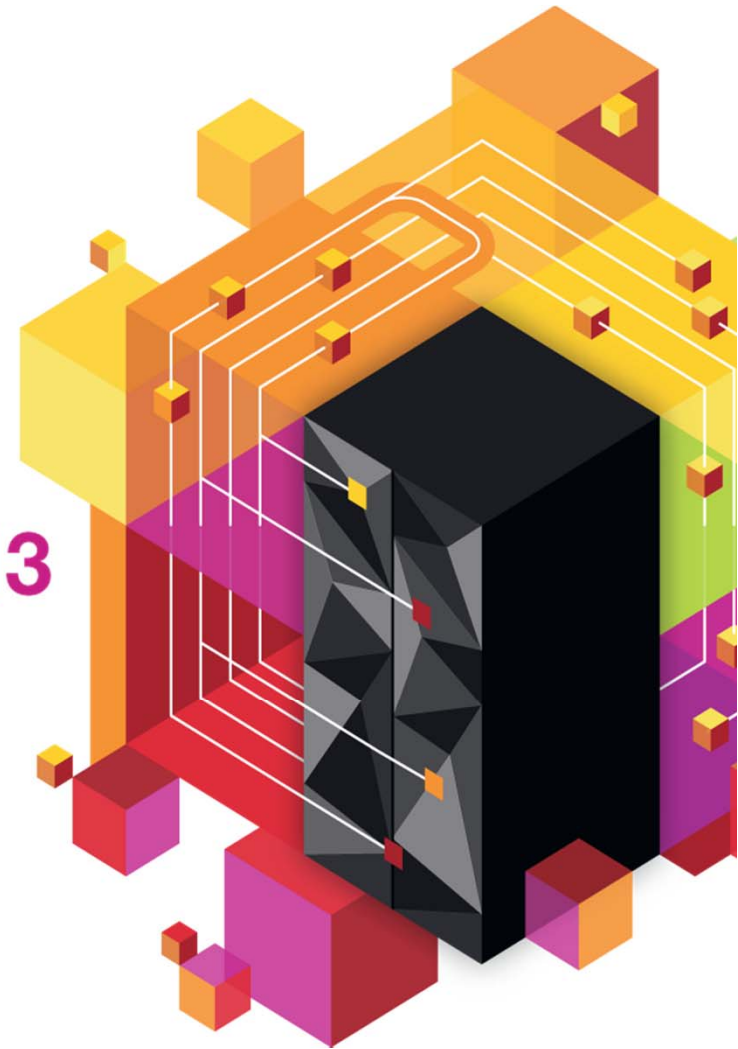




Université du Mainframe 2013

4-5 avril





z/Aware - Comment être informé de la santé de vos z/OS

Alain Maneville

Senior Certified I/T Specialist – zChampion

Jeudi 4 Avril 2013 – 16H00-16H55

Université du Mainframe 2013

4-5 avril



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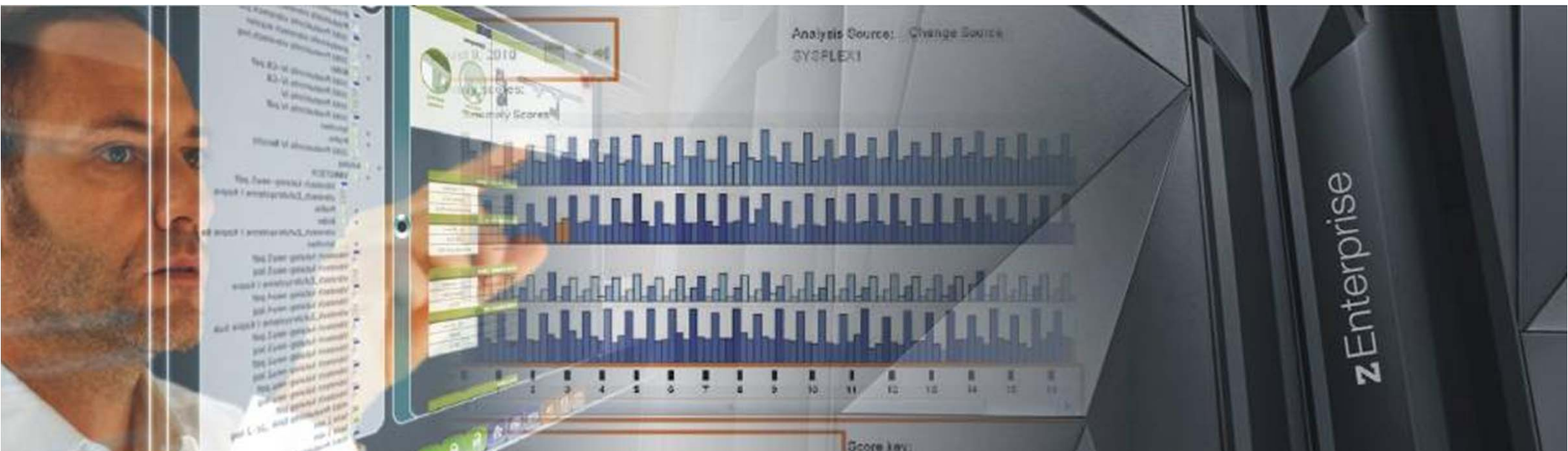


AGENDA

- **Introduction et définition**
- **Mise en œuvre**
- **Configuration**
- **Le Reporting**
- **zAWARE en action**



Introduction et définition





Introduction et définition

■ IBM zAWARE

- IBM System z Advanced Workload Analysis Reporter

■ Les attentes

- Résoudre le problème créé par la complexité des configurations et la rapidité des changements pour :
 - Maintenir une qualité de service
 - Résoudre les problèmes rapidement grâce à une information rapide et précise de la situation
 - Prévenir les problèmes autant que faire ce peut
- Le challenge de l'I/T aujourd'hui est:
 - Diagnostiquer rapidement les anomalies des systèmes
 - Restaurer le service rapidement

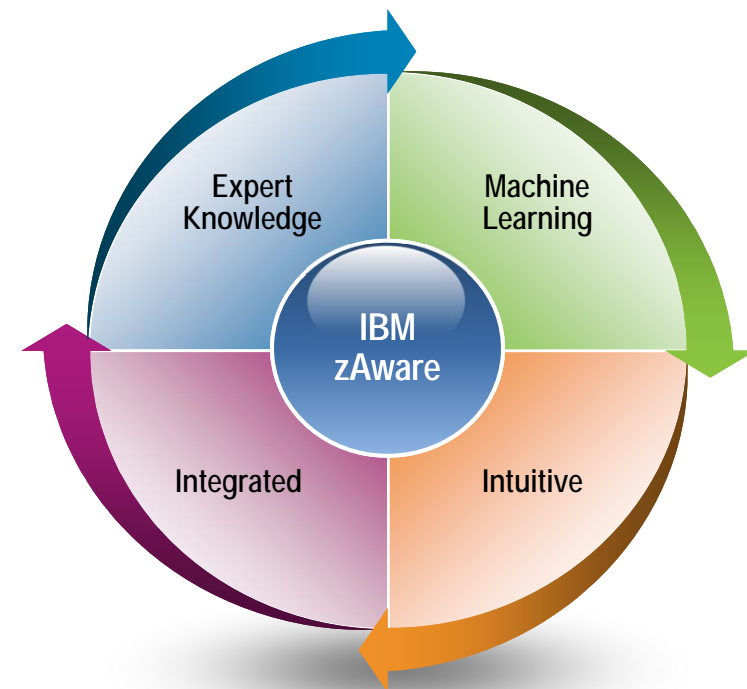
■ La fonction rendue par IBM zAWARE

- Améliore la rapidité de la détermination des problèmes grâce à un système expert
- Crée un comportement type (modèle) d'un système et analyse les déviations
 - À partir de la collecte des messages OPERLOG

Introduction et définition

■ IBM zAWARE

- Est une solution basée sur un système expert qui « **apprend** » le comportement de vos systèmes en analysant leurs messages en quasi temps réel de manière à fournir des informations sur le comportement de vos systèmes.
- Est une solution « **hors** » z/OS
- **Solution analytique** qui s'adapte et apprend votre environnement unique
- Hôte sur un serveur zEnterprise EC12; peut analyser les autres IBM System z ® serveurs.



Introduction et définition

■ IBM zAWARE – Identification des comportement inhabituels des systèmes

Surveillance	Détection	Fréquence	Reporting
<ul style="list-style-type: none"> • Supports les middleware IBM & non IBM et les applications • Surveille les OPERLOG dans un Sysplex ou Monoplex • Attribue un score d'anomalie aux message pour vous aider à identifier les problèmes potentiels 	<ul style="list-style-type: none"> • Détecte des anomalies que d'autres dispositifs pourraient rater • Peut trouver les messages rares ou peu fréquents • Peut détecter un nombre inhabituel de messages normaux • Peut détecter des messages envoyés hors contexte 	<ul style="list-style-type: none"> • Échantillonnage toute les 2 minutes • Intervalle de reporting de 10 minutes • Utilise 90 jours roulants comme base (utilitaire fournit pour peupler cette base) • Permet d'inclure/exclure des dates 	<ul style="list-style-type: none"> • Analyse en quasi temps réel • Reporting de type WEB, haut niveau ou granulaire • Codage en couleur, graphes en tranche de temps • Sortie XML (autres utilisateurs possibles)



Introduction et définition

• Identifie un incident potentiel z/OS

- *Quelle image a un comportement inhabituel?*
 - Examine le comportement d'un message
 - Score élevé généré par des messages inhabituels ou des modèles de messages
- *Quand ce comportement a-t-il démarré?*
 - Dans un intervalle de 10 minutes particulier, dans l'intervalle actuel de 10 minutes ou le dernier intervalle: Quels messages sont inhabituels?
 - Fréquence de l'occurrence du message ?
 - Quand ce message a-t-il commencé à apparaître ?
- *Y a-t-il eu des messages similaires avant ?*
 - Comprends des caractéristiques de message et les modèles de messages

• Identifie un comportement après l'application d'un changement

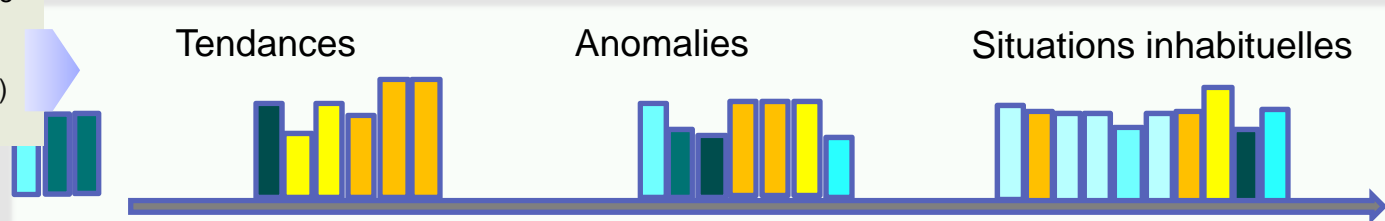
- *Les messages inhabituels sont-ils générés après un changement?*
 - Nouveaux niveaux de software (operating system, middleware, applications)
 - Mise à jour des paramètres système ou configuration configurations

• Diagnostique des problèmes intermittents

- *Les messages inhabituels sont-ils générés quand un problème intermittent arrive?*
 - Y a-t-il plus de messages que prévu?
 - Les messages émis sont-ils en dehors du modèle normal ?

