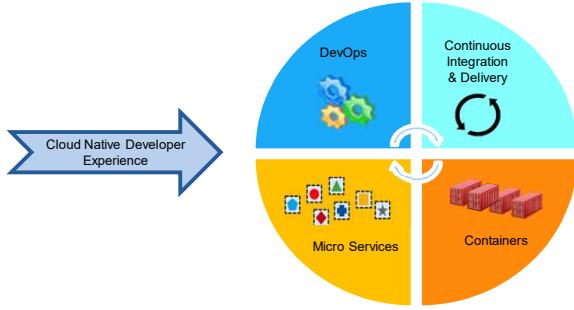
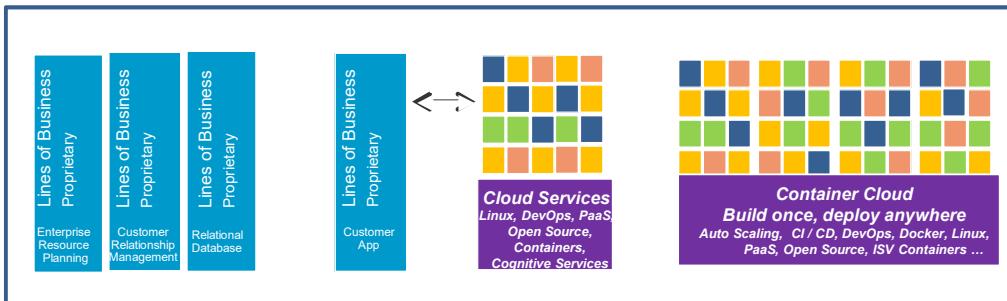
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NOTES :

Cloud is changing how workloads are built & delivered



By 2018, Over **60%** of **New Apps**
Will Use Cloud-Enabled Continuous
Delivery and
Cloud-Native Application
Architectures to Enable Faster
Innovation and Business Agility.
(IDC Prediction)

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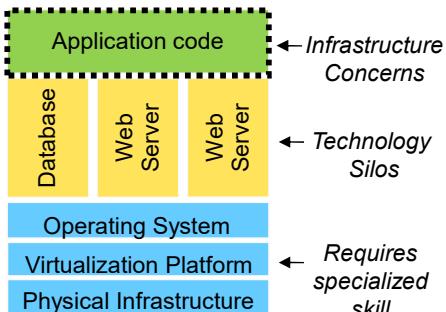
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NOTES :

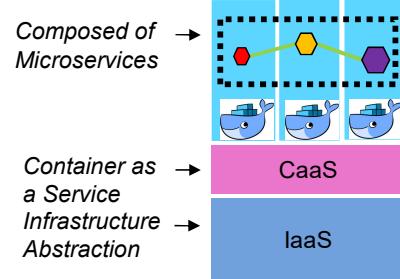
Cloud Platform Evolution

Cloud-Enabled Application



Traditional

Cloud-Native Application



New Workload Paradigm Shift

Microservices demand a combination of APIs and DevOps where Innovation is rewarded within an Agile Culture.

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NOTES :

APIs, language of Cloud: connection & consumption of IT, applications & data



Big data sources provide insights that are shared and monetized through APIs.



Cloud services are exposed through Web APIs, which enable rapid composition environments.

Industries: Retail, Banking, Insurance, Healthcare, Utilities, Government, Automotive

- Provide **rapid and self service access** to assets across developer communities (external, internal & business partners)
- APIs allow for an **agile business** to adapt to change, competition and evolving markets



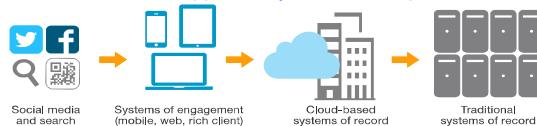
Social APIs fuel personalized experiences for users and new business models.



Mobile applications make calls to back-end services through Web APIs.

API's *Fuel* Innovation & the foundation of a composable business

Modern apps are hybrid and composite



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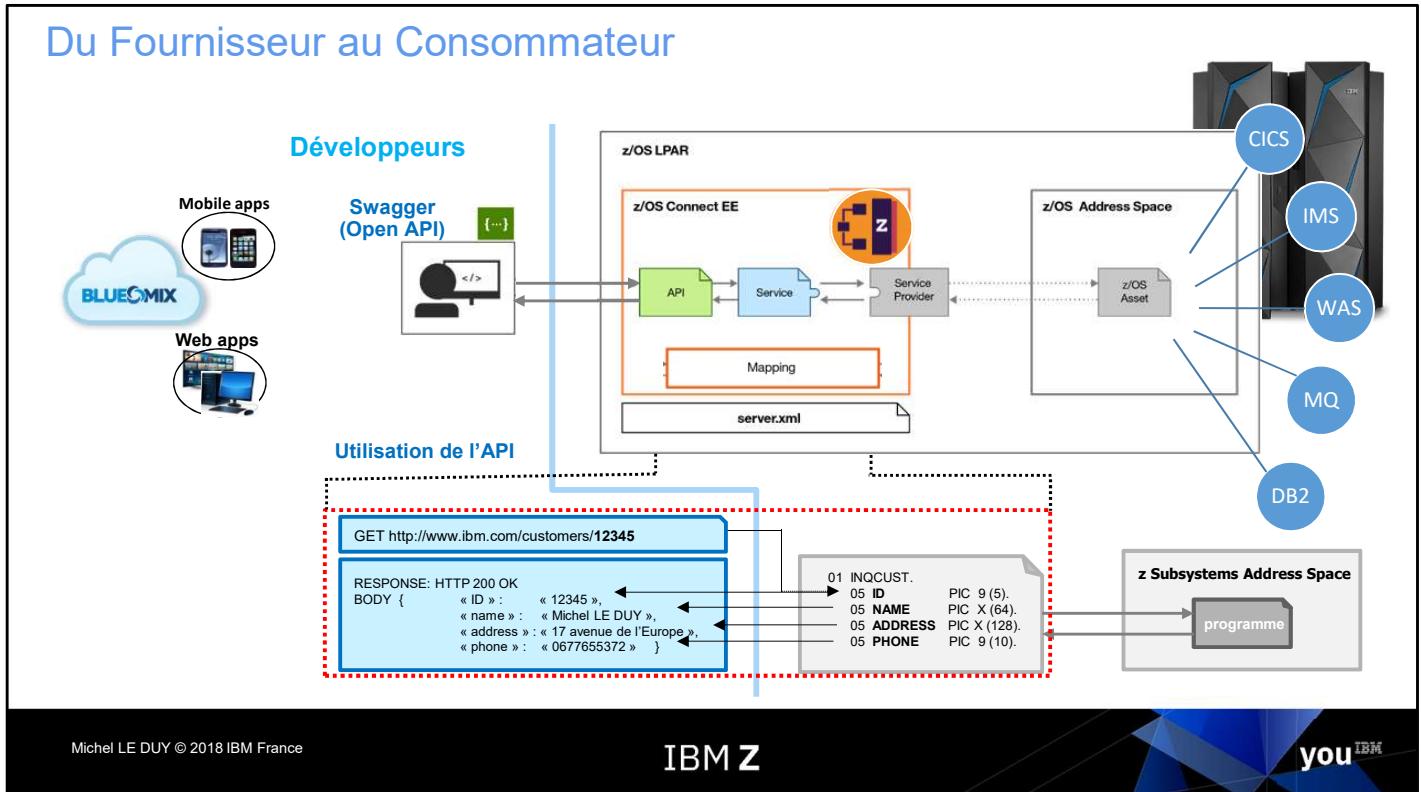
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NOTES :

Du Fournisseur au Consommateur



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NOTES :

Mobile Internet users will surpass PC internet users by 2015



The number of people accessing the Internet from smartphones, tablets and other mobile devices will surpass the number of users connecting from a home or office computer by 2015, according to a September 2013 study by market analyst firm IDC.

