IBM CICS® Transaction Server for z/OS™
CICS integration strategic options & Tools

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AGENDA

- SOA sur System Z
- CICS dans une architecture SOA sur System Z
- CICS : Modernisation et Ouverture de l’existant
- Accélération et Performance XML sur System z
- CICS – WPS – ESB Intégration
SOA Reference Architecture

Business Innovation & Optimization Services
- WebSphere Business Monitor
  - Facilitate better decision-making with real-time business information

Interaction Services
- WebSphere Portal
  - Enable collaboration processes & information

Process Services
- WebSphere Process Server
  - Build integrated processes
- WebSphere Integration Developer
  - Build on a robust, scaleable, and secure services environment

Information Services
- WebSphere Information Integrator
  - Manage diverse data unified manner
- WebSphere ESB
- WebSphere Message Broker – Advanced ESB

Partner Services
- WebSphere Partner Gateway

Business App Services
- WebSphere Application Server
  - Build services environment
- WebSphere Application Server

Access Services
- WebSphere Adapter
  - and application assets

Infrastructure Services
- WebSphere XD
  - Optimize throughput, availability and performance

Model
Assemble
Deploy
Manage

CICS products play majors role here

CICS TS V3.1
CICS TG V6.1
Platform Readiness – Key Middleware

Platform Readiness
(Technology, Web Services/SOA)

Integrated Mainframe Software Tool Set

IMS V9
DB2 V8
CICS V3
NetView V5.2
WebSphere V6
WebSphere MQ V6

Operating System z/OS 1.7

zSeries Server Hardware zAAP zIIP

Source: Maximizing Business Value With Resurgent zSeries Mainframes - Platform Readiness Key in 2005 (Ian Bramley)
Application Transformation using WebSphere and CICS

The majority of large corporations deploying WebSphere will:

- Have a core of previously established, proven CICS business logic that they will want to leverage within modern WebSphere J2EE environments
- Want tooling to help them discover, design, deploy and manage, mixed CICS and WebSphere applications, helping to minimize cost, risk and time to market

Current
Use standards based programmatic integration to deliver mixed workloads with good Qualities of Service

Future
Applications transformed to fully exploit the agility of a Service Oriented Architecture

Integrate WebSphere and CICS technology.
Satisfy business and application needs.
Strategic options to access CICS

1. Web Browser
2. J2EE
3. EJB Client
4. Client JMS
5. Web Services
6. Client TCP/IP

CICS TS

- 3270
- J2EE
- EJB Client
- EJB+A
- MQ Trigger
- Web Services
- Client TCP/IP
- DBD
- HTTP/WMQ
- Sockets IP
- RMI Over IIOP
- SOAP
- JCA
- CCI
- CTG

Prog Id Myproge
Data division
01 WS -Datr
 02 Copy sss
 02 Copy yyyy
 01 DFHComarea
 02 comc pic x
Procedure div.
return
“Service Flow Modeler” (SFM)

- Service Flow Modeler est l’outil permettant de construire un flow de services en se basant sur des Commarea et applications Terminal CICS.
- Permet de gérer :
  - Model business process
  - Implementation de business process par aggregation de multiple transactions d’invocations, interactions terminal, et sub-flows
  - Déploiement de ces aggregations dans le runtime inclut dans CICS Transaction Server V3.1 ou WebSphere Application Server
  - Optionnellement le déploiement du business process comme web services.
- Ce Concept de développement est compatible avec d'autres tâches de développement SOA
Service Flow Modeler

Avec “Service Flow Modeler”

XML

CICS Transaction A
CICS Transaction B
CICS Transaction C

Web services client

Fine-grained interaction pattern

Sans “Service Flow Modeler”

XML

CICS Transaction A
CICS Transaction B
CICS Transaction C

Web services client

Coarse-grained interaction pattern

Service Flow Modeler::
Runtimes Supported

- Service Flow Modeler
- WebSphere Developer
- CICS 3.1
  - CICS Integrator Adapter
  - Adapter Service
  - HATS
  - Adapter Service
- WebSphere App Server
- Service Interface
- Service Interface

Deploy

Deploy
IBM Rational Developer for System z

**XML Services for the Enterprise**
- SOA access to CICS V3.x and IMS V9 or V10 COBOL/PL/I applications
- Bottom-up/Top-down or meet-in-the-middle COBOL/PL/I to XML mapping support
- Meet-in-the-middle development scenario tooling wizards for CICS, IMS, and batch applications

**z/OS Application Development**
- Connect to z/OS remote systems
- Work with z/OS resources like COBOL, PL/I, C, C++, JCL, etc.
- Interact with the Job Entry Subsystem (JES) to submit jobs, monitor jobs, and review job output
- Perform dataset management actions like allocating datasets and migrating datasets
- Perform typical edit, compile, and debug tasks on remote z/OS resources from the workstation