-Barre verticale indique le nombre de messages uniques dans un intervalle de 10 minutes
 -Notation de la couleur des messages codés à partir de commun (bleu) ou rare (orange)

Constata des anomalies qui seraient difficiles à détecter



Réduit le temps et les efforts pour identifier et diagnostiquer les messages problématiques



Introduction et définition

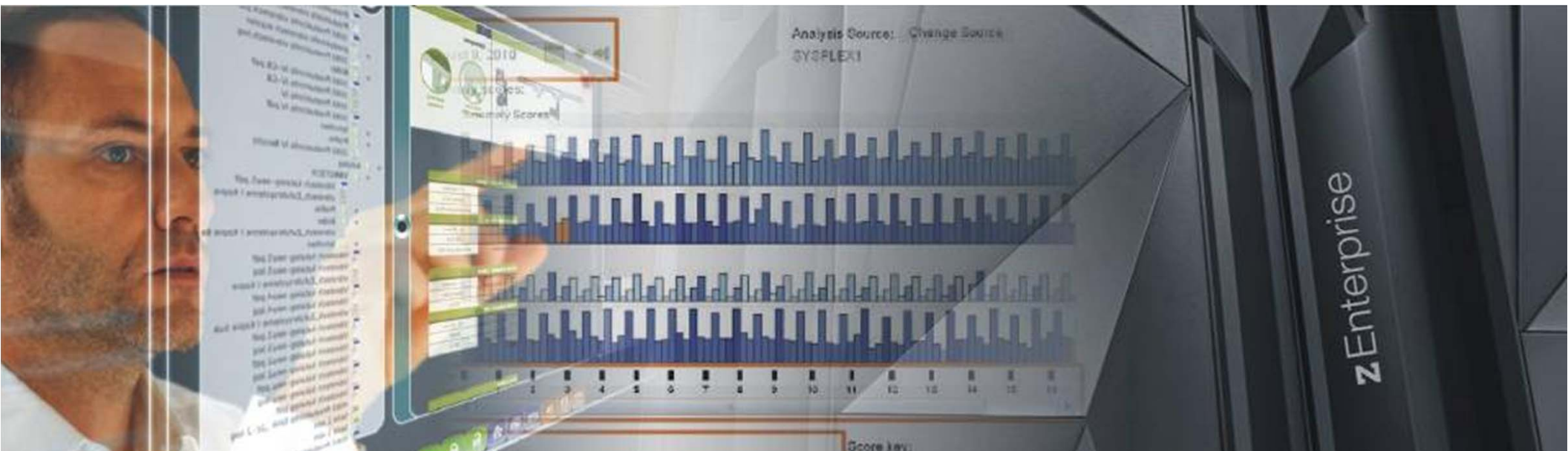
▪ Positionnement par rapport aux autres produits

Solutions Available:		Rules based	Analytics / Statistical model	Examines message traffic	Self Learning	Method
z/OS Health Checker	<ul style="list-style-type: none"> ▪ Checks configurations ▪ Programmatic, applies to IBM and ISV tools ▪ Can escalate notifications 	✓				Rules based to screen for conditions
z/OS PFA	<ul style="list-style-type: none"> ▪ Trending analysis of z/OS system resources, and performance ▪ Can invoke z/OS RTD 		✓		✓	Early detection
z/OS RTD	<ul style="list-style-type: none"> ▪ Real time diagnostics of specific z/OS system issues 	✓		✓		After an incident
IBM zAware	<ul style="list-style-type: none"> ▪ Pattern based message analysis ▪ Self learning ▪ Provides aid in diagnosing complex z/OS problems, including cross sysplex, problems that may or may not bring the system down 		✓	✓	✓	Diagnosis Useful before or after an incident

- IBM zAware Uniquely analyzes messages in context to determine unusual behaviors
- IBM zAware Uniquely understands and tunes its baseline to compare against your current activity
- IBM zAware does not depend on other solutions, manual coding of rules, and is always enabled to watch your system