Mobile has already superseded the Web
Mobile is a disrupting technology



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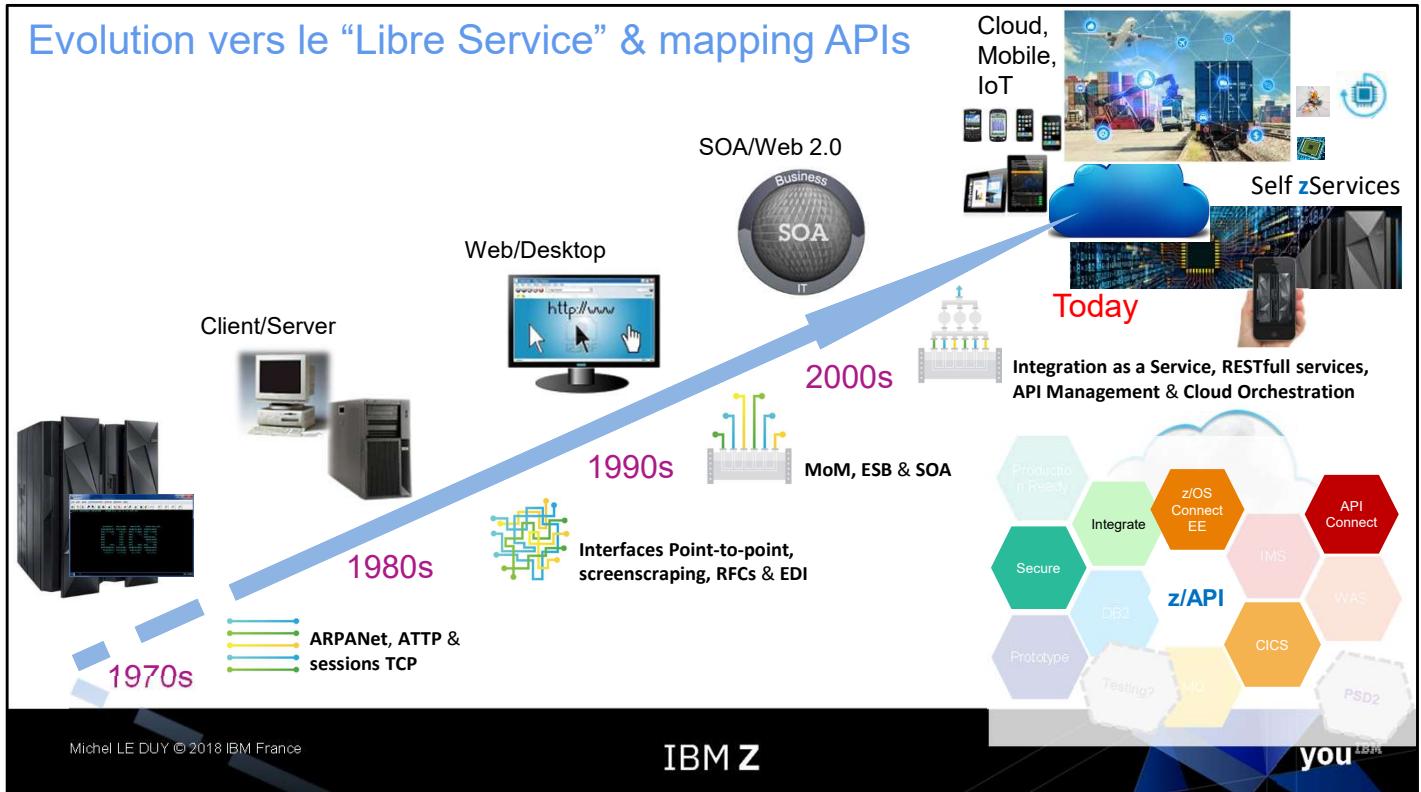
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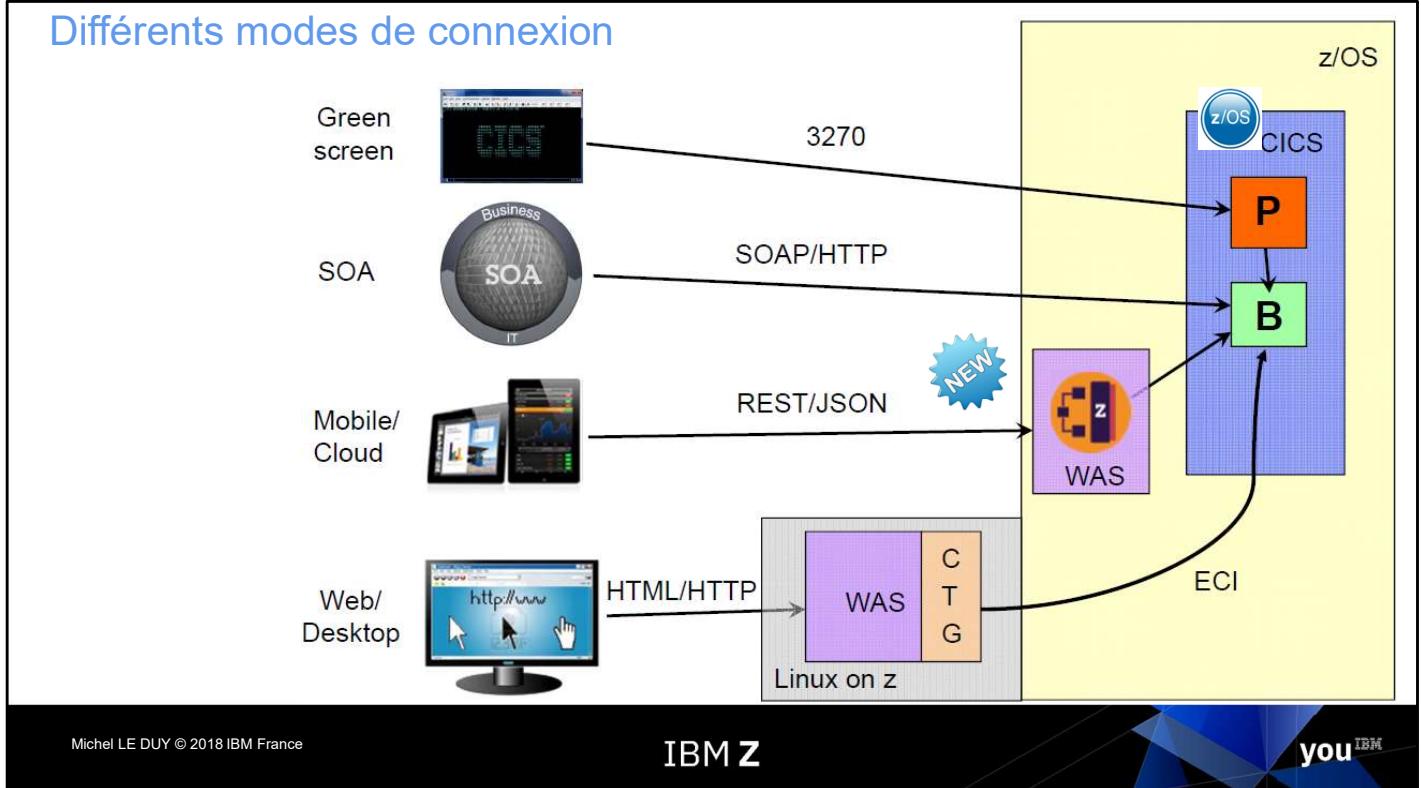
NOTES :

Evolution vers le “Libre Service” & mapping APIs



NOTES :

Différents modes de connexion



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NOTES :

JSON vs. XML

XML

```
<employees>
<employee>
    <firstName>Guillaume</firstName>
    <lastName>Wazner</lastName>
</employee>
<employee>
    <firstName>Loulou</firstName>
    <lastName>Goolen</lastName>
</employee>
<employee>
    <firstName>Michel</firstName>
    <lastName>Le Duy</lastName>
</employee>
</employees>
```

300 Bytes Approx.

Pour 50 000 enregistrements:

XML: ~14 MB
JSON: ~7 MB

JSON

```
var employeesArray = [
    { "firstName": "Guillaume" , "lastName": "Wazner" },
    { "firstName": "Loulou" , "lastName": "Goolen" },
    { "firstName": "Michel" , "lastName": "Le Duy" }
];
```

150 Bytes Approx.

C'est la même data,
avec 50% de moins !