**DB2 Stored Procedure for COBOL and PL/I**
- Create DB2 stored procedures on z/OS in either COBOL or PL/I
- Build and catalog support for the DB2 stored procedure
- Debug z/OS based stored procedures from workstation

**CICS BMS/ IMS MFS Map Support**
- Visually create and modify BMS Map sets or IMS/MFS
- Generates JCL
- Work with local or remote maps

**DB2 Stored Proc – COBOL / PL/I**
- z/OS Application Development

**Database App Generator wizard**
- Ability to generate WSDL and CICS COBOL program to access DB2
- Generate CRUD DB2 program code from UML, which can also be integrated into web service applications

**CICS Service flow support**
- CICS Service Flow Feature
- Implements SOA and Web Services
- Service Flow is a tool to build service flows out of your existing COMMAREA and Terminal based CICS applications

**z/OS Tooling Integration**
- Read/Write/Update VSAM datasets via integration with IBM File Manager
- Access IBM Fault analyzer reports for analyzing ABENDS and associating back to source code

**Rational Application Developer**
History of Rational Developer for System z

- WebSphere Studio Enterprise Developer
- WebSphere Developer for zSeries
- WebSphere Developer for System z
- Rational Developer for System z

Years:
- 2004
- 2005
- 2006
- 2007
Les fonctions gérées par le Datapower

- Protéger le mainframe en intercalant un boîtier qui va contrôler le flux entrant
- Assurer un contrôle d'accès aux services du mainframe
- Valider que les appels WS en direction du mainframe ne sont pas dangereux
- Remplacer les différents modes d'authentification des appelants (UID/password, certificats X509V3, token) par des ID RACF acceptés par le mainframe
- Valider les schémas XML des messages SOAP arrivants.
- Chiffrer les communications pour protéger les données sensibles
- Assurer la supervision des flux entrants
- Contrôler la qualité de service délivrée par le mainframe, réguler le traffic et gérer les priorités.
- Modifier/Simplifier/Transcoder les messages SOAP pour supprimer les informations superflues des messages de et vers CICS
- Attaquer d'autres protocoles que HTTP, comme MQ par exemple
Datapower : Prétraitements XML pour décharger CICS

- XML Pipeline Processing:
  - Enables dynamic content generation, data and forms processing

- Performs XML Schema Validation:
  - On all incoming/outgoing XML documents to ensure messages are legitimate and properly express your data's business rules

- Support for popular XSLT extensions:
  - Some popular elements and functions supported by other engines, metadata extensions for accessing protocol data (e.g. `<remove-http-request-header>`); regular expressions for string processing; time/date and math functions

- XML Caching:
  - Where repeatedly used items can be cached to reduce XML processing requirements and overall application latency: cache stylesheets, URLs, XML, policies, XML schema
  - Caching of both XML documents frequently used as well as XSL caching reducing "XSL fetch" calls to repeated transforms
  - Ability to hash XSL cache for quicker XSL indexing and compilation comparisons

- XML Compression:
  - Using standard compression negotiation with the remote HTTP peer to reduce XML overhead
Datapower : Authentifier et Contrôler les accès

- Chiffrement des communications
- Architecture d'authentification et d'autorisation modulaire.
- Politiques de contrôle d'accès internes ou externes
  - Internes: certs, XML file
  - Externes: external access control servers
- Authentification / Identification multiples
  - WS-Security user/pass token
  - SSL client certificate
  - SAML assertion
  - HTTP basic-auth
  - Proprietary SSO cookie/token
- Resource examples:
  - URL ou SOAP method
- Support des Standards
  - LDAP (for CRL, authentication, authorization)
  - RADIUS (authentication)
  - XKMS (for CRL, authentication)
  - SAML (consume, authentication, authorization, produce)
  - WS-Security, WS-Trust, WS-*
  - Outbound SOAP or HTTP call
Datapower : Protéger le Mainframe des malveillances

Les Datapowers analysent automatiquement tous les appels SOAP aux Web Services pour détecter les malveillances introduites dans les messages et protéger ainsi le Mainframe

- XML Entity Expansion and Recursion Attacks
- XML Document Size Attacks
- XML Document Width Attacks
- XML Document Depth Attacks
- XML Wellformedness-based Parser Attacks
- Jumbo Payloads
- Recursive Elements
- MegaTags – aka Jumbo Tag Names
- Public Key DoS
- XML Flood
- Resource Hijack
- Dictionary Attack
- Message Tampering
- Data Tampering
- Message Snooping
- XPath Injection
- SQL injection
- WSDL Enumeration
- Routing Detour
- Schema Poisoning
- Malicious Morphing
- Malicious Include – also called XML External Entity (XXE) Attack
- Memory Space Breach
- XML Encapsulation
- XML Virus
- Falsified Message
- Replay Attack
- …others
Datapower : Supervision Automatique du Service