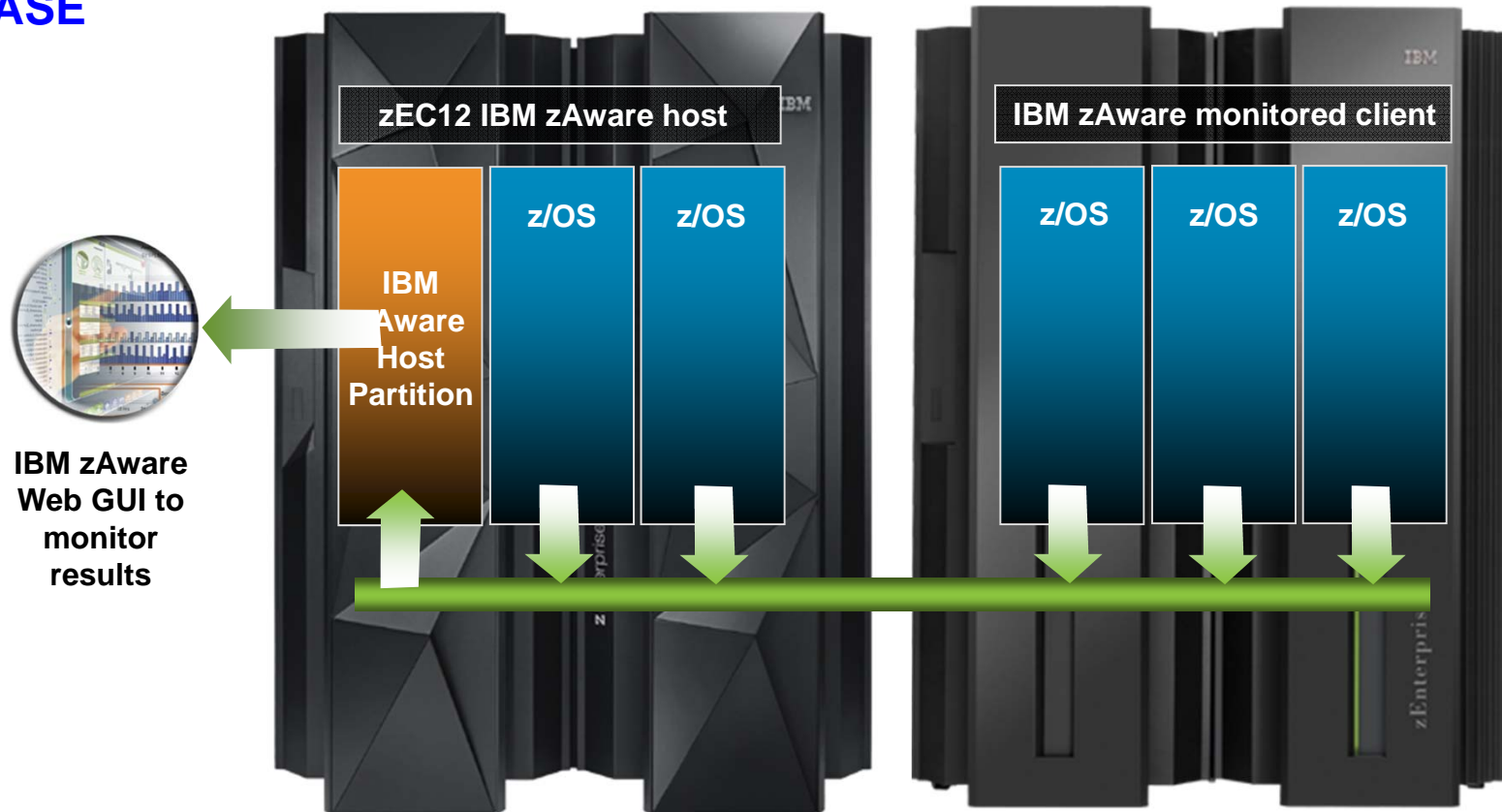


Mise en œuvre



Mise en œuvre

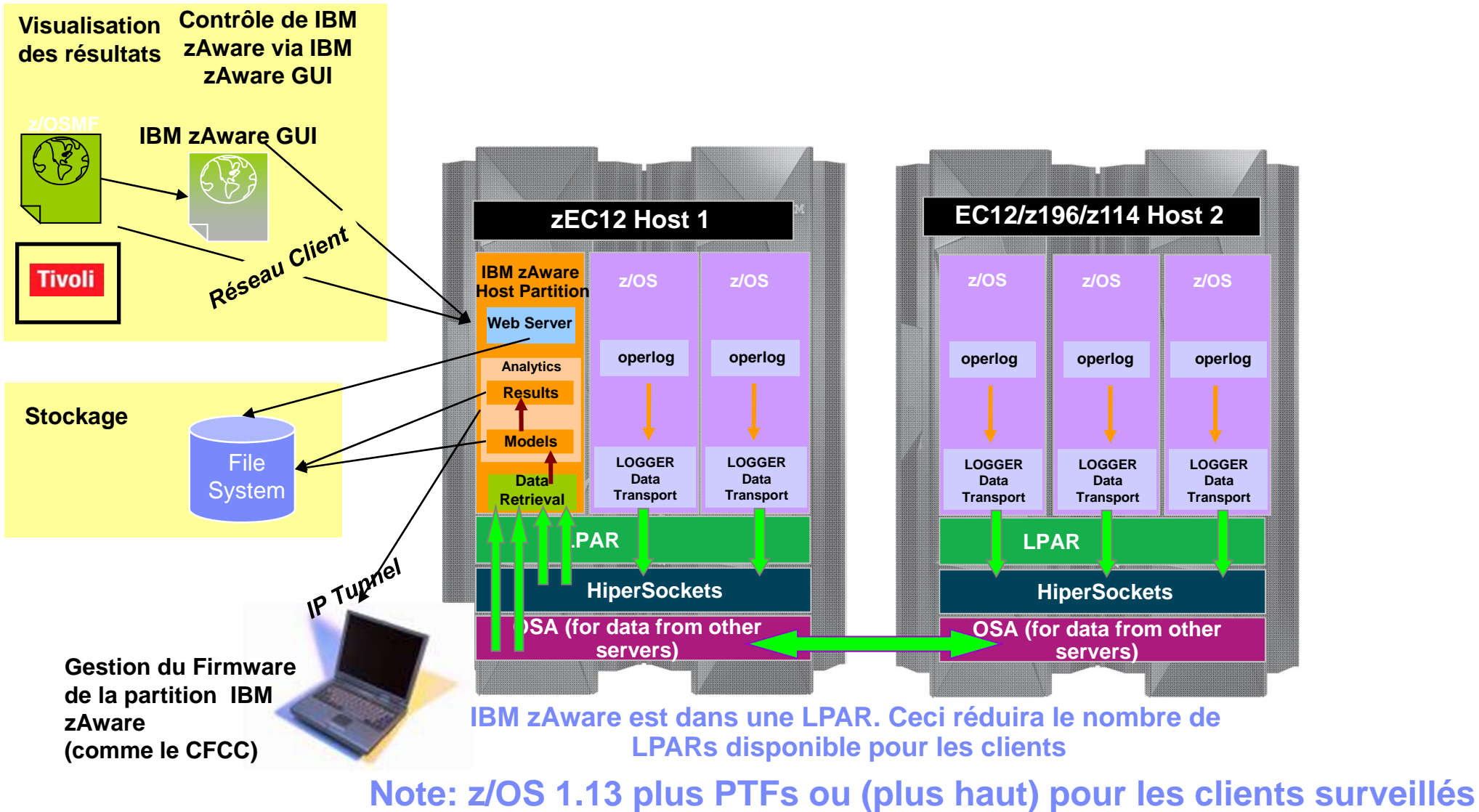
- **BASE**



Surveillance du zEC12 ou tout autre System z servers exécutant z/OS v1.13 +PTF
 Supporte z/OS sous VM
 Nécessite OPERLOG
 La partition zAWARE ne peut être que sur du zEC12

Mise en œuvre

En détail

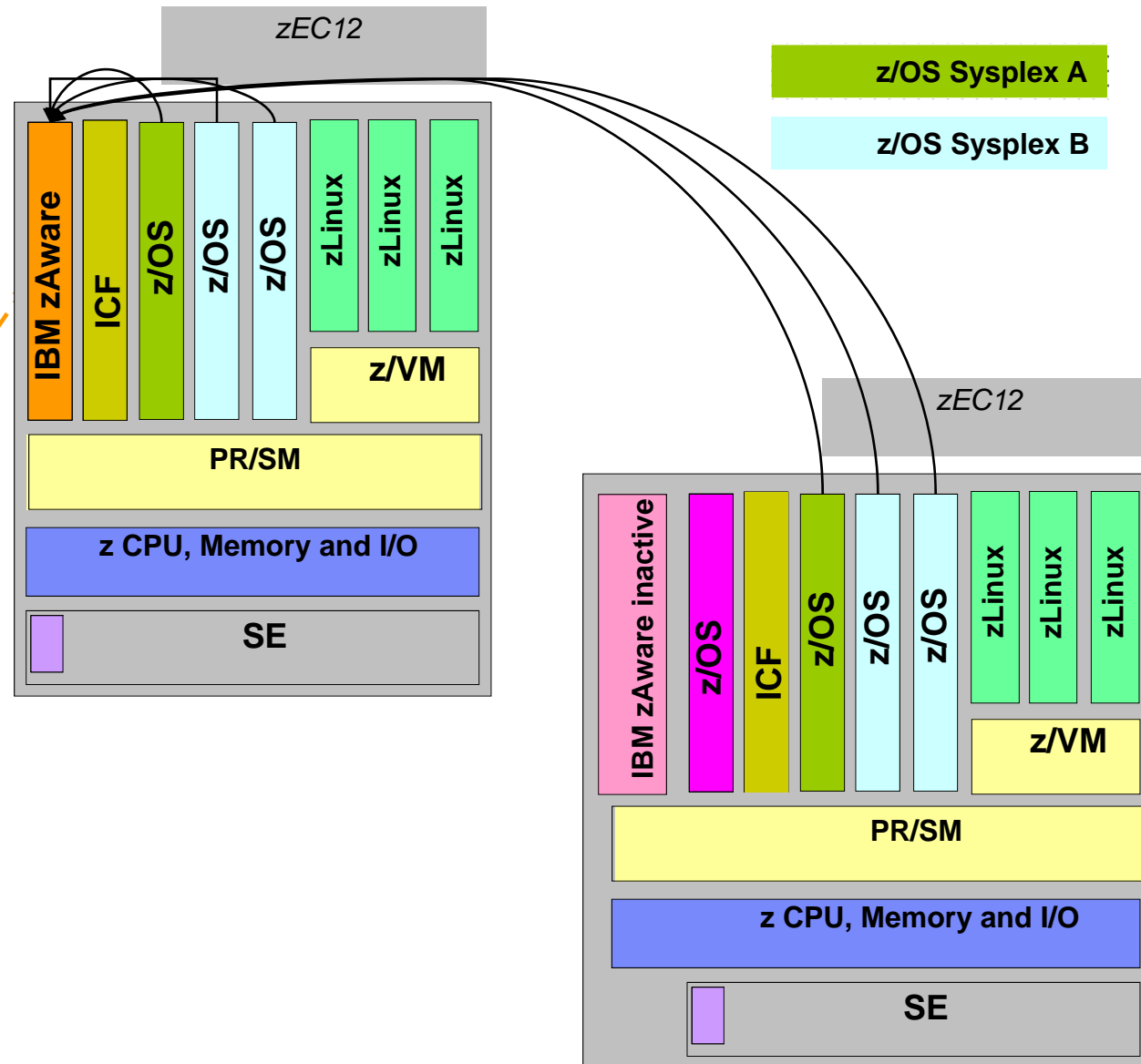


Mise en œuvre

Multi-site

- Un seul IBM zAware actif
- Dispositif IBM zAware sur les deux zEC12 CPCs, un seul actif
- Si panne d'un CPC une automatisation démarre le IBM zAware en standby

IBM zAware



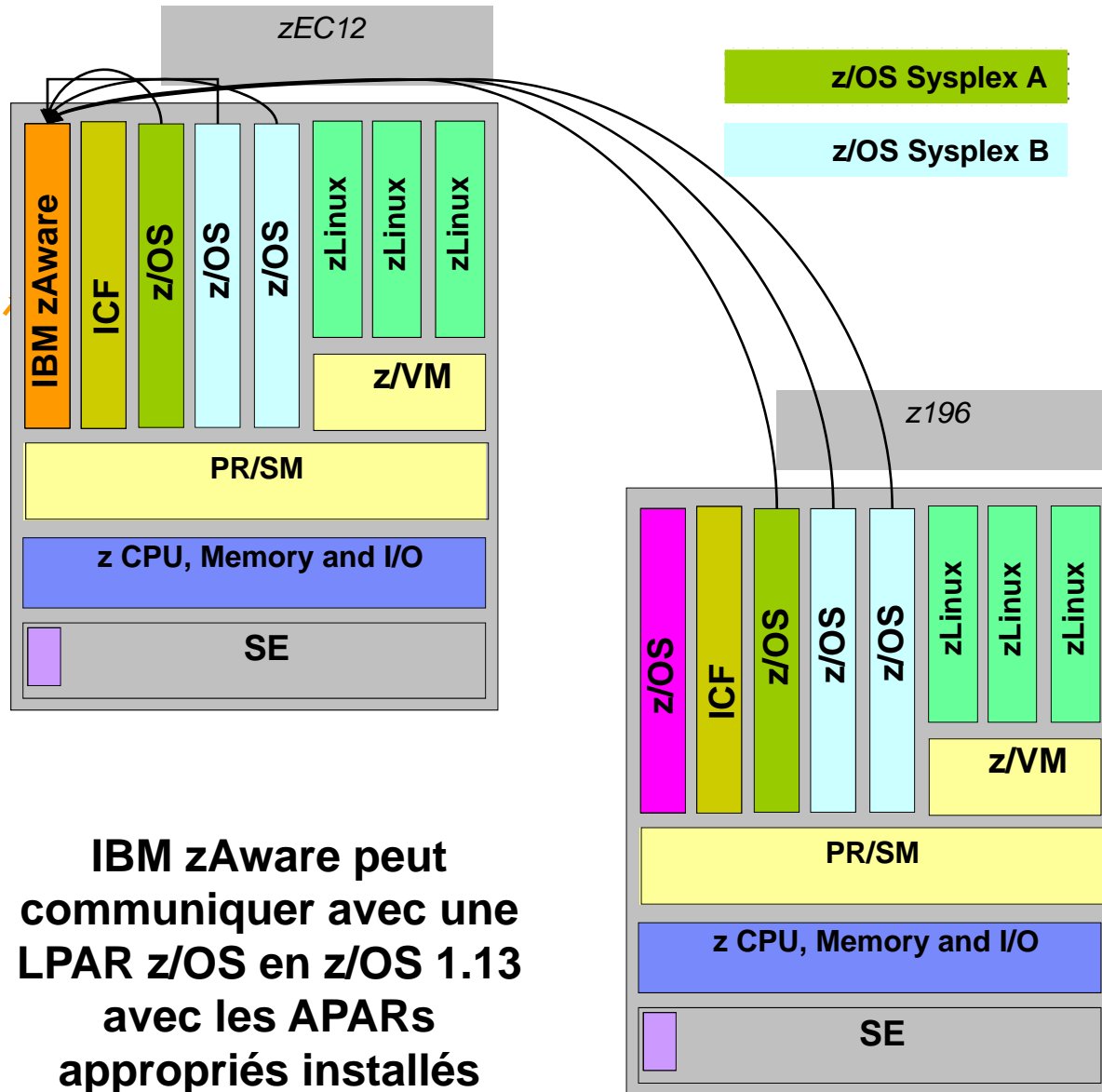
Etendu contrôlée

- Vue Sysplex
- Vue image z/OS

Mise en œuvre

■ Sites Mixtes

- Un seul IBM zAware actif sur zEC12





Mise en œuvre

▪ **zEC12 pour héberger le serveur IBM zAware**

- IBM zAware nécessite sa propre LPAR et exécute son propre firmware stack.
 - Réduction potentielle du nombre de LPARs pour les clients
- IBM zAware peut s'exécuter sur des processeurs IFL ou GCP
- Les ressources Mémoire ou DASD sont dépendantes du nombre de « clients » surveillés, de la quantité de trafic des messages, et de la longueur de rétention des données
 - Mémoire – minimum 6 GB pour 6 z/OS Clients + 256 MB pour chaque client z/OS additionnel – avec une intensité de 500 messages par seconde. (après les 6 premiers).
 - DASD ~ 500 GB (ECKD)
 - IBM zAware utilise Logical Volume Manager (LVM) pour agréger de multiple « physical devices » dans un seul « logical device »
- Network: Ports HiperSockets ou OSA – pour à la fois collectionner les données et les messages d'alerte
- Adresse IP dédiée pour la partition