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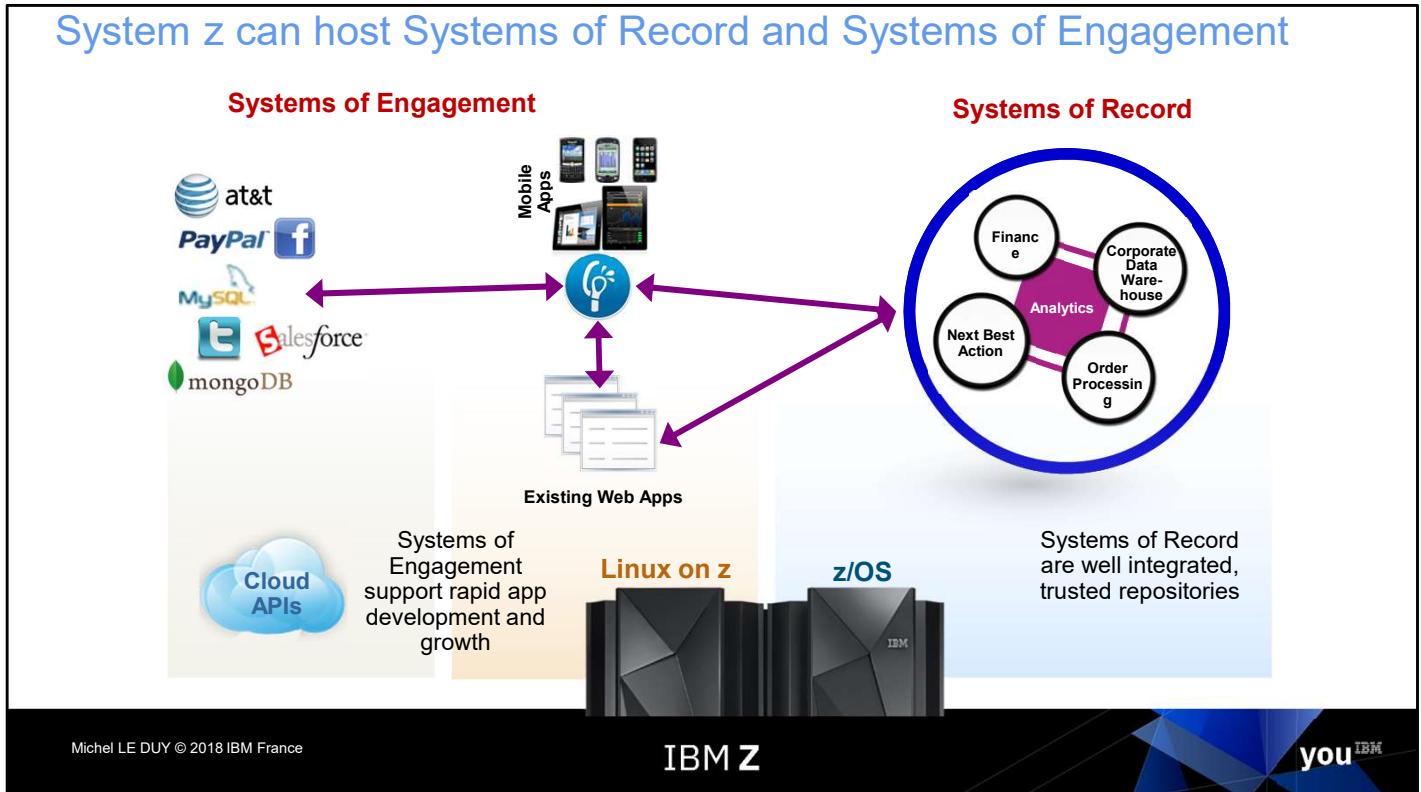
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NOTES :

System z can host Systems of Record and Systems of Engagement



NOTES :

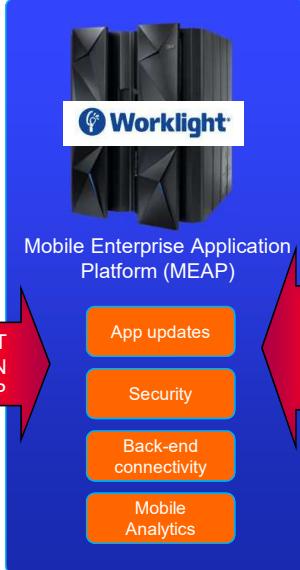
Typical mobile environment



Mobile Devices



Systems of Engagement



Systems of Record



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NOTES :

Hybrid transaction / analytical processing

Transactions



Workloads Analytiques



Plate-forme Hybride sur IBM Z

Prendre en charge le traitement des transactions et les workloads analytiques en temps réel, de manière efficace et rentable

Délivre des performances de pointe pour les workloads mixtes

Plate-forme scale-out hétérogène unique dans l'industrie

Meilleure disponibilité, fiabilité et sécurité

DB2 Analytics Accelerator & DB2 for z/OS

Système de gestion de Database des workloads hybrides optimisé, s'autogéré qui exécute chaque query workload de la manière la plus efficace afin que chaque requête est exécutée dans son environnement optimal pour la plus grande performance et l'efficacité des coûts

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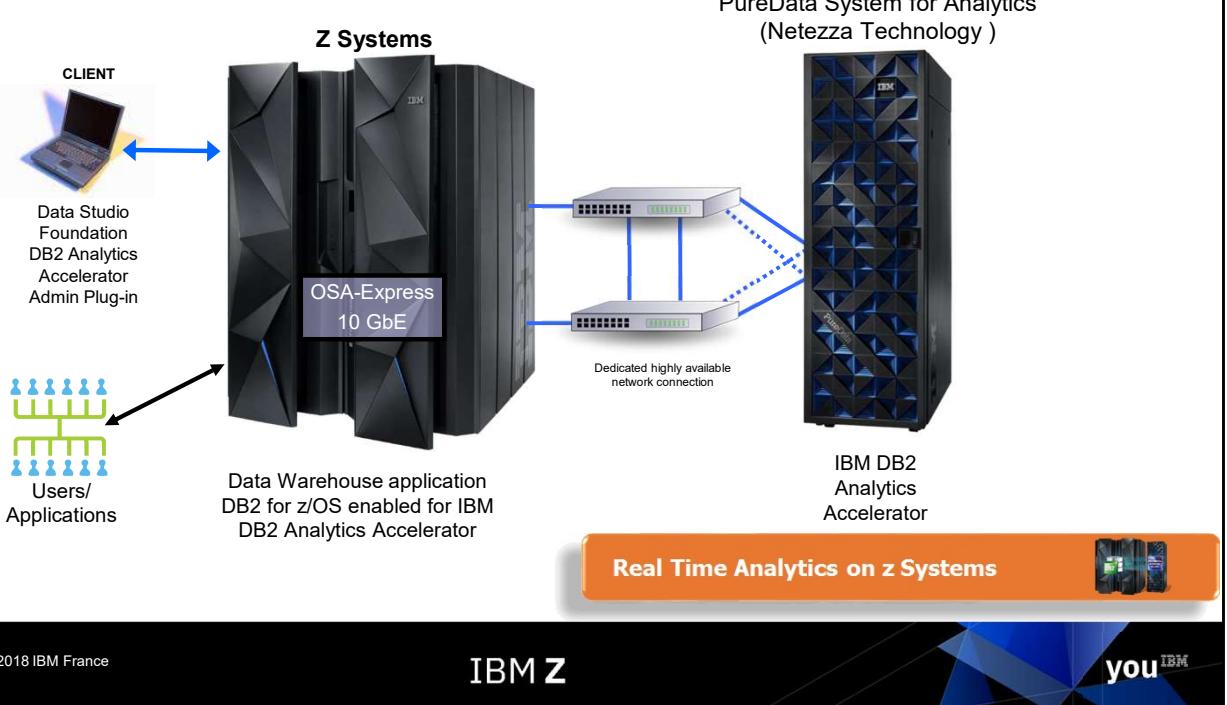
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NOTES :

