



IBM Software Group

# Migrating to a CICS-based SOA environment

*Peter Siddell*

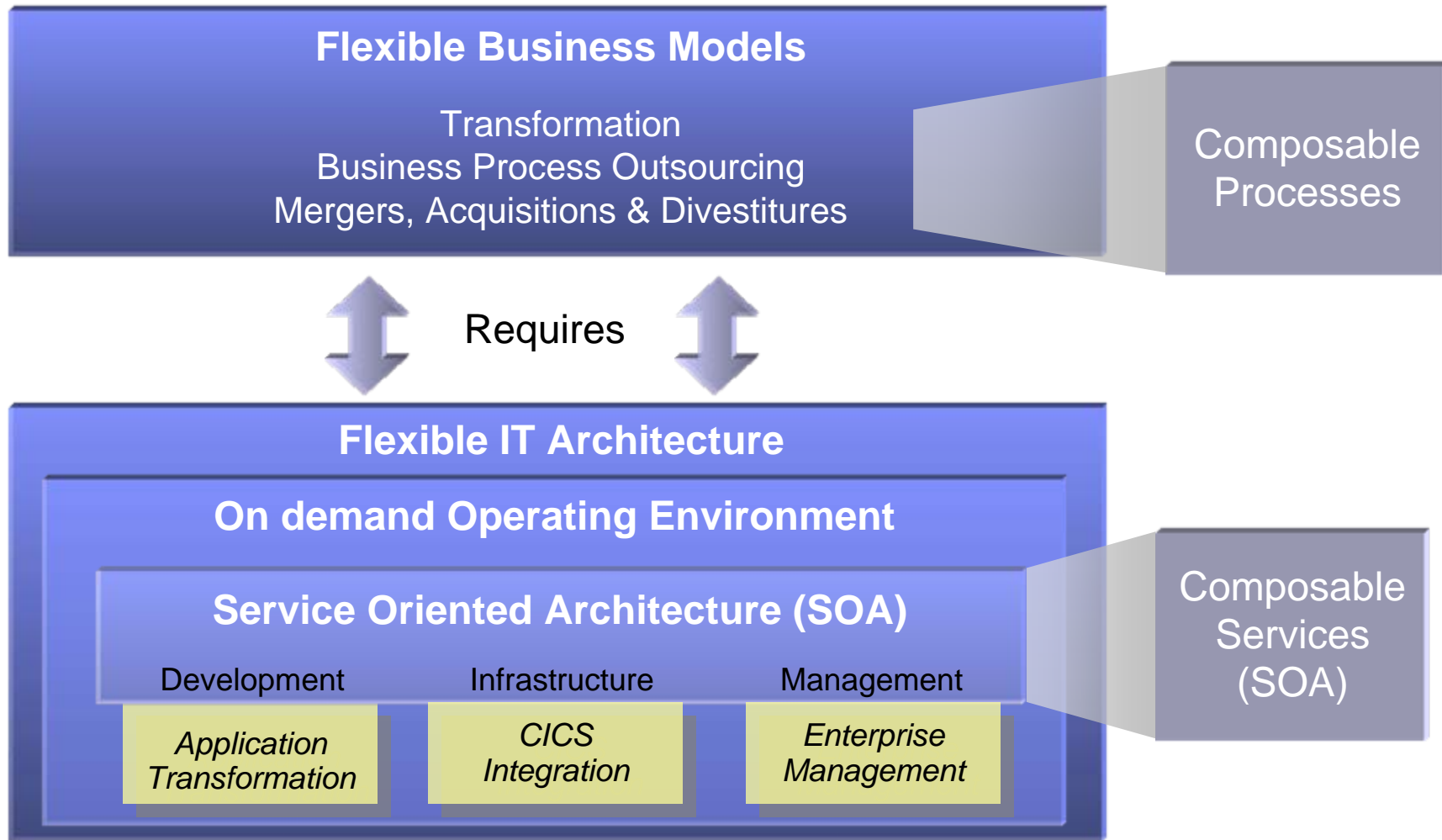
*CICS Tools Development*

*psiddell@uk.ibm.com*



**ON** DEMAND BUSINESS™

# Service Oriented Architecture at the Core of A Flexible IT Environment Supporting Today's On Demand Businesses



# CICS Transaction Server themes

## CICS Integration

Enable the reuse of CICS applications within a flexible On Demand operating environment via standard interfaces and communication protocols.