▪ **IBM zAware – partie « Clients »**

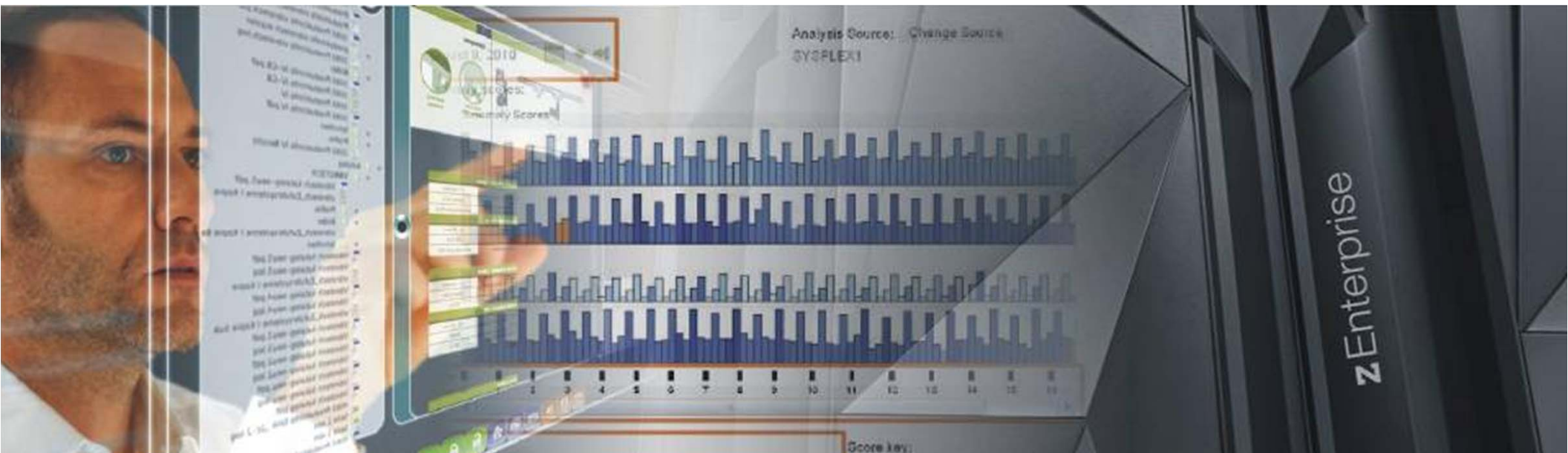
- Peuvent être sur n'importe quel serveur System z exécutant du z/OS 1.13 + PTFs
- IBM zEnterprise 196 (z196), IBM zEnterprise 114 (z114), etc., peuvent partager les fichiers LOGS par un réseau IP avec le serveur IBM zAware

▪ **L'amorce nécessite 90 jours de données OPERLOG ou SYSLOG historisés**

- Le programme MSGLG610 aide à analyser la structure de votre modèle de messages
 - Voir RedBook : Extending z/OS System Management Functions with IBM zAware, SG24-8070 pour l'utilisation de ce programme



Configuration





Configuration

■ Définitions

- **Un IBM zAware host system** est le zEC12 qui héberge la LPAR IBM zAware. Généralement, ce serveur aura aussi des LPARs surveillées. Il peut y avoir plusieurs LPARs IBM zAware sur un zEC12, mais il n'y aura qu'un dispositif zAware FC 0011 (pas de charge additionnelle)
- **Un IBM zAware monitored client** est une LPAR z/OS qui envoie les fichiers OPERLOG pour être traités par une LPAR IBM zAware. Ces LPARs surveillées par IBM zAware monitored clients, doivent être en z/OS 1.13 (exploitation).
- **Un IBM zAware environment** est l'ensemble constitué par l'**IBM zAware host system** et les **IBM zAware monitored clients** qui envoient les informations vers l'IBM zAware host system.
- Une **IBM zAware connection** est utilisée (lors du processus eConfig) pour représenter un ensemble de 10 CPs associés à ce serveur qui sont soit le IBM zAware host system ou les IBM zAware monitored clients. Le IBM zAware environment peut avoir moins de 10 CPs mais il sera arrondi à 10.
- Un **Disaster Recovery (DR) IBM zAware server** est un zEC12 avec un firmware gratuit pour exécuter IBM zAware en cas de sinistre.



Configuration

▪ Les dispositifs.

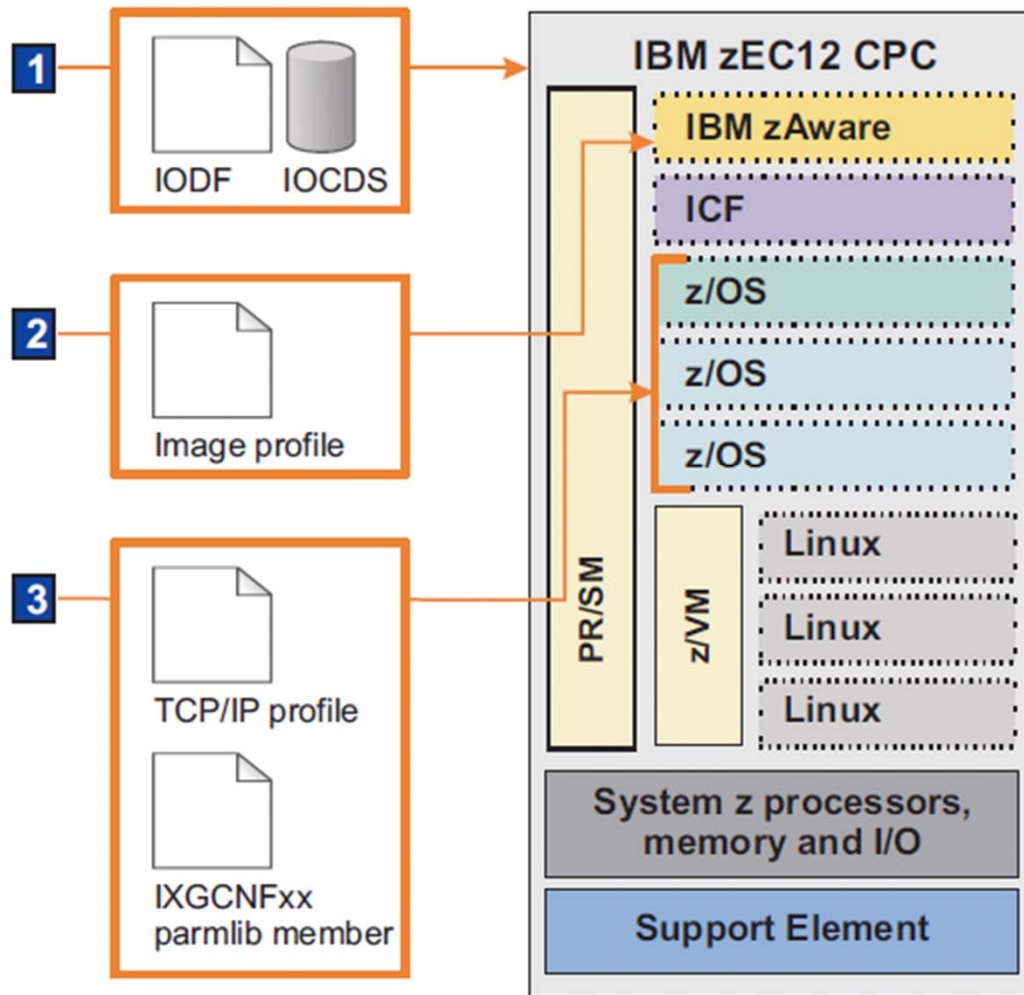
- FC 0011 indique que IBM zAware est installé sur le serveur CPC host.
- FC 0101 représente la quantité de connexions IBM zAware host/client.
- FC 0102 représente la quantité de connexions IBM zAware sur un serveur DR
 - Dans ce cas le dispositif FC0011 sera interdit

- Les connexions IBM zAware connections sont commandées en fonction du nombre de CPs sur le **serveur Host** plus la quantité de CP sur les **serveurs monitored client** (la limité étant le nombre de CP maximum possible).

- Calcul du nombre de dispositifs à commander
 - 1 – déterminer les machines cibles
 - 2 – Compter le nombre total de CP de ces machines (High Water Mark)
 - Exemple - zEC12 (101 CPs), z10 EC (40 CPs), z9 EC (33 CPs) → $101+40+33=174$.
 - 3 – Arrondir à la dizaine supérieure – 180 dans notre cas
 - 4 – Diviser par 10 – 18 dans notre cas – donc commander 18 dispositifs (FC 0011)
 - Rappel : pas de charge pour un serveur DR

Configuration

■ Configuration Générale



Configuration

■ Configuration de la LPAR

Customize/Delete Activation Profiles : P91

--- Select Action ---

Select ^	Name	Type	Profile Description
<input type="checkbox"/>	DEFAULT	Image	This is the default Image profile.
<input type="checkbox"/>	J90	Image	This is the default Image profile.
<input type="checkbox"/>	JB0	Image	JB0 on P91
<input type="checkbox"/>	JD0	Image	JD0
<input type="checkbox"/>	JF0	Image	This is the default Image profile.
<input type="checkbox"/>	Jl0	Image	This is the default Image profile.
<input type="checkbox"/>	JJ0	Image	This is the default Image profile.
<input type="checkbox"/>	JK0	Not created	
<input type="checkbox"/>	LP1	Not created	
<input type="checkbox"/>	LTICT75	Image	LTICT75 Image profile.
<input checked="" type="checkbox"/>	P91AWARE	Not created	
<input type="checkbox"/>	PETLVS	Image	This is the default Image profile.
<input type="checkbox"/>	PETLVS2	Image	This is the default Image profile.
<input type="checkbox"/>	TICLTST	Image	This is the default Image profile.
<input type="checkbox"/>	Z1	Image	This is the default Image profile.
<input type="checkbox"/>	Z2	Image	
<input type="checkbox"/>	Z3	Image	This is the default Image profile.
<input type="checkbox"/>	Z4	Image	
<input type="checkbox"/>	DEFAULT	Group	This is the default Group profile.
<input type="checkbox"/>	TESTPLEX	Group	Group profile for Z1 & Z3

Total: 37 Filtered: 37 Selected: 1



Configuration

■ Configuration de la LPAR

Customize Image Profiles: P92:ZAWARE1 : ZAWARE1 : General

P92:ZAWARE1
 ZAWARE1
 General
 Processor
 Security
 Storage
 Options
 Firmware

Profile name: ZAWARE1 Assigned for activation
Description: This is the ZAWARE1 Image pi
Partition identifier: 3A
Mode: ESA/390, ESA/390 TPF, Coupling facility, LINUX only, z/VM, **zAware**
Clock Type Assignment:
 Standard time of day
 Logical partition time offset
 Ensure that the image profile data conforms to the current maximum LICCC configuration.