IBM DB2 Analytics Accelerator Product Components



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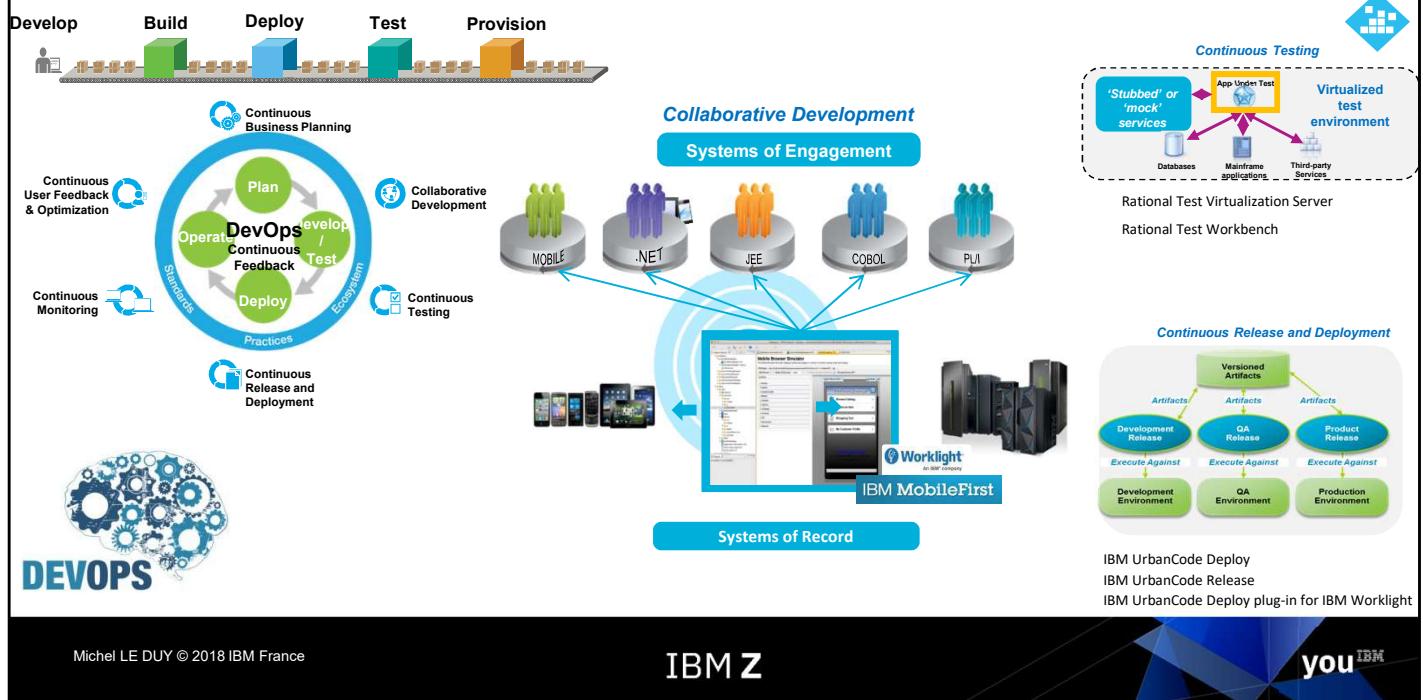
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NOTES :

Un environnement DevOps intégrant le z Systems



NOTES :

Modernize Mainframe Development

Develop and Test 

Rational Developer for z Systems – Integrated multiplatform development environment

Integration with Team Concert for Lifecycle and Source Management



Integration with RD&T for flexible access to z Systems environment



Integration with Fault Analyzer for ABEND Analysis



Rational Developer for System z

A modern IDE for productive development of cross-platform applications written in COBOL, PL/I, ASM, Java, EGL or C/C++ in z Systems CICS, IMS, DB2, Batch applications, with a powerful state of the art integrated debugger



Access to typical System z sub-system functionality in z/OS, CICS, IMS, DB2, WAS



Robust Mobile Development in conjunction with Worklight



Integration with Asset Analyzer for Application Understanding and Impact Analysis



Integration with File Manager for file and test data handling



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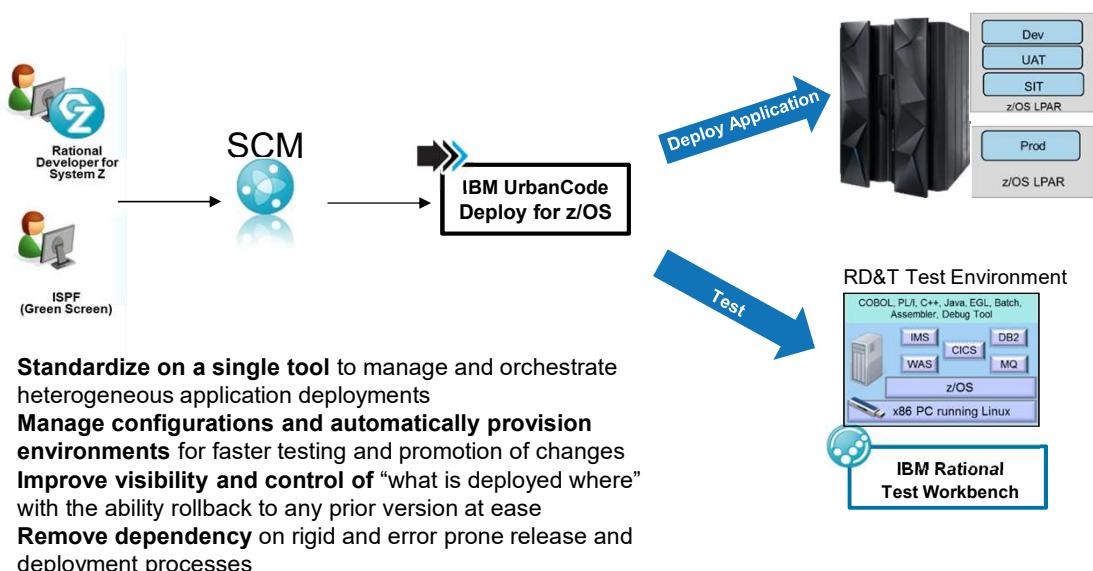


NOTES :

UrbanCode Deploy

Integrate Systems of Engagement with Systems of Record

Deploy



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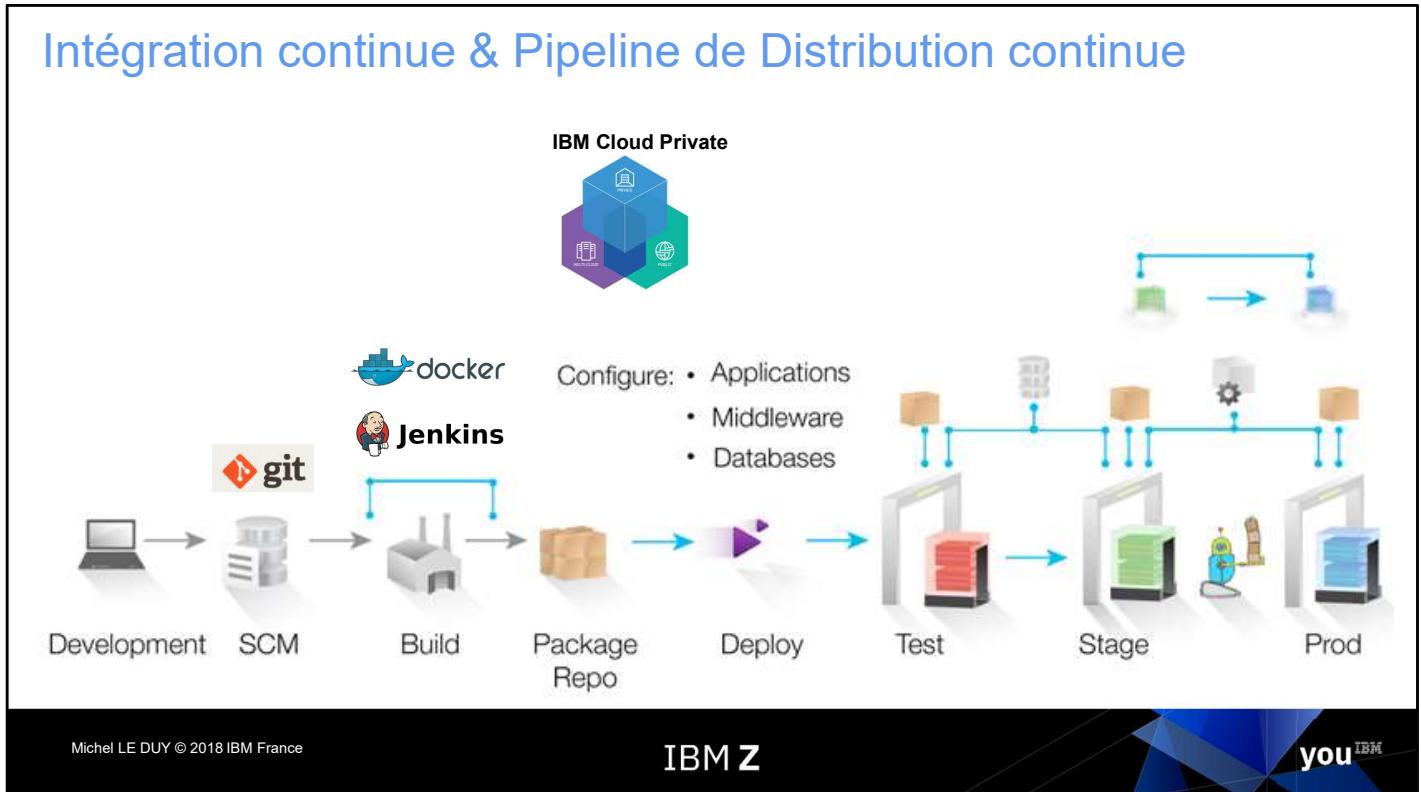
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NOTES :