## Application Transformation

Enable the enhancement of existing applications, and construction of new applications, using contemporary programming languages, constructs and tools

## Enterprise Management

Enable the effective management of large runtime configurations via modern user interfaces

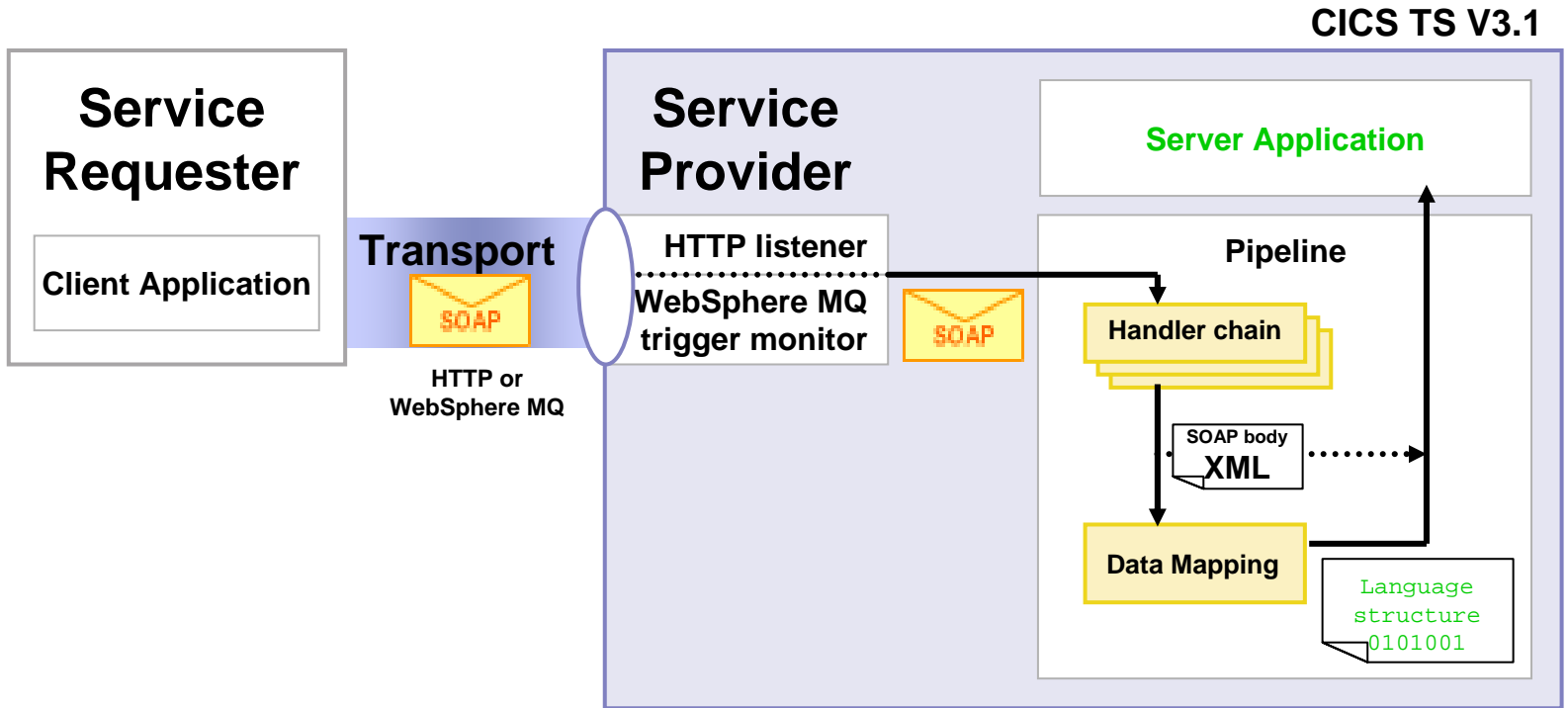


# CICS Web Services – a major feature of CICS Version 3

- Web services capabilities extend CICS applications directly to a Service Oriented Architecture
  - ▶ A CICS application can now be a Web service provider and requester
- Evolution of SOAP for CICS feature
  - ▶ Simplification of pipeline and system management
  - ▶ Fully integrated into CICS
    - RDO, problem determination, monitoring & statistics
    - New tooling support for easier application development
  - ▶ Guidance provided to assist migration from the SOAP for CICS Feature
- Rich set of Web services standards supported