Cancel Save Copy Profile Paste Profile Assign Profile Help

Configuration

■ Configuration de la LPAR

– Processeurs

Customize Image Profiles: P92:ZAWARE1 : ZAWARE1 : Processor
i

- [-] P92:ZAWARE1
 - [-] ZAWARE1
 - General
 - Processor
 - Security
 - Storage
 - Options
 - Firmware

Group Name <Not Assigned>

Logical Processor Assignment

- Dedicated central processors
- Dedicated integrated facility for Linux
- Not dedicated central processors
- Not dedicated integrated facility for Linux

Not Dedicated Processor Details

Initial processing weight 500 1 to 999 Initial capping

Number of processors - Initial 2 Reserved 0

Cancel
Save
Copy Profile
Paste Profile
Assign Profile
Help

Configuration

■ Configuration de la LPAR

– Sécurité

Customize Image Profiles: P92:ZAWARE1 : ZAWARE1 : Security

- P92:ZAWARE1
 - ZAWARE1
 - General
 - Processor
 - Security**
 - Storage
 - Options
 - Firmware

Partition Security Options

- Global performance data control
- Input/output (I/O) configuration control
- Cross partition authority
- Logical partition isolation

Counter Facility Security Options

- Basic counter set authorization control
- Problem state counter set authorization control
- Crypto activity counter set authorization control
- Extended counter set authorization control

Sampling Facility Security Options

- Basic sampling authorization control
- Diagnosis and basic sampling authorization control

CPACF Key Management Operations

- Permit AES key import functions
- Permit DEA key import functions

Buttons: Cancel, Save, Copy Profile, Paste Profile, Assign Profile, Help

Configuration

■ Configuration de la LPAR

– Mémoire

The screenshot shows a dialog box titled "Customize Image Profiles: P92:ZAWARE1 : ZAWARE1 : Storage". On the left is a tree view with the following structure:

- P92:ZAWARE1
 - ZAWARE1
 - General
 - Processor
 - Security
 - Storage**
 - Options
 - Firmware

The main area of the dialog is titled "Central Storage" and contains the following settings:

- Amount (in megabytes)
 - Initial:
- Storage origin
 - Determined by the system
 - Determined by the user
 - Origin:

At the bottom of the dialog are several buttons: Cancel, Save, Copy Profile, Paste Profile, Assign Profile, and Help.

Configuration

■ Configuration de la LPAR

- Firmware – Connexions réseau avec les autres LPARs – Host Name de la zAWARE LPAR

Customize Image Profiles: P92:ZAWARE1 : ZAWARE1 : Firmware i

- [-] P92:ZAWARE1
 - [-] ZAWARE1
 - General
 - Processor
 - Security
 - Storage
 - Options
 - Firmware

Host name :

Master user ID :

Master password :

Confirm master password :

Network Adapters

↓↑ ↻ ✎ 🗑 ⚙ | --- Select Action ---

Select ^	CHPID ^	VLAN ^	IP address ^	Mask/Prefix ^
<input type="radio"/>	12		9.12.41.185	24
<input type="radio"/>	16		fec0::11:22:33:44:242	116
<input type="radio"/>	16		192.168.50.242	24

Default gateway :

DNS Servers

↓↑ ↻ ✎ 🗑 ⚙ | --- Select Action ---

Select ^	IP address ^
<input type="radio"/>	9.12.16.2

Cancel
Save
Copy Profile
Paste Profile
Assign Profile
Help

Configuration

■ Configuration de la LPAR

- Firmware – définition d'une connexion réseau

Add/Edit Network Adapters Entry - P89:ZAWARE1

Select an address type and modify or fill in the details for this CHPID.

IP address type

DHCP
 Link Local
 Static IPv4 Address
 Static IPv6 Address

Details


CHPID :

VLAN :

IP address :

Mask / Prefix :

OK
Cancel
Help

x


Configuration

■ Configuration de la LPAR

- Firmware – indique les connections réseau avec les autres LPARs

Customize Image Profiles: JOSH11K : 11KZAWAR : Firmware

JOSH11K

- 11KZAWAR
 - General
 - Processor
 - Security
 - Storage
 - Options
 - Firmware**

Host name :
 Master userid :
 Master password :
 Confirm master password :

Network Adapters

Select	CHPID	VLAN	IP address	Mask/Prefix
<input type="radio"/>	44	1877	Link Local	
<input type="radio"/>	a2	8001	e111:d123:c98a:4::0	128
<input type="radio"/>	a1		9.60.15.111	30
<input type="radio"/>	44	1171	Link Local	
<input type="radio"/>	44	1944	DHCP	

Default gateway :

DNS Servers

Select	IP address
<input type="radio"/>	e111:d123::ffff
<input type="radio"/>	9.0.0.0

Configuration

■ Configuration z/OS

– z/OS – Service

Table 1. Required V1R13 PTFs for z/OS monitored clients

Component	APAR	PTF
BCP system logger	OA38747	UA66494 HBB7780 UA66495 JBB778J
BCP system logger	OA38613 Prerequisite for APAR OA38747	UA66195 HBB7780 UA66196 JBB778J
BCP z/OS bulk load client for IBM zAware	OA39256	UA66522 HBB7780

– Modifications potentielles da SYS1.PARMLIB

- IEASYSxx – IXGCNF=xx
- IXGCNFxx
- COUPLExx
- D'autres (CONSOLxx)

– Modifications nécessaires décrites dans z/OS MVS Setting Up a Sysplex :

- Maj SYS1.PARMLIB:
 - ❑ IXGCNFxx ZAI SERVER(host) PORT(nnnnn)
- Logstream
 - ❑ ZAI(YES) ZAIDATA('OPERLOG')
- Network
 - ❑ Configure network scheme to include above host/port info
- S'assurer que z/OS OMVS & Resolver, z/OS Communications Server et TCP/IP sont actifs



Configuration

■ Configuration z/OS

– Modifications potentielles da SYS1.PARMLIB

- IEASYSxx – IXGCNF=xx

Syntax format of IXGCNFxx

```
[ CTRACE(parmlib_member_name) ]  
  
[ MONITOR [ OFFLOAD [ WARNALLOC(initial-delay-interval) ]  
[ ACTIONALLOC(secondary-delay-interval)]  
[ WARNRECALL(initial-delay-interval) ]  
[ ACTIONRECALL(secondary-delay-interval) ]]]  
  
[ ZAI ]  
[ SERVER(NONE | host_name | IP_addr) ]  
[ PORT(port num) ]  
[ LOGBUFMAX(value) ]  
[ LOGBUFWARN(nn) ]  
[ LOGBUFFULL(MSG|QUIESCE) ]
```



Configuration

▪ Configuration z/OS

- Transfert des données pour création du modèle
 - SYS1.SAMPLIB(AIZBLK)
 - SYS1.SAMPLIB(AIZBLKE) – pgm en REXX



Configuration

■ Commandes – LOGGER AS:

```
COMMAND INPUT ==> /D LOGGER,STATUS,ZAI
RESPONSE=J90
IXG601I 10.34.43 LOGGER DISPLAY 339
SYSTEM LOGGER STATUS
SYSTEM SYSTEM LOGGER STATUS
-----
J90 ACTIVE

ZAI LOGSTREAM CLIENTS: ACTIVE
BUFFERS IN USE: 00 GB 0000 MB

LOGGER PARAMETER OPTIONS
KEYWORD SOURCE VALUE
-----
ZAI
SERVER IPV4 IPL (00) 10.20.10.250
PORT IPL (00) 2001
LOGBUFMAX DEFAULT 02
LOGBUFWARN DEFAULT 75
LOGBUFFULL DEFAULT MSG
```

```
022.ZAI.LSTREAM *DASDONLY* 000000 AVAILABLE
```



Configuration

▪ Commandes – LOGGER AS:

```
-D LOGGER,STATUS,ZAI,VERIFY
IXG386I ZAI LOGSTREAM CLIENT CONNECT ATTEMPT IN PROGRESS
FOR DISPLAY ZAI,VERIFY
STATUS:  ATTEMPTING SOCKET CREATE
IXG386I ZAI LOGSTREAM CLIENT CONNECT ATTEMPT IN PROGRESS
FOR DISPLAY ZAI,VERIFY
STATUS:  SOCKET CREATE SUCCESSFUL
IXG386I ZAI LOGSTREAM CLIENT CONNECT ATTEMPT IN PROGRESS
FOR DISPLAY ZAI,VERIFY
STATUS:  ATTEMPTING SOCKET CONNECT
IXG601I   10.39.07  LOGGER DISPLAY 054
SYSTEM  LOGGER STATUS
SYSTEM  SYSTEM  LOGGER STATUS
-----
J90      ACTIVE

ZAI LOGSTREAM CLIENTS: ACTIVE
BUFFERS IN USE:    00 GB 0000 MB
ZAI VERIFY INITIATED,  CHECK FOR MESSAGES IXG37X, IXG38X
```



Configuration

▪ **Recommandations IBM**

- Ne pas mettre des images z/OS d'un Sysplex dans plusieurs instances IBM zAware
- IBM zAware devrait être dans une seule "security zone" / firewall
 - Les mécanismes de sécurité existants sont utilisés pour sécuriser le trafic vers IBM zAware
- UN IBM zAware par site ou organisation
- Obtenir une licence pour le DR (si l'approche DR est symétrique)
- Obtenir une licence de backup pour prendre en compte la panne d'un CPC



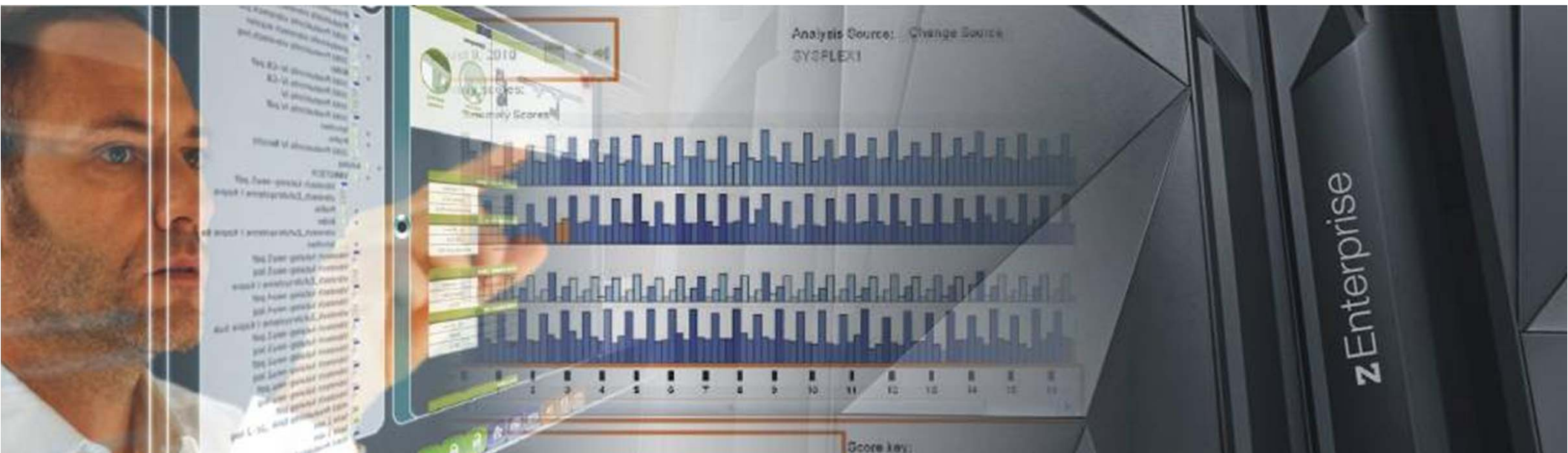
Configuration

■ **Consommation prévues (informations non contractuelles)**

- z/OS zAware monitored client MIPs ~ 1%
- zAWARE Host
 - Partie de moteurs (CP ou IFL) pour une configuration moyenne à deux moteurs pour une grande configuration.
 - Pour supporter des « Monitored Clients » avec une intensité de message jusqu'à 1500 par seconde, allouer 2 IFL/CP (shared).

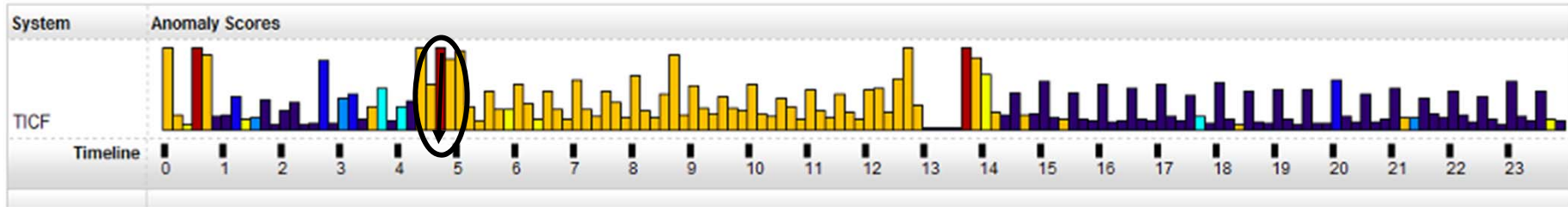


Le Reporting





Le Reporting



Interval Contribution Score	Appear Count	Cluster ID	Rarity Score ▼	Time Line	Component	Message ID	Message Example
0.894	17	-	101	[Redacted]	ILR	ILR032I	PAGE DATA SET HAS BEEN USED BY ANOTHER SYSTEM: 042 DATA SET NAME - SYS1.TIPG00.COMMON VOLUME SERIAL - TIPG00 DEVICE NUMBER - 87FC SYSTEM NAME - TICF [...] DATA SET LAST UPDATED AT
0.043	1	-	101	[Redacted]	ILR	ILR030A	PAGE DATA SET MAY BE IN USE: 032 DATA SET NAME - SYS1.TIPG00.PLPA VOLUME SERIAL - TIPG00 DEVICE NUMBER - 87FC SYSTEM NAME - TICF [...] DATA SET LAST UPDATED AT 09:37:31 ON
0.043	1	-	101	[Redacted]	ILR	ILR031A	REPLY 'DENY' TO PREVENT ACCESS, 'CONTINUE' TO ALLOW USE OF SYS1.TIPG00.PLPA.
0.043	1	-	101	[Redacted]	IEA	IEA380I	THIS SYSTEM IS NOW OPERATING IN STP TIMING MODE.
0.043	1	-	101	[Redacted]	AOF	AOF604I	AUTOMATION PAUSED BY OPERATOR REQUEST
0.043	1	-	101	[Redacted]	CNZZ	CNZZ033E	SPECIFIC MESSAGE THRESHOLD REACHED FOR IOS2911
0.043	1	-	101	[Redacted]	IEAVEH	IEAVEH071E	HiperDispatch is expected to be enabled but it is disabled
0.291	6	-	101	[Redacted]	EZZ	EZZ7871I	NO MATCHING INTERFACE STATEMENTS FOR 10.103.247.18 (MPC_TICF_TW PR)

Le Reporting – « Scoring »

– 0 à 99.4

- L'intervalle contient des messages qui ne montrent que des différences non significatives par rapport au comportement attendu dans le modèle. Un score de 0 est possible car le serveur élimine les messages attendus ou dans le contexte du calcul du score. Les barres sont de couleur bleu clair.
- Les intervalles avec des scores supérieurs à 0 mais inférieurs à 99.5 contiennent des messages qui sont inattendus ou envoyés hors contexte.

– 99.5

- Les intervalles avec ce score contiennent du message rarement vu, inattendu, ou hors-contexte.
- De manière générale, cette note indique les intervalles avec quelques différences par rapport au modèle du système mais ne contient pas de messages d'intérêt important pour le diagnostique. (couleur bleu foncé).

– 96.6 – 100

- Les intervalles avec ce score contiennent des messages rarement vu (ces messages apparaissent dans le modèle qu'une ou deux fois), ou de nombreux messages qui sont inattendus ou émis hors de leur contexte.
- Ce score indique des intervalles avec plus de différences par rapport au modèle du système, ces intervalles peuvent contenir des messages qui peuvent vous aider à diagnostiquer le comportement anormal du système (couleur or).

– 101

- Ces intervalles avec ce score présentent les différences les plus significatives du modèle du système; Ils contiennent des messages qui méritent d'être examinées. Dans l'affichage graphique à barres, ces intervalles sont de couleur orange. IBM zAware attribue ce résultat à des intervalles qui contiennent:

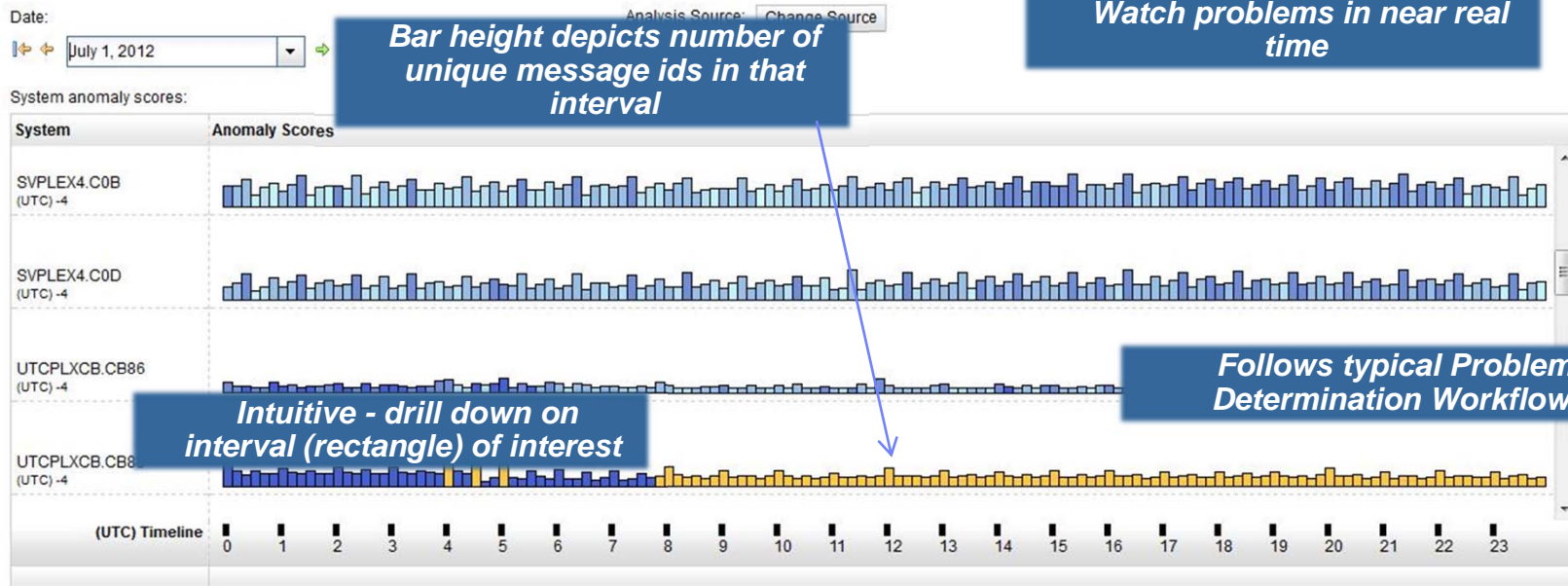
- ❑ ID de message unique que le serveur n'a pas détecté précédemment dans le modèle du client
- ❑ Messages inhabituels ou inattendus
- ❑ Les messages que les règles d'IBM définissent comme critiques
- ❑ Un volume beaucoup plus élevé que prévu des ces messages