Intégration continue & Pipeline de Distribution continue



NOTES :

Virtualize

IBM z/VM 6.4

Support more virtual servers than any other platform in a single footprint
Integrated OpenStack support



IBM Wave for z/VM

A graphical interface tool that simplifies the management and administration of z/VM and Linux environments



KVM

Hypervisor alternative

Differentiation

LinuxONE Systems Cloud Blueprint

OpenStack Cloud Management Dashboard

A simple, entry level cloud management stack
Based on OpenStack
Can be run from LinuxONE System environment ("managed-from")



VMware vRealize Automation



Standardize

DevOps

IBM UrbanCode Deploy with Patterns is a full-stack environment management and deployment solution that enables users to design, deploy and update full-stack environments to multiple clouds

IBM UrbanCode Deploy automates the deployment of applications, databases and configurations into development, test and production environments, helping to drive down cost, speed time to market with reduced risk.

Advanced Cloud

IBM Cloud Orchestrator

Builds on functionality of **OpenStack** and adds runbook automation and middleware pattern support for workload deployment



LinuxONE System supported as "managed-to"
Formerly known as SmartCloud Orchestrator

Service Lifecycle Management

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NOTES :

vRA, Que sert-il ? Provisionne & orchestre la virtualisation des workloads IBM z Systems / LinuxONE & Power

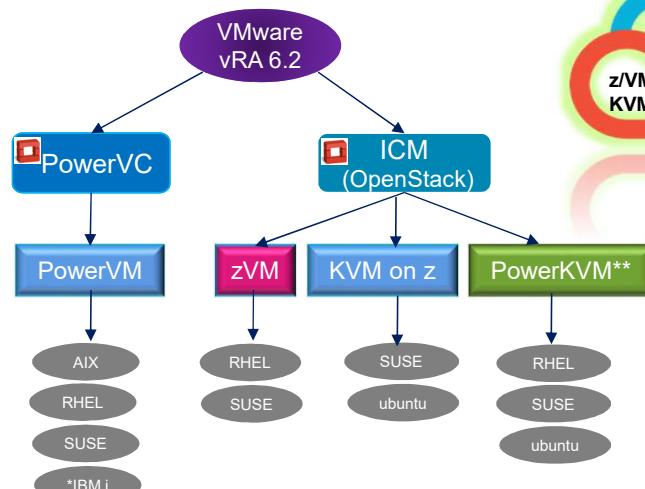
Annonce @VMWorld
30 Août 2015

• Infrastructure as a Service (IaaS)

vRA transfère les demandes de gestion des workloads via OpenStack API's (Juno) vers IBM PowerVM, PowerKVM, z/VM et KVM sur IBM z

• Platform as a Service (PaaS)

Installation d'applications scriptées et workflows via IBM Cloud Builder Services



* Test/vérification pour IBM i prévu plus tard 4Q 2015
** Provision PowerKVM via PowerVC prévu 1Q 2016

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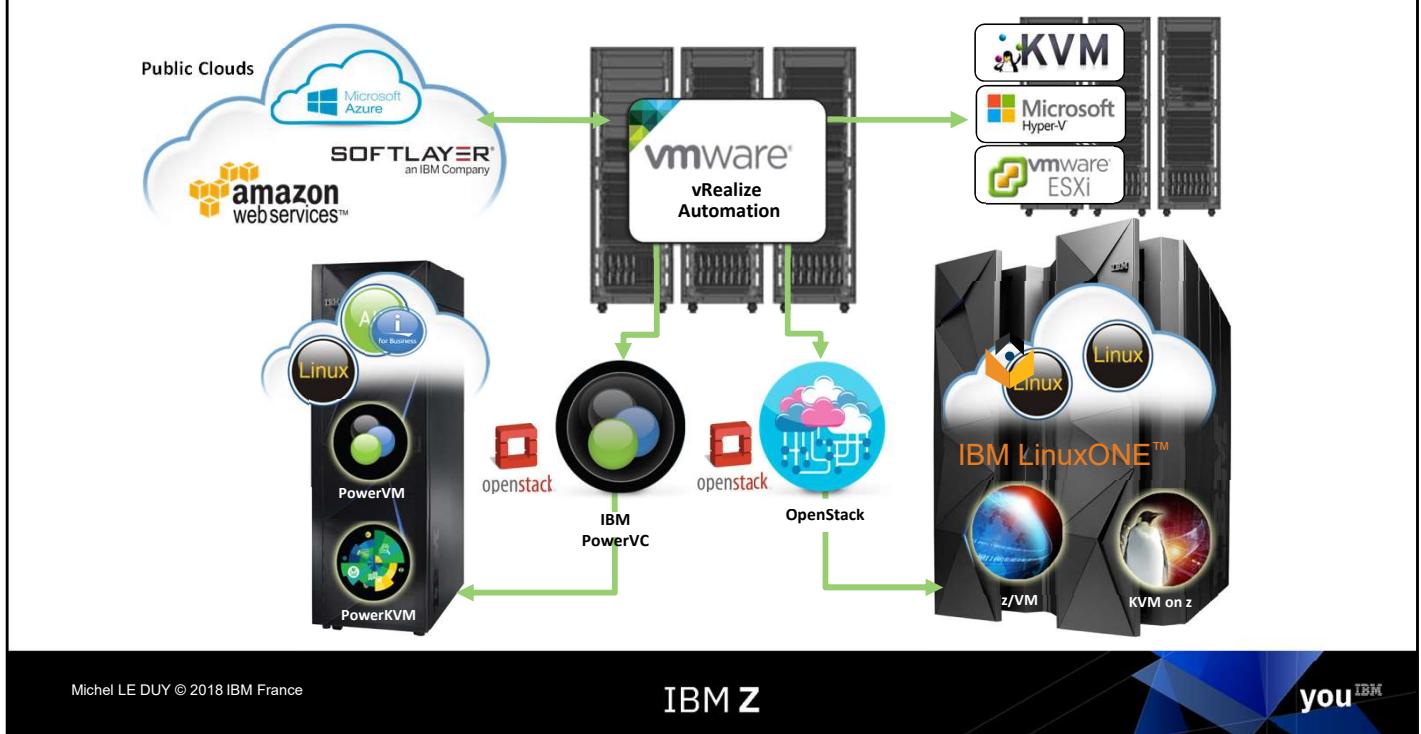
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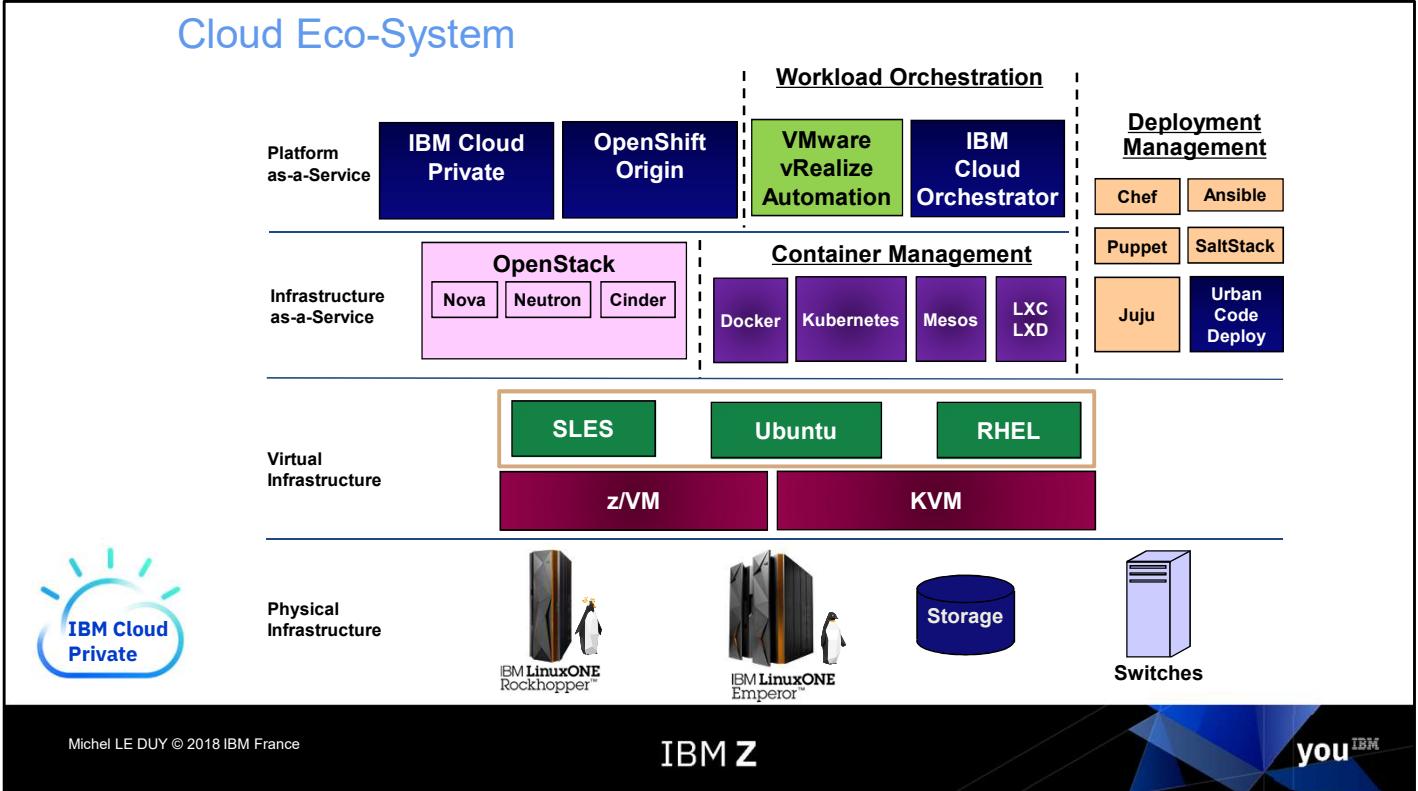
NOTES :