  1. SOAP 1.1 and 1.2 to send and receive Web services messages
  2. WS-I Basic Profile 1.0a for interoperability with between providers and requesters using SOAP
  3. WS-Coordination extensible coordination framework, and specific coordination of transactions
  4. WS-AtomicTransaction for transaction coordination
  5. WS-Security for authentication and encryption of all or part of a message
    - SOAP Message Security, Username Token Profile 1.0, X.509 Certificate Token
- Both HTTP and WebSphere MQ network layers supported
  - ▶ For flexible deployment options dependant on application and IT requirements
  - ▶ CICS applications acting as providers or requesters are agnostic to the transport mechanism used



# CICS as a Web service provider



Dynamic install

### 1. Develop

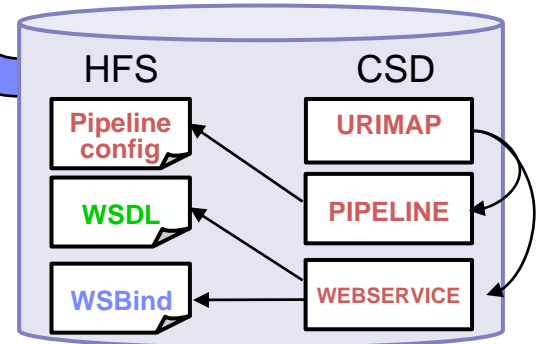
- Use existing copybook
- Client application from generated WSDL

### 2. Generate

- WSDL
- WSBIND

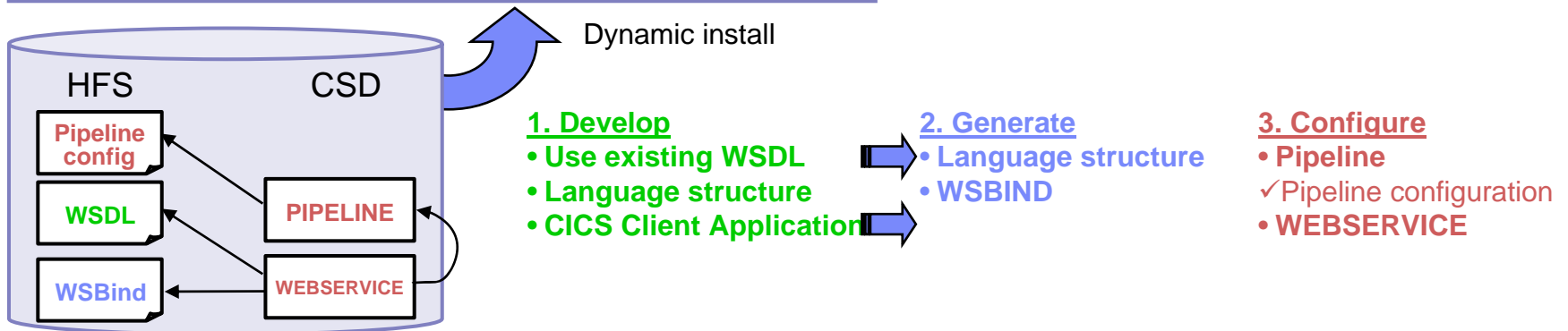
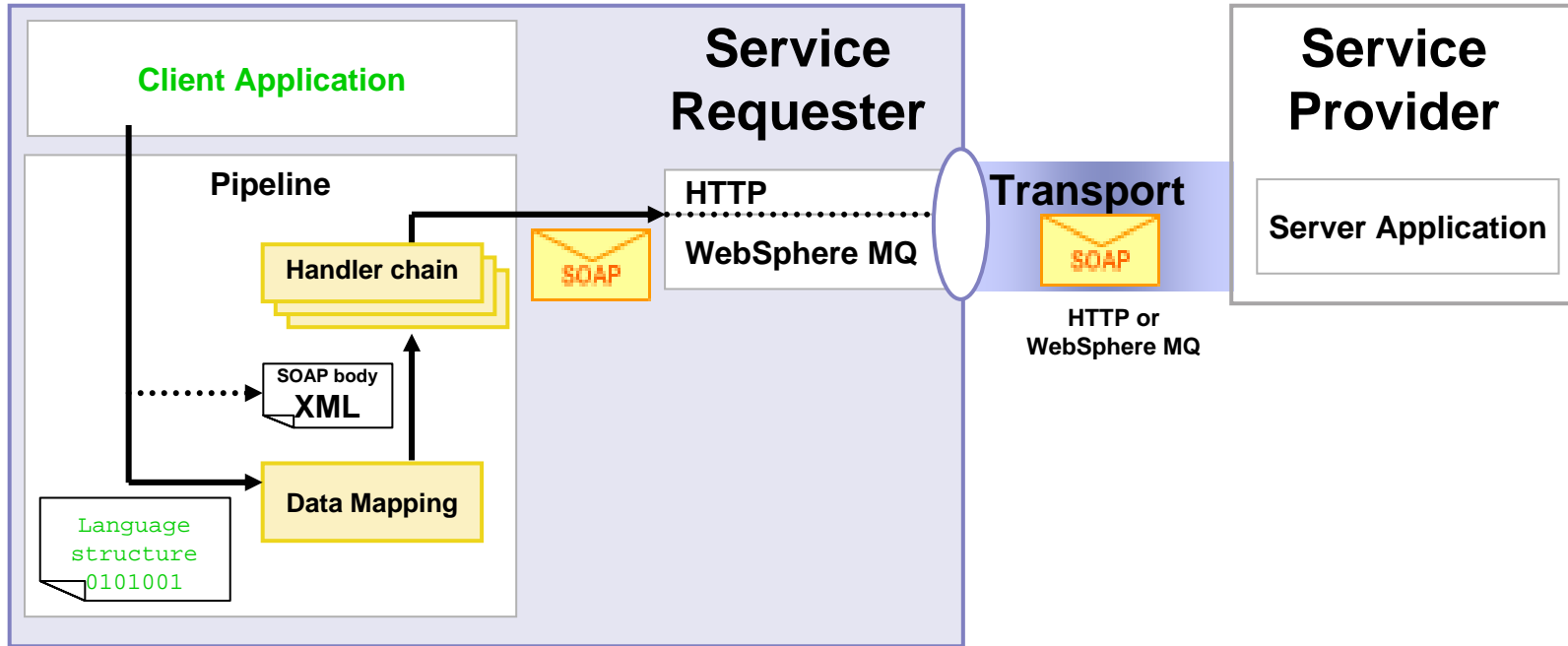
### 3. Configure

- Transport  
✓TCPIPService or QLOCAL
- PIPELINE  
✓Pipeline configuration
- URIMAP
- WEBSERVICE



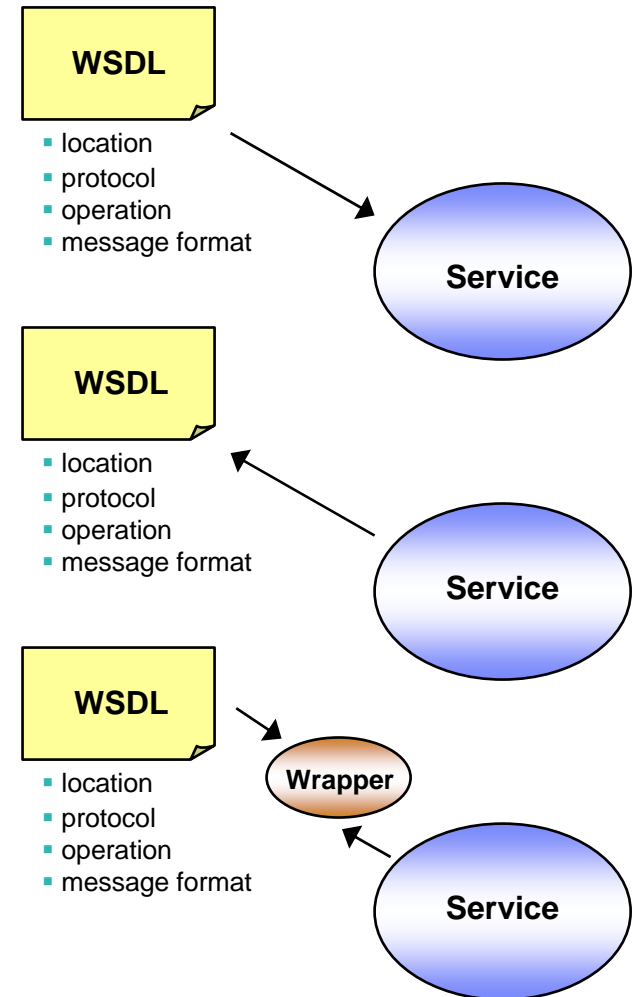
# CICS as a Web service requester

CICS TS V3.1



# Web Services development approaches

- “Top down” approach
  - Create a service from an existing WSDL
    - Create a new Web service application
      - Better interfaces for the requester
      - New CICS code using the new language structure
- “Bottom up” approach
  - Create a WSDL from an existing application
    - Expose the application as a Web service
      - Quicker implementation of the service
      - Potentially more complex interface for the requester
- “Meet in the middle” approach
  - Create a WSDL from an existing application, modify the WSDL and create a wrapper from the modified WSDL
    - Indirectly expose the application as a Web service
      - More suitable interface for the requester
      - Minimum, if any, CICS development



# CICS Tools Support New Function Exploitation

- Identify candidate applications for new function exploitation
  - ▶ Make applications thread safe
    - CICS Interdependency Analyzer helps understand applications that conform to thread safe standards
    - CICS Performance Analyzer reports can show CICS TCB usage by your thread safe CICS applications
  - ▶ Enable CICSplex SM
    - CICS Interdependency Analyzer identifies affinities
    - CICS Configuration Manager can simplify management of resource definitions in a CICSplex environment
- Improved efficiency to support SOA and Web Services implementations
  - ▶ CICS Subsystem management tools help move closer to 24/7 operation, a key requirement for SOA.





# Sample Scenario: Exploiting WebServices capabilities in CICS TS 3.1 - Converting existing CICS business logic into WebServices.

1. ATW and WSAA identify business processes to be exposed as WebServices and componentize them.
2. CICS IA provides application topology and program linkage to determine a set of programs to be exposed as WebServices.
3. WDz used to develop these programs as CICS WebServices
4. CICS CM used to create the required resource definitions - PIPELINE, WEBSERVICE, URIMAP, TCPIPSERVICE
5. CICS PA CICS WebServices reports used to provide performance data for the new developed CICS WebServices and for comparison with baselines CICS TS 2.3 Performance List report
6. Any performance problems can be further investigated using Application Performance Analyzer.



# WSAA – exploring MVS assets

## ■ Using Explore

In this example we are looking at details for a program

Home | **Explore** | Connect | Inventory | Data

[MVS assets](#)

### Program details

File:	<a href="#">DMHSRC13</a>
Program:	QAD01
Language/type:	COB / Program source
Analysis status:	Completed
Number of lines in file:	399
Blank lines:	0
Comment lines:	46
Noncomment lines:	353
Number of lines in program:	518
Splitting nodes:	47
Site:	<a href="#">DEMOMVS</a>
Container:	Partitioned Data Set <a href="#">WSAA.V3R1.SDMHSSRC</a>
Data base updated:	1/22/04 1:14 PM by PUBLIC
Concatenation set assigned:	<a href="#">DMH1</a>

**Actions**

- [Manage annotations](#)
- [Code extraction](#)
- [Assign concatenation set](#)
- [Queue for analysis](#)
- [View source](#)
- [View program data elements](#)
- [View e-business program information](#)
- [Show control flow diagram](#)
- [Show structure diagram](#)
- [Show Program diagram](#)

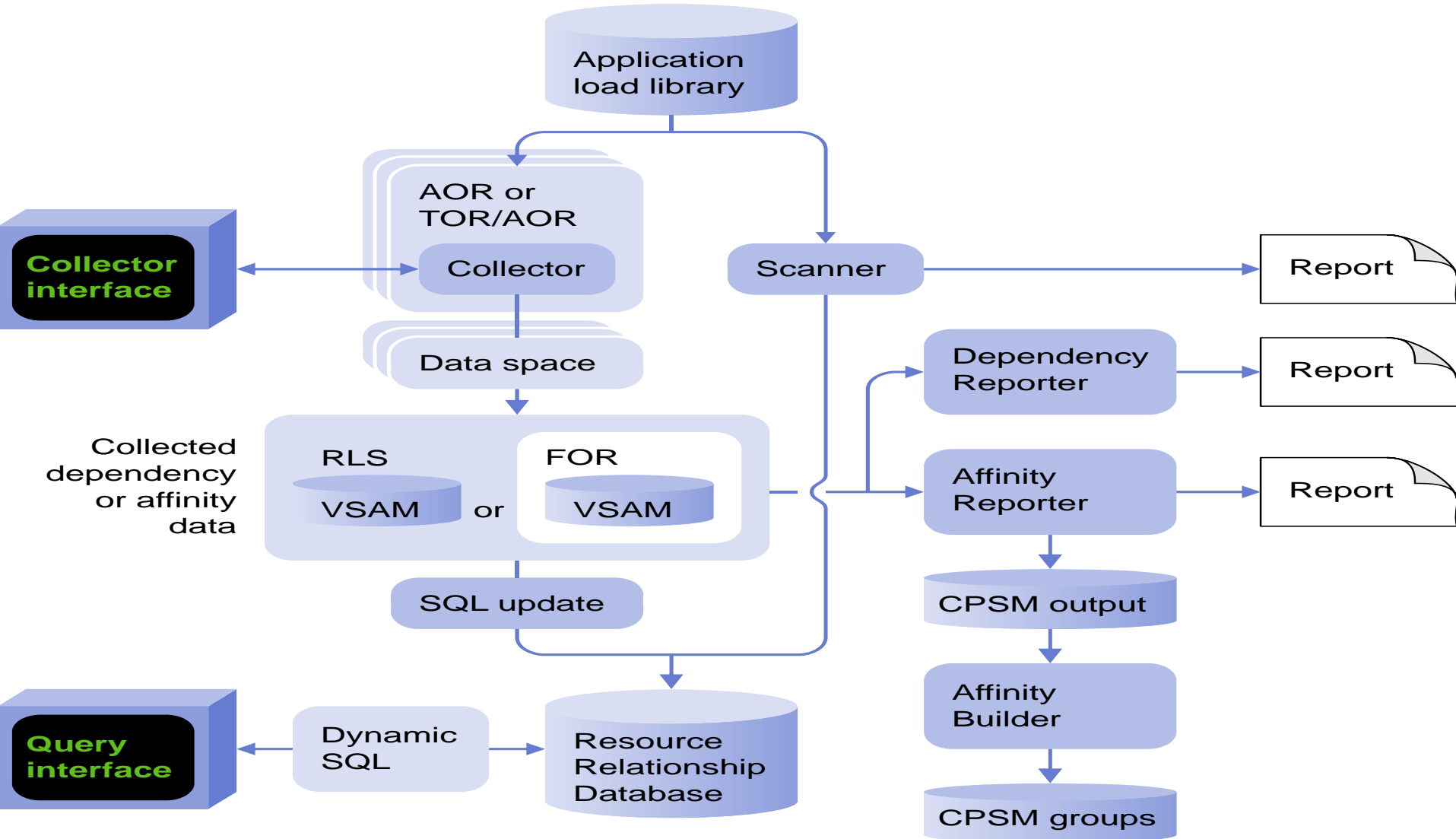
The following components relate to Program QAD01.

**Source files included**

File (3)	Language	Type	Analysis status	Action	Number of lines in file

From here, click to see more information about this program, to display diagrams, or to see a related component

# CICS IA - Overview



DemoMVS

File Edit View Communication Actions Window Help

CIU560 CICS Interdependency Analyzer for z/OS - V2R1M0 2006/09/27  
 For your CICS Query 08:18:03AM  
 WHICH PROGRAM USE FILE ACC% Page 1 of 1

HOME	PROGRAM	USES	FUNCTION
SYSID		FILE	
C22A	NACT02	ACCTFIL	READ READ UPD REWRITE

CICS Sysid: C22A CICS Applid: CICSACB2 TermID: 2002  
 CIU7011I No more details to display  
 F1= F2= F3=End F4=Exit F5= F6=  
 F7= Page Up F8= Page Down F9= F10= F11= F12=End

## CICS IA - Sample Queries

- Or you can run the query via SPUFI

- CIUSAMP1

```
-- SHOW ME DISTINCT FILES USED BY REGION TSTC AND NOT IN TSTB
SELECT DISTINCT HOMESYSID,TRANSID,PROGRAM,TYPE,OBJECT
FROM CIU3_CICS_DATA
WHERE TYPE='FILE'
AND HOMESYSID='TCTC'
AND OBJECT NOT IN (SELECT OBJECT FROM CIU3_CICS_DATA
WHERE HOMESYSID='TCTB');
```

HOMESYSID	TRANSID	PROGRAM	TYPE	OBJECT
TSTC	EQSS	EQZ3SUBS	FILE	EQZTRCA
TSTC	EQSS	EQZ3SUBS	FILE	EQZTRFA





```
EDIT          SIDDELL.JCL.CNTL (DFHLSWEB) - 01.00          Columns 00001 00072
Command ==> _____ Scroll ==> CSR
***** ***** Top of Data *****
000001 //IYK2JOB  JOB (256701),NOTIFY=SIDDELL,CLASS=A,
000002 //          MSGCLASS=A,MSGLEVEL=(1,1)
000003 //  SET QT=' '
000004 //PROCS    JCLLIB ORDER=SIDDELL.JCL.CNTL
000005 //JAVAPROG EXEC DFHLS2WS,
000006 // TMPFILE=&QT.&SYSUID.&QT
000007 //INPUT.SYSUT1 DD *
000008 PDSLIB=//SIDDELL.SOURCE.COPYBOOK
000009 REQMEN=NACTCNA
000010 RESPEN=NACTCNA
000011 LANG=COBOL
000012 LOGFILE=/u/siddell/exampleapp/wsbind/inquireAccount.log
000013 MAPPING-LEVEL=1.0
000014 PGMNAME=NACTCNA1
000015 URI=exampleApp/inquireSingle
000016 PGMINT=COMMAREA
000017 WSBIND=/u/siddell/exampleapp/wsbind/inquireAccount.wsbind
000018 WSDL=/u/siddell/exampleapp/wSDL/inquireAccount.wSDL
000019 /*
```



File Directory Special\_file Commands Help

### Directory List

Select one or more files with / or action codes. If / is used also select an action from the action bar otherwise your default action will be used. Select with S to use your default action. Cursor select can also be used for quick navigation. See help for details.

EUID=209 /MV26/cicsts/aposervice/samples/webservices/wsbind/provider/

Row 1 of 10

Type	Filename
Dir	.
Dir	..
File	dispatchOrderEndpoint.wsbind
Dir	IBM
File	inquireCatalog.wsbind
File	inquireCatalogWrapper.wsbind
File	inquireSingle.wsbind
File	inquireSingleWrapper.wsbind
File	placeOrder.wsbind
File	placeOrderWrapper.wsbind

Command ==>



I WEBS

STATUS: RESULTS - OVERTYPE TO MODIFY

```

Webs(dispatchOrderEndpoint      ) Pip(EXPIPE02)
  Unu                Pro(DFH0X0DE) Com                Dat(20050331)
Webs(inquireCatalog             ) Pip(EXPIPE01)
  Ins Uri(£320460 ) Pro(DFH0XCMN) Com                Dat(20050331)
Webs(inquireCatalogWrapper      ) Pip(EXPIPE02)
  Unu                Pro(DFH0XICW) Cha Con(DFHWS-DATA ) Dat(20050331)
Webs(inquireSingle              ) Pip(EXPIPE01)
  Ins Uri(£320461 ) Pro(DFH0XCMN) Com                Dat(20050331)
Webs(inquireSingleWrapper       ) Pip(EXPIPE02)
  Unu                Pro(DFH0XISW) Cha Con(DFHWS-DATA ) Dat(20050331)
Webs(placeOrder                 ) Pip(EXPIPE01)
  Ins Uri(£320462 ) Pro(DFH0XCMN) Com                Dat(20050331)
Webs(placeOrderWrapper          ) Pip(EXPIPE02)
  Unu                Pro(DFH0XPOW) Cha Con(DFHWS-DATA ) Dat(20050331)

```

SYSID=CIC2 APPLID=IYK2ZPS2

RESPONSE: NORMAL

TIME: 10.45.05 DATE: 26.09.06

PF 1 HELP 3 END 5 VAR 7 SBH 8 SFH 9 MSG 10 SB 11 SF



Debug

com.ibm.debug.load [Compiled Application]

- Platform: OS/390(R) Connection: 9.20.101.6:1565
  - Thread: 1 (Runnable)
    - NACTCNA1: 01
- Process: 469773512 Program: NACTCNA1

SIDDELL.SYSDEBUG(NACTCNA1)

Line	Column	Insert	Browse
1690			
1691		END-IF.	
1692	*		
1693		NACT01-040.	
1694	*		
1695	*	Set up values in the eye-catcher	
1696	*		
1697		MOVE EIBTRNID TO DEBUG-TRANID.	
1698		MOVE EIBTRMID TO DEBUG-TERMID.	
1699		MOVE EIBTASKN TO DEBUG-TASKNO.	
1700	*		
1701	*	Set up the commarea address	
1702	*		
1703		SET DEBUG-COMMAREA-ADDR TO ADDRESS OF DFHCOMMAREA	

Monitors Breakpoints Modules

Empty panel for monitoring application state.

Variables Registers

WS-DEBUG-DETAILS