Le Reporting

Analysis

Help

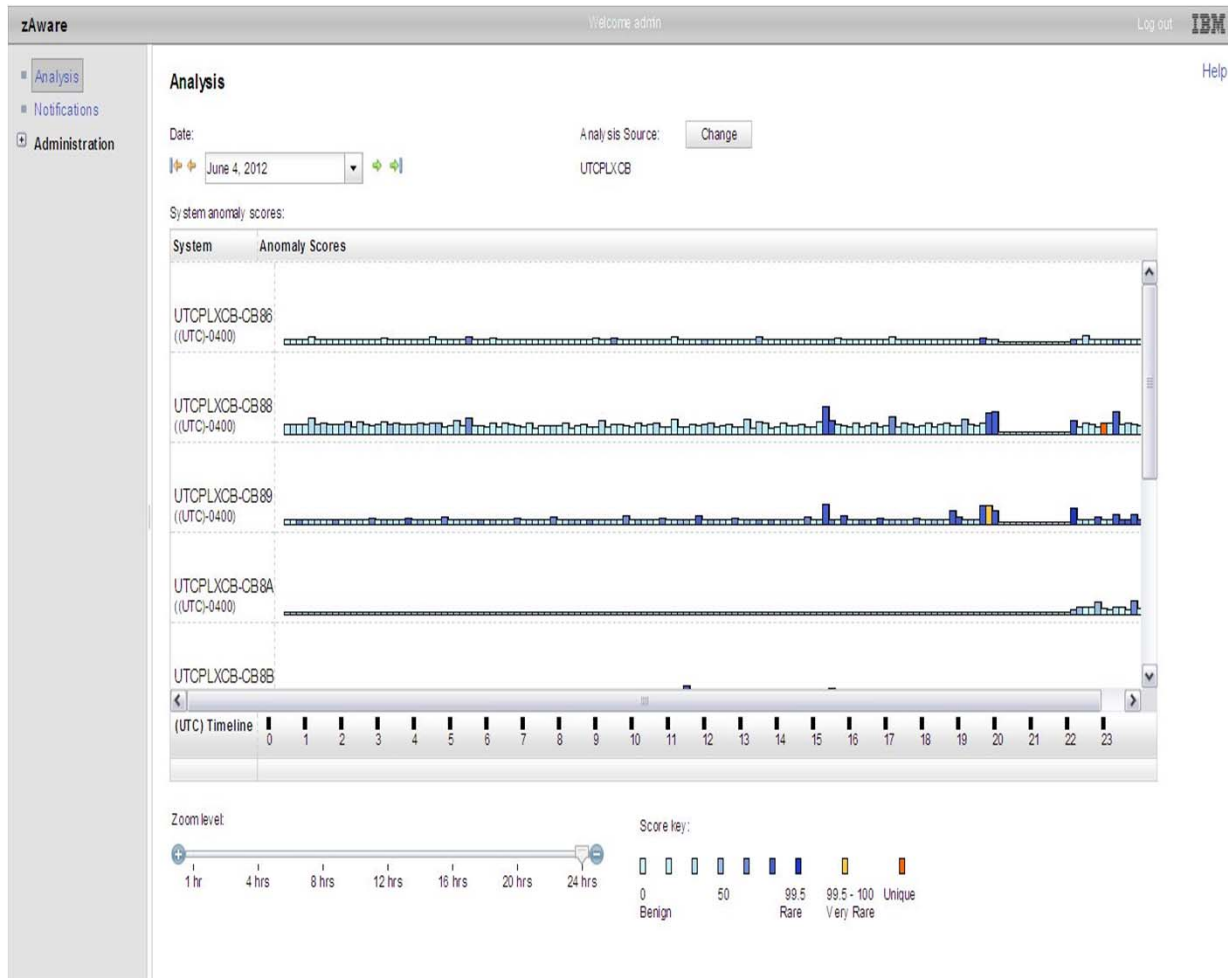
The System Anomaly Scores graph shows message analysis data for each system in ten minute intervals. For each interval, the bar height indicates the number of unique messages and the bar color reflects the commonality of the messages occurring during that interval. Click on an interval bar to access detailed message information. To view messaging analyses from other days, use the date selector. To customize which systems are shown in the graph, click the **Change Source** button.



Anomaly score indicates the rarity of the message IDs within that interval

Le Reporting

SYSPLEX view



■ SYSPLEX view

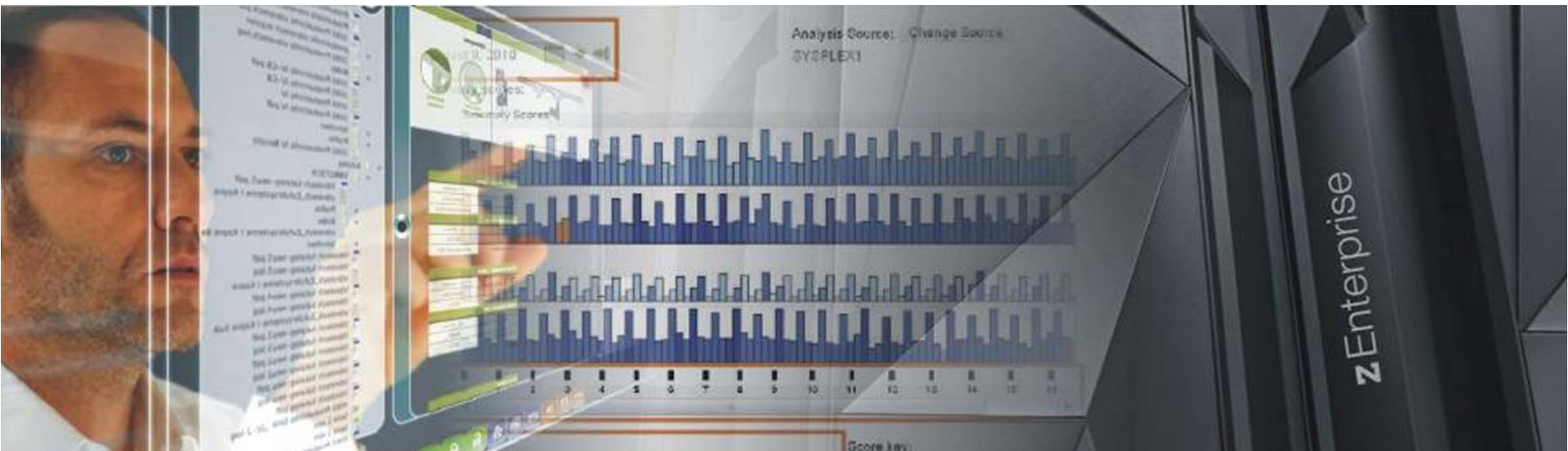
- zAware updates view every two minutes looking back 10 minutes
 - Number of unique messages
 - Interval score
 - Interval score calculation
 - zAware eliminates expected messages (eg. messages within clusters)
 - zAware uses unexpected messages to calculate interval score
- Interval score = sum of message id contribution
- Message id contribution function of
- Number of appearances
 - Probability of occurrence
 - IBM insight

Updates

- Provides ability to look at individual systems, sysplex, all systems monitored by zAware
- Improved scoring – recognize when too many messages are issued
- Add IBM insight
 - Identify critical z/OS kernel messages
- Correct scores when burst of random messages (scale number of appearances using log function instead of linearly)




zAWARE en action





zAWARE en action - LOGIN

■ Panneau de Log In

IBM zAware Welcome guest 

IBM zAware

The **IBM System z Advanced Workload Analysis Reporter (IBM zAware)** provides a smart solution for detecting and diagnosing anomalies in z/OS systems. Its analysis of current events, compared to models of normal system behavior, provides nearly real-time detection of anomalies. Through this graphical user interface (GUI), you can view analytical data and use it to diagnose the cause of past or current anomalies.

Analysis	The Analysis page displays analytical data that provides a clear visual indication of systems that are experiencing anomalous behavior. Through a secondary page, the Interval view , you can pinpoint and diagnose the cause of this behavior.
Notifications	View informational and error notifications pertaining to zAware's processing
System Status	View information about the z/OS systems that are connected to IBM zAware.
Administration	Through the Administration menu, you can use these functions to manage IBM zAware operations: <ul style="list-style-type: none">• Training Sets: View information about the generation of system behavior models.• Configuration: Manage storage devices, manage security mechanisms, view the sysplex topology, and assign priming data to build system behavior models.

[Log in](#)



zAWARE en action - Analysis

IBM zAware
Welcome admin
Log out

- Analysis
- Notifications
- System Status
- Administration
 - Training Sets
 - Configuration

Analysis

The System Anomaly Scores graph shows message analysis data for each system in ten minute intervals. For each interval, the bar height indicates the number of unique messages and the bar color reflects the commonality of the messages occurring during that interval. Click on an interval bar to access detailed message information. To view messaging analyses from other days, use the date selector. To customize which systems are shown in the graph, click the Change Source button.

Date: Analysis Source:

All Monitored Systems

System anomaly scores:

System	Anomaly Scores
BAPLEX.BA01 (UTC) +1:59	
BAPLEX.BA02 (UTC) +1:59	
(UTC) Timeline	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

Zoom level:

Score key:

0					99.5		99.6 - 100	101		
No Difference									Significantly Different	



zAWARE en action - Analysis

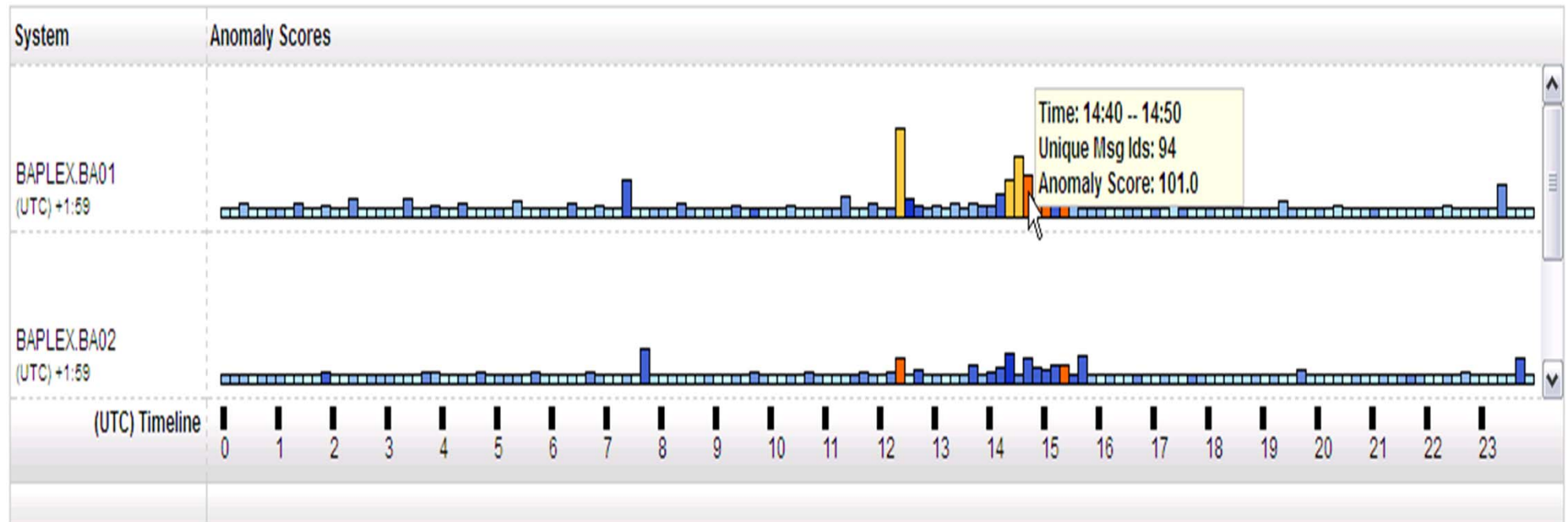
Date:

Analysis Source: [Change Source](#)