VMware vRealize Automation Architecture & IBM Systems



NOTES :

Cloud Eco-System

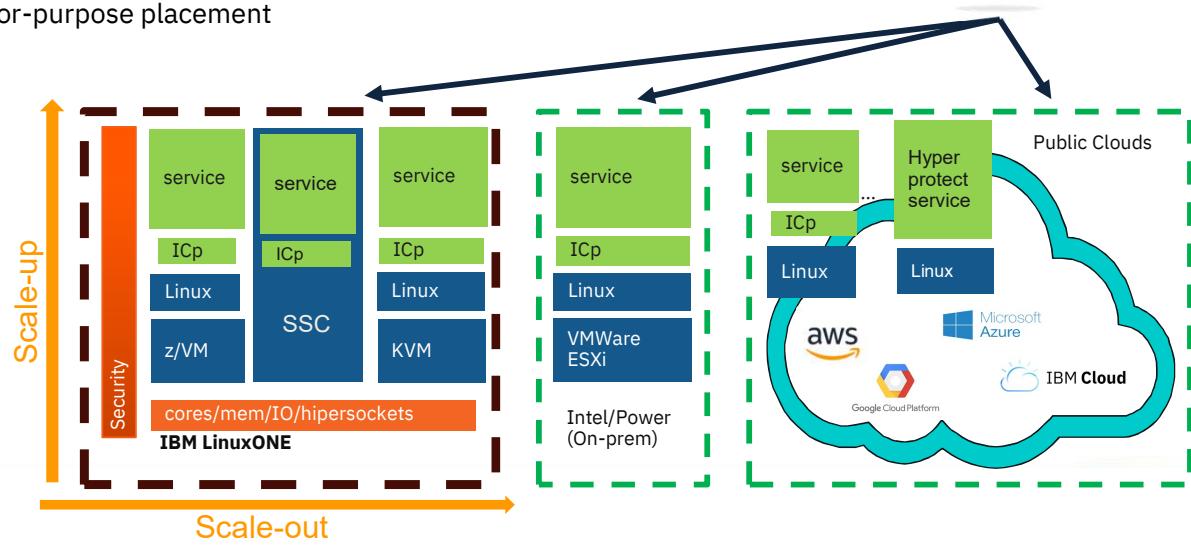


NOTES :

Multi Cloud Management with LinuxONE and ICP

- Common helm based deployment model across on premise and public cloud
- Deploy, monitor & govern Kubernetes clusters across multiple clouds
- Simplify movement of application services between clusters for fit-for-purpose placement

IBM Cloud private (ICp) master



NOTES :

IBM Cloud private (Icp) Solution

... to enable enterprises to both innovate & optimize



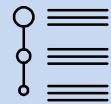
Enterprise Content Catalog

Open Source and IBM Middleware, Data, Analytics, and AI Software



Core Operational Services

Log Management, Monitoring, Security, Alerting



Kubernetes Container Orchestration Platform



Choose your infrastructure:



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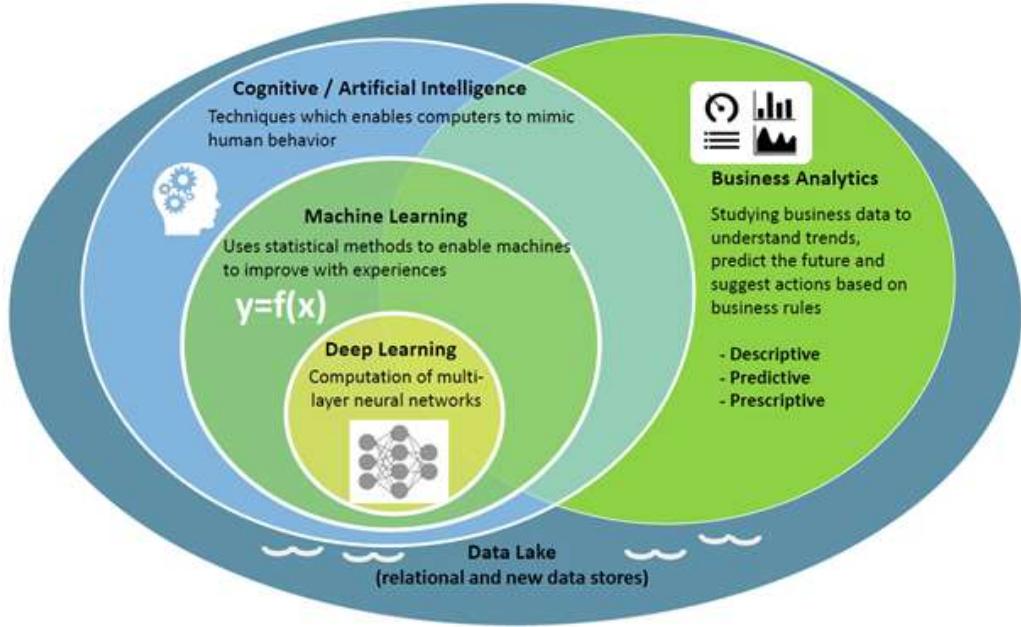
Strategic Value:
Self-service catalog
Agility, scalability, and elasticity
Self-healing
Enterprise security
Open-source embracing platform - No vendor lock-in
Modernization

Michel LE DUY © 2018 IBM France



NOTES :

Cognitive Computing, Machine Learning, and Business Analytics



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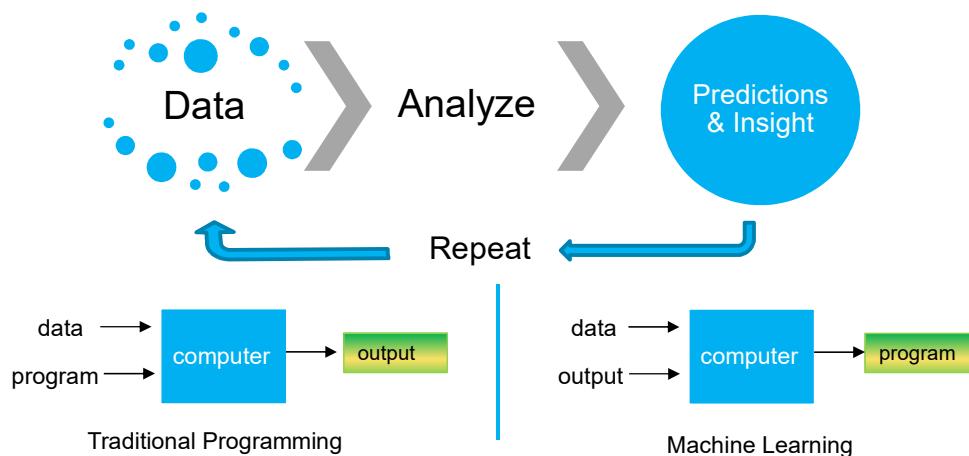
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NOTES :

What is Machine Learning?

Computers that learn without being explicitly programmed



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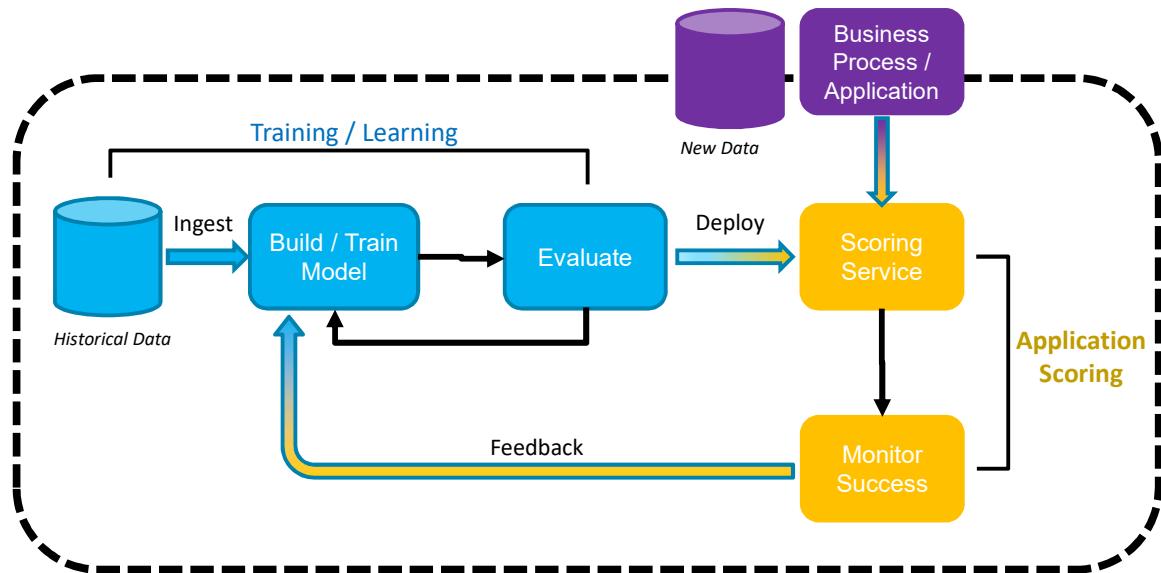
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NOTES :

Components for a Machine Learning Implementation



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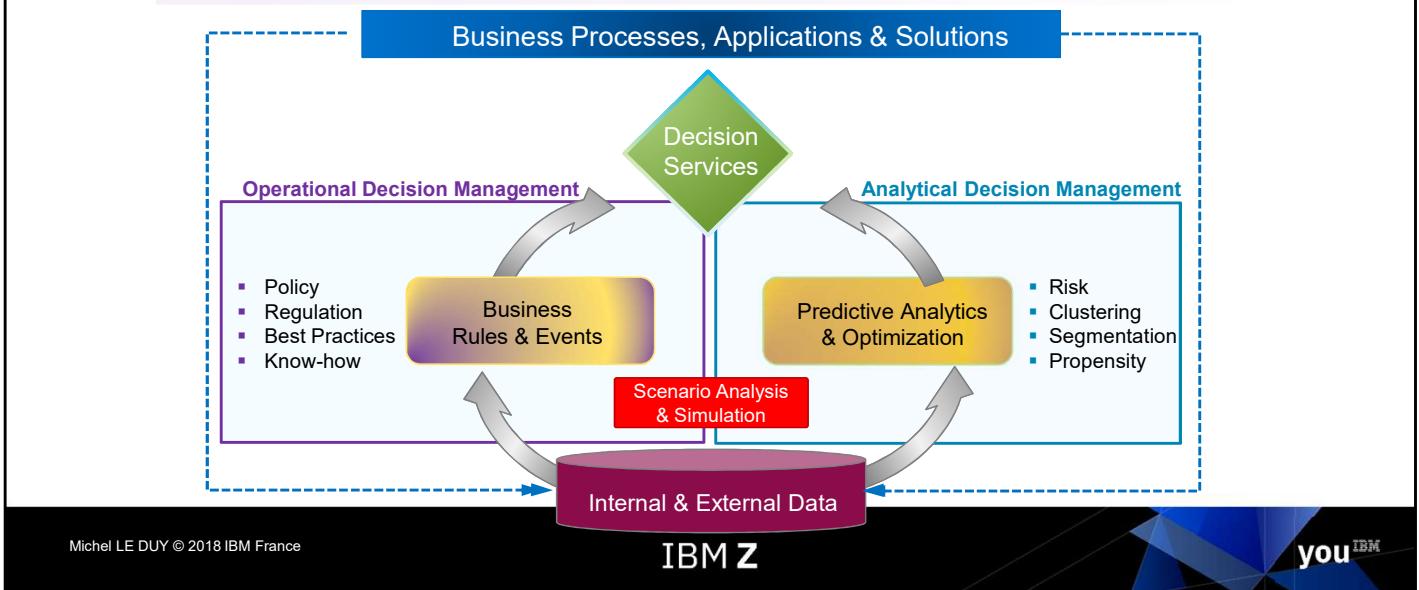
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NOTES :

What is Decision Management?

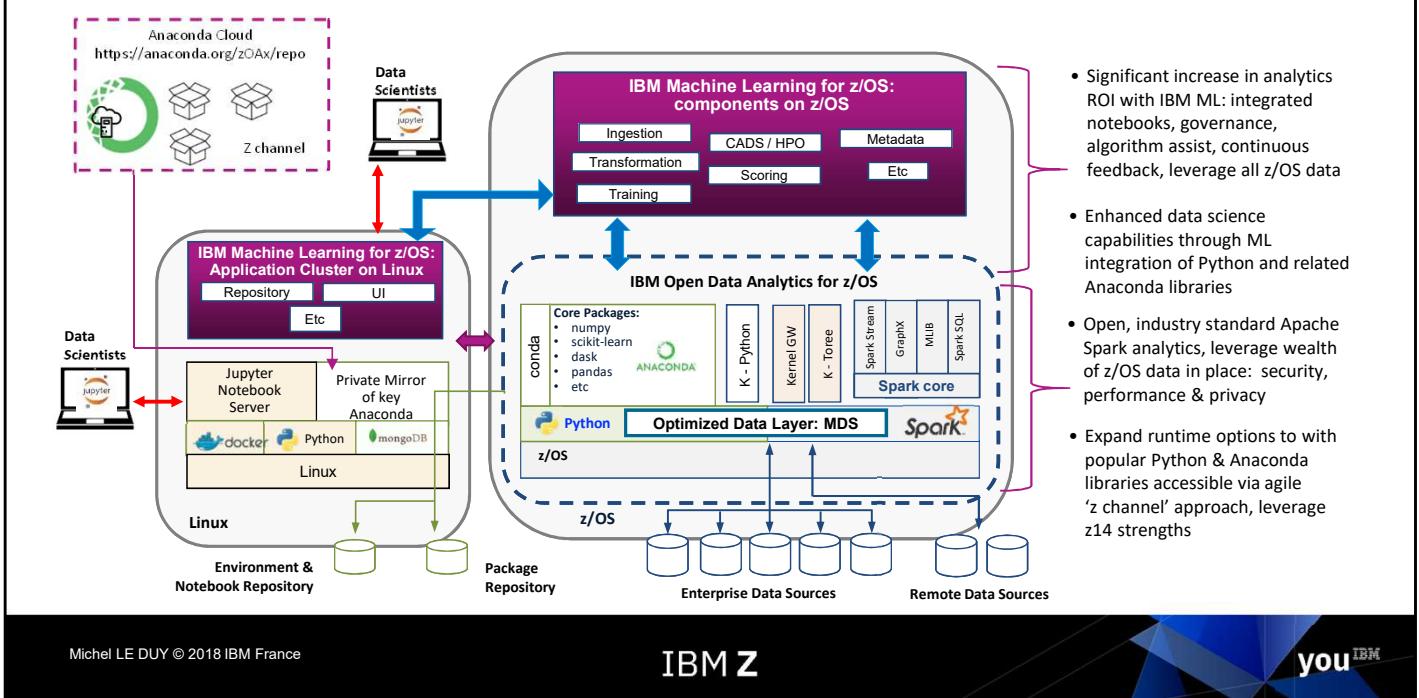
Decision Management is a business discipline, supported by operational and analytics software, that enables organizations to automate, optimize and govern repeatable business decisions to improve the value of customer, partner and internal interactions.



NOTES :

IBM Machine Learning Architecture

Leverages IBM open Data Analytics for z/OS



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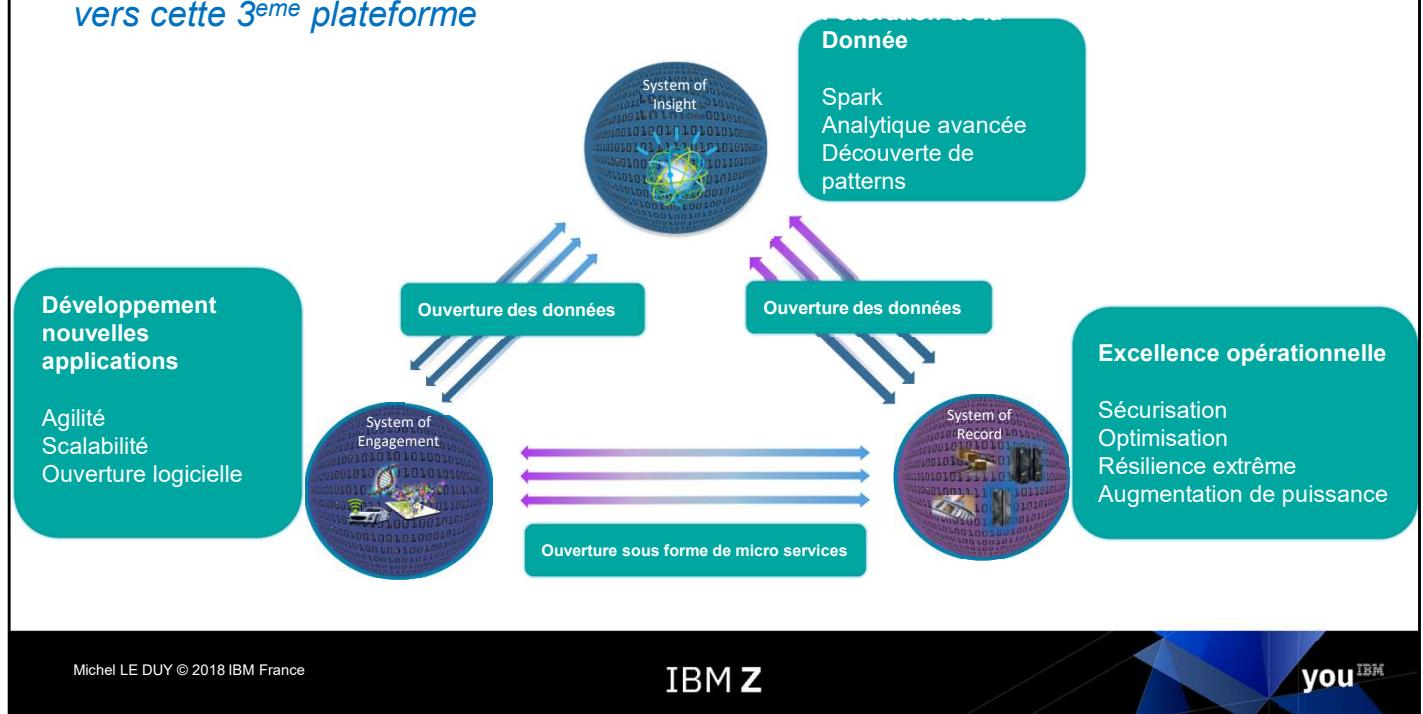
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NOTES :

Adaptation / Evolution des Systèmes d'Information vers cette 3^{eme} plateforme



NOTES :

Les systèmes IBM LinuxOne accompagnent ses clients vers la 3^{ème} plateforme



Maîtriser l'explosion des données issues de la transformation numérique et de l'internet des Objets



Garantir la sécurité
dans des
infrastructures basés
sur des solutions en
cloud hybride



Entrer dans l'ère du cognitive en intégrant vos infrastructures existantes



Avantage économique
Coût à la transaction et Coût total de possession

Le meilleur de
Linux et du libre
« Open Source »



Les meilleures **Plateformes d'entreprise**

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NOTES :

Le monde change,
NOUS AUSSI

Contributions à la communauté Linux

Accès à IBM LinuxONE dans le cloud

<https://www.openmainframeproject.org>



NOTES :



Agenda



Mainframe (IBM z14™) & Digital Transformation

1. Introduction on zStack
2. Key concepts of SOA
3. SOA Solutions on z/OS
 - ✓ Transaction environments
 - ✓ SOA Foundation products
 - ✓ SOA Integration solutions
 - ✓ Development and full SOA cycle solutions
 - ✓ System Management Tools for z/OS Applications
4. LinuxONE
5. Digital Transformation : Solutions on Z System & LinuxONE
6. Conclusion

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NOTES :

The IBM Z

Delivers Greater Simplification, Flexibility, and Value for Digital Transformation

- The IBM Systems z14™ is the world's fastest and most scalable enterprise system*
- Enables a mixed set of workloads to be deployed on best fit technologies
- Meets the need of today's heterogeneous data centers
- Reduces risk by extending the reach of IBM Z Qualities of Service
- Improves service through tighter integration for multi-tier workloads
- Delivers lower acquisition and operating costs than a 'one-size-fits-all' approach

*Based on 5.2 GHz core processor speed

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NOTES :

Thriving IBM Z Ecosystem

Linux on IBM Z:
Fastest growing
server platform



- Installed IFL MIPS increased by 17% YTY from 4Q14 to 4Q15
- Shipped IFL MIPS increased 65% (YE10 to YE16)
- 81 of the top 100 IBM Z Customers are running Linux on z as of 4Q15 **
- 28.2% of Total installed MIPS run Linux as of 4Q15

Based on IBM market analysis

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Thousands of ISVs investing in IBM Z platform



As of 1H2015:

- 1,650 unique ISVs have enabled more than 6,300 applications on the IBM Z platform
- 3,000+ Linux applications are supported on IBM Z:
 - 550 new Linux applications added in 2012; another 80 applications already enabled in 2015
- 4,000 applications are enabled on z/OS:
 - 2,000+ applications are enabled on z/OS 2.1 and later

Worldwide adoption of mainframe curriculum



Students educated:

- Over 50,000 worldwide, 5,000 more students in China by 2015

University adoption:

- Over 600 schools enrolled globally
- 90% growth in 2 years; 2,000% since 2003; continued flow of schools adding curricula
- 50%+ outside of US

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NOTES :

Building Mainframe skills

The workforce of the new IBM Z era

- 1.) the new Unchain The Frame virtual hackathon
<http://unchaintheframe.com/>
- 2.) New Faces of IBM Z now live on YouTube...
Young IT professionals, students and developers describe their experiences on working on the machine that makes the world work every day.
<https://www.youtube.com/playlist?list=PLezLS0Tuqb-47nYbqa3yVPbSrbA9o5cVj>
- 3.) New IBM zAcademic skills website for students, educators, clients and partners
<https://www-03.ibm.com/systems/z/education/academic/index.html>

IBM LinuxONE Community Cloud
No-charge, open access to an enterprise grade Linux environment for fostering innovations.

<https://developer.ibm.com/linuxone/>



NOTES :



The Future Runs on z Systems

zEND & Merci

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IBM Z New WorkLoads
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NOTES :