- Strong features for both operational event and whole-message logging:
  - Log as verb in pipeline
  - Log individual transactions for auditing and historical analysis
  - Log to database

- Administrative Logging:
  - SNMP v1/2/3, Syslog, Syslog-ng, SMTP, File, FTP, HTTP/SOAP, database
  - Every message documented and cross-referenced
  - Log targets can include and/or exclude events

- Multiple source / sink log architecture:
  - Multiple log event types (e.g., http, ssl, crypto) & 7 priorities
  - Log targets subscribe to 1 or more event types at minimum priority
  - Supports: console, syslog, syslog-ng, SMTP, http/SOAP, file, scp, ftp, SNMP traps, CBE, database
  - Full log access from within custom XPath rules
  - Signed & encrypted logs
  - Log rotate and automatic upload (ftp, sftp)

- Separate, locked audit log:
  - User admin actions, key operations, firmware upgrades, config changes, restarts, etc.
Datapower : Contrôler la qualité du service délivrée

- **Configure Policies**
  - Based on any parameter: WSDL; Service Endpoint; Operation; Credential
  - Based on Rate (TPS) or Count by Time (Outlook like Calendar)
  - Based on Request; Response; Fault; XPath
  - Support for enforcement across a pool of devices
  - Action: Notify (Alert); Shape (Slow Down); Throttle (Reject)
  - Notify other applications such as billing, audit, etc.

- **SLM is a verb in the policy pipeline**
- **Support for Web services management standards**
- **Allow subscription to SLM for alerts, logging, etc.**
- **Graphical Dashboard**
Datapower

Éventuellement externe
Sur LDAP ou autres

Authentification
Contrôle d’accès

Annuaire LDAP

Accélération XML

WebSphere Datapower

Contrôle QOS

Firewall XML
Anti intrusion XML

SOAP sur HTTP(S)

Logs

Administration
WEB ou ITCAM SE

Annuaire LDAP
DEMO TIME
Using rational Developer for System z

• Working with z/OS COBOL remote assests
  ✓ Edit remote COBOL program
  ✓ Syntax Checking using Local compiler
  ✓ Generate JCL for Batch Execution using z/OS Debug
  ✓ Debug the batch execution and recovery and abend
  ✓ Access the JES output
Questions?
Backup
Enterprise Service Bus (ESB) :
C’est quoi ?
SOA Reference Architecture

Business Innovation & Optimization Services
Provide for better decision-making with real-time business information

Interaction Services
Enable collaboration between people, processes & information

Process Services
Orchestrate and automate business processes

Information Services
Manages diverse data and content in a unified manner

ESB
Enable inter-connectivity between services

Partner Services
Connect with trading partners

Business App Services
Build on a robust, scaleable, and secure services environment

Access Services
Facilitate interactions with existing information and application assets

Infrastructure Services
Optimizes throughput, availability and performance

Development Services
Integrated environment for design and creation of solution assets

IT Service Management
Manage and secure services, applications & resources

Apps & Info Assets
Facilitate interactions with existing information and application assets
Two key types of ESB

1. If all your applications conform to the Web Services standards...

   - Travel Reservation Process
   - Check Traveler Service
   - Check Credit Service
   - Book Flight Service

   Enterprise Service Bus
   - Hotel Availability Service
   - Flight Availability Service
   - Book Hotel Service
   - Book Car Service

   …then all you may require is an ESB focused on standards-based service integration.

2. If not all your applications conform to the Web Services standards...

   - Travel Reservation Process
   - Check Traveler Application
   - Check Credit Application
   - Book Flight Application

   Advanced ESB
   - Hotel Availability Service
   - Flight Availability Application
   - Book Hotel Application
   - Book Car Application

   …then you may require a more advanced ESB focused on the integration of services with existing non-services assets.

IBM ESB Products

ESB  WebSphere ESB, a new product that delivers an Enterprise Service Bus

Advanced ESB  WebSphere Message Broker, a new version of IBM’s proven product that delivers an advanced Enterprise Service Bus.
Rôle d’un ESB dans une approche SOA

Une SOA « démêle les applications » :

Elle transforme ceci… ...en ceci.

= interface

✓ Décrire l’interface de l’application par des abstractions orientées métier
✓ Découpler l’interface de l’application
✓ Réduire le nombre et complexité des interfaces des applications métier ainsi que leurs interfaces
✓ Faciliter la réutilisation

Mais les points de connexion séparés laissent toujours un « plat de spaghetti »
Rôle d'un ESB dans une approche SOA

Un Enterprise Service Bus permet de simplifier les interfaces :

- Rendre les applications plus sobles
- Faciliter la réutilisation des applications
- Découpler les connections point à point des interfaces
- Gérer les interfaces hors de l’application

Son rôle est d’agir comme un intermédiaire (proxy) entre un demandeur et un fournisseur.
Un ESB apporte une virtualisation de service :

- Où et Qui
- Protocole des interactions
- Interfaces

Les Interactions sont découpées.