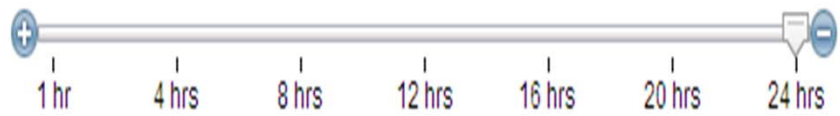
septembre 25, 2012

All Monitored Systems

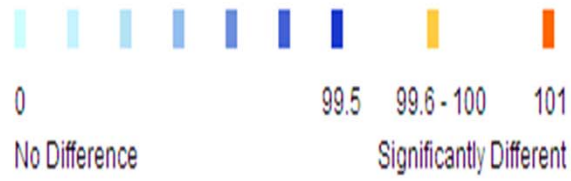
System anomaly scores:



Zoom level:



Score key:





zAWARE en action - Analysis

Date:

septembre 25, 2012

Analysis Source:

All Monitored Systems

Time interval (UTC):

14:40 -- 14:50

Interval anomaly score:

101.0

Messages

Actions ▾										
▼1 Anomaly Score	Interval ▼2 Contribution Score	Message Context	Rules Status	Appearance Count	Time Line	Message ID	Message Example	Rarity Score	Component	Cluster ID
1	10.479	new	None	3		ISG378I	GRS QSCAN ERROR COMMUNICATING WITH SYSTEM BAK1, DIAG=00000001	101	ISG	-1
1	9.723	new	None	2		IOS500I	ACTIVATE RESULTS 994 TEST DETECTED NO CONDITIONS WHICH WOULD RESULT IN	101	IOS	-1
1	9.223	new	None	1		GEO133I	GDPS MASTER FUNCTION MOVED TO BA01/CNMP1	101	GEO	-1
1	7.837	unclustered	CRITICAL	1		IXC101I	SYSPLEX PARTITIONING IN PROGRESS FOR BAK1 REQUESTED BY XCFAS. REASON:	100	IXC	-1
1	7.837	unclustered	IMPORTANT	2		IXC409D	GDPS TEST MESSAGE	91	IXC	-1
1	1.992	unclustered	IMPORTANT	1		CNZZ007E	MESSAGE RATE EXCEEDED 30 MESSAGES IN <1 SECONDS.	21	CNZZ	-1



zAWARE en action - Notifications

- Analysis
- **Notifications**
- System Status
- ☐ Administration
 - Training Sets
 - Configuration

Notifications

Notification messages



Actions ▼		
<input type="checkbox"/> Message ID	Message Text	Message Date/Time
<input type="checkbox"/> AIFT0001I	Train Request for Managed System ZBPLEX-ZB01 started [Thu Oct 18 12:17:38 UTC 2012].	Thu Oct 18 2012 14:17:38 GMT+0200 (Romance Daylight Time)
<input type="checkbox"/> AIFT0102I	Modeling for ZBPLEX-ZB01 did not complete successfully. Pattern analysis of the data did not result in usable pattern.	Thu Oct 18 2012 14:18:36 GMT+0200 (Romance Daylight Time)
<input type="checkbox"/> AIFT0001E	Train Request for Managed System ZBPLEX-ZB01 failed (rc: 12) [Thu Oct 18 12:18:36 UTC 2012].	Thu Oct 18 2012 14:18:36 GMT+0200 (Romance Daylight Time)
<input type="checkbox"/> AIFT0104I	Priming request started at Thu, 18 Oct 2012 12:17:45 +0000 processed 110 lines 30 lines had messages	Thu Oct 18 2012 14:20:25 GMT+0200 (Romance Daylight Time)
<input type="checkbox"/> AIFT0104I	Priming request started at Thu, 18 Oct 2012 12:17:45 +0000 processed 51 lines 22 lines had messages	Thu Oct 18 2012 14:20:25 GMT+0200 (Romance Daylight Time)
<input type="checkbox"/> AIFT0104I	Priming request started at Thu, 18 Oct 2012 12:17:42 +0000 processed 100 lines 53 lines had messages	Thu Oct 18 2012 14:20:30 GMT+0200 (Romance Daylight Time)
<input type="checkbox"/> AIFT0104I	Priming request started at Thu, 18 Oct 2012 12:17:43 +0000 processed 141 lines 58 lines had messages	Thu Oct 18 2012 14:20:30 GMT+0200 (Romance Daylight Time)
<input type="checkbox"/> AIFT0001I	Train Request for Managed System ZBPLEX-ZB01 started [Thu Oct 18 12:20:59 UTC 2012].	Thu Oct 18 2012 14:20:59 GMT+0200 (Romance Daylight Time)

Last Refresh: Mon Oct 22 2012 18:04:08 GMT+0200 (Romance Daylight Time)



zAWARE en action – System Status






System Status

System Status displays the IBM zAware analytics engine status, as well as monitored systems information for z/OS systems connected to IBM zAware. Click the start button () () to stop it.

Analytics engine status: Running



IBM zAware Monitored System Data Suppliers:

System	Sysplex ▲	Status	Instrumentation Data Type	Connect Start Time
BA02	BAPLEX	 Active	OPERLOG	18 octobre 2012 14:20:25 Romance Daylight Time
BA01	BAPLEX	 Active	OPERLOG	18 octobre 2012 14:20:25 Romance Daylight Time
ZB02	ZBPLEX	 Active	OPERLOG	18 octobre 2012 14:20:30 Romance Daylight Time
ZB03	ZBPLEX	 Inactive	OPERLOG	12 octobre 2012 15:27:23 Romance Daylight Time
ZB01	ZBPLEX	 Active	OPERLOG	18 octobre 2012 14:20:30 Romance Daylight Time



zAWARE en action – Training Set

Training Sets

The Monitored Systems table provides training statuses and results for IBM zAware monitored systems. The Actions menu provides functions for managing model dates, requesting or cancel messages. Training details for a given system can be accessed by clicking on links in the Training Progress and Last Training Result columns.

Monitored Systems

Actions ▼						
	System	Sysplex	Training Progress	Last Training Result	Last Training Result Time	Current Model Built
<input type="radio"/>	BA01	BAPLEX	—	Complete	22 octobre 2012 02:00:05 Romance Daylight Time	22 octobre 2012 02:00:05 Romance Daylight Time
<input type="radio"/>	BA02	BAPLEX	—	Complete	22 octobre 2012 02:00:20 Romance Daylight Time	22 octobre 2012 02:00:20 Romance Daylight Time
<input type="radio"/>	ZB01	ZBPLEX	—	Complete	18 octobre 2012 14:21:02 Romance Daylight Time	18 octobre 2012 14:21:02 Romance Daylight Time
<input type="radio"/>	ZB02	ZBPLEX	—	Complete	18 octobre 2012 02:00:48 Romance Daylight Time	18 octobre 2012 02:00:48 Romance Daylight Time
<input type="radio"/>	ZB03	ZBPLEX	—	Failed	19 octobre 2012 10:18:31 Romance Daylight Time	—



▶ Current Training Status Details (Click on training statuses above to view details)



zAWARE en action - Configuration

IBM zAware Welcome admin

- Analysis
- Notifications
- System Status
- Administration
 - Training Sets
 - Configuration**

Configure Settings

Analytics | Data Storage | Security | Sysplex Topology | **Priming Data**

Instrumentation data retention time (training period - 730 days): days Durée de conservation des données à partir de systèmes surveillés.

Training models retention time (0 - 730 days): days Durée de conservation des modèles

Analysis results retention time (30 - 3650 days): days Combien de temps conserver les résultats d'analyse

Training period (1 - 365 days): days Nombre de jours consécutifs à utiliser comme période de modélisation

Training Interval (7 - 365 days): days Combien de jours avant qu'un nouveau modèle soit construit



zAWARE en action - Configuration

- Analysis
- Notifications
- System Status
- ☐ Administration
 - Training Sets
 - Configuration

Configure Settings

- Analytics
- Data Storage
- Security
- Sysplex Topology
- Priming Data

The current sysplex topology is displayed below. If it does not properly reflect your actual sysplex configuration, use the **Move Selected Systems** button to move systems into the correct sysplexes as needed.

Sysplex Topology:

- ☐ BAPLEX
 - ☐ BA01
 - ☐ BA02
- ☐ ZBPLEX
 - ☐ ZB01
 - ☐ ZB02
 - ☐ ZB03



CONCLUSION

- zAware est la future génération de surveillance du système
- zAware aide à se protéger des anomalies rares, des événements “sick-but-not-dead” et des erreurs par inadvertance
- zAware offre un interface simple
- zAware aide sur le diagnostic et la résolution des problèmes



(TBD) zAware can deliver 4 gigabytes of data/day on a single web page (TBD)



SYNTHESE

- **1.If a system is unresponsive – example is console hung**
 - Use IBM zAware to see if anomalous messages were issued.
- **2.If a Sysplex wide problem appears to be occurring**
 - Use IBM zAware to determine on which LPAR the problem originated and to see if anomalous messages were issued prior to the problem .
 - Use Runtime Diagnostics to quickly investigate the problem to find problem (in operating system core)
- **3.When response time monitoring detects a problem or when a hard failure occurs (automate detects a job has terminated and restarts the job) – need to determine the cause of the event to prevent reoccurrence**
 - Use Runtime Diagnostics to quickly investigate the problem – find problem in BCP 'kernel' (core of operating system)
 - Use standard monitoring product like OMEGAMON XE to find a classic performance problem (e.g. bad WLM policy)
 - Use IBM zAware to see if anomalous messages were issued to find a configuration problem or resource problem (bad VTAM definitions).



SYNTHESE

■ 4. When the start of soft failure is detected by

- An exception was issued by PFA that the arrival rate is too high
 - Use Runtime Diagnostics to quickly investigate the problem
 - Use PFA's report to identify address space(s) likely causing exception.
 - Use IBM zAware to identify messages
 - Use OMEGAMON XE
- An exception was issued by PFA that the arrival rate is too low
 - Use PFA's report in SDSF to view Runtime Diagnostic events and view the address space(s) likely causing the exception.
 - Use IBM zAware to identify messages
 - Use OMEGAMON XE
- IBM zAware detects an unusual interval
 - Investigate the messages with the largest interval contribution score.
 - Use Runtime Diagnostics
 - Use OMEGAMON XE

■ 5. If Software changes have been made to your system.

- Use IBM zAware to see if new, unusual messages are issued or if there are more messages than expected.
- Use IBM Health Checker to verify configuration settings and to detect if migration actions were performed.





z/Aware - Comment être informé de la santé de vos z/OS

Alain Maneville

Senior Certified I/T Specialist – zChampion

FIN DU DOCUMENT

Université du Mainframe 2013

4-5 avril