Dans un ESB sera implémenté tout ce qui donne la capacité nécessaire pour supporter la virtualisation des services, ce qui n’interdit pas d’utiliser des services externes pour remplir la mission :
Customers face a range of ESB requirements. As a result, any given project might require an ESB or an Advanced ESB... or both.
WebSphere Process Server (WPS)
C’est quoi ?
Exemple de processus métier

- Receive NiceJourney
- Validate
  - Reserve Flight
  - Reserve Car
  - Reserve Hotel
- Bill Customer
- Reply NiceJourney
Chorégraphie des processus
Process Integration utilisant WebSphere Process Server

Extensible IT Model

One simplified integration framework that leverages existing IT.

Legacy

Support for business-to-business (B2B) applications

Support for Standard based messaging infrastructure

SAP

WPS

J2EE

Siebel
**WebSphere Process Server**

WebSphere Process Server à base de J2EE combine l’intégration applicative, l’orchestration de services et le traitement de bout en bout des processus métier.

WPS vise à simplifier la création, l’assemblage, le déploiement, l’exécution et l’administration des applications d’intégration d’entreprise et basée sur SCA, SDO et CEI.

WPS permet la gestion de processus, qui comprend également des composants de modélisation et de suivi des processus (WebSphere Business Modeler et Monitor), de connectivité tant interne qu’externe de l’entreprise, avec des connecteurs applicatifs d’une passerelle B2B (WebSphere Adapters et WebSphere Partner Gateway).
WebSphere Process Server V6

- Deploy composite applications
- A Single Process Server built on SOA
  - Reliable, scalable, secure, open standards
  - Single integrated runtime for all SOA based process automation
- Support all aspects of process integration
  - process flows, business rules, human steps, services and state machines
- Rapidly change process behavior to keep pace with business requirements
  - Reuse existing services that you already have and create new services for future use
  - Build process flows without knowing where the information is coming from (late binding of services)
    - business rules control the execution sequence of the process and can change dynamically
WebSphere/Rational development family (V7)

**WebSphere Integration Developer (WID)**
- Advanced J2EE developers
- Flow composition
- Support of WebSphere Process Server

**Rational Application Developer (RAD)**
  - Professional Web, Java, XML, and Web services developers
  - SCM interface to connect to vendor of your choice
  - Embedded WebSphere Application Server Express
- J2EE developers
- Relational DB tools
- Embedded WebSphere Application Server

**WebSphere Developer for System z (WDz)**
- J2EE developers
- Relational DB tools
- Embedded WebSphere Application Server
- Enterprise development organizations
- Leverage and extend existing application
- Web service and connector based enterprise transformation
- Enterprise web to host
- Traditional COBOL, PL/I, C development

**Workbench**
IBM’s commercially supported version of the Eclipse Workbench

- **iSeries Developers**
  - Advanced J2EE developers
  - Flow composition
  - Support of WebSphere Process Server

- **J2EE Developers**

- **Integration Developers/Advanced J2EE Developers**

- **zSeries Developers**
  - Enterprise development organizations
  - Leverage and extend existing application
  - Web service and connector based enterprise transformation
  - Enterprise web to host
  - Traditional COBOL, PL/I, C development

**WDS**
- iSeries Server and eBusiness developers
- Leverage and extend iSeries Data, Code and Skills

**WebSphere Developer for System z (WDz)**
FREE now
Complimentary Products

- Base ESB product function can be enhanced with complementary products:
  - WebSphere DataPower
  - WebSphere Transformation Extender
  - WebSphere Service Registry and Repository
CICS-WPS-ESB : Ensemble comment?
Exemple de config avec ESB

L'accès à CICS au sein de l'ESB peut se faire :
- Directement - appel ECI alimentant un Objet SDO préalablement généré à partir d’un copybook Cobol ou d’une structure C
- Par le biais d’une encapsulation de la transaction CICS dans un Web-service :
  - Par le biais d’un adapteur WBI (JMS)
CICS SOA Integration With DataPower
Datapower role

- Datapower provides a common access point for internal .Net and external service requesters that need access to CICS services providers (and vice-versa).
  - intercepts and routes requests to the relevant service provider
  - change in the location of the service provider only affects the Datapower routing (service virtualization)
  - service provider location remains transparent to the service requester.

- Provides authentication, identity mapping and auditing for service requests

- Provides possibility of message transformation for complex XML messages
In this test Datapower XSLT processing transforms a complex response (RequestComplexResponse) containing multiple elements into a simpler response (RequestDataBlockResponse) containing one element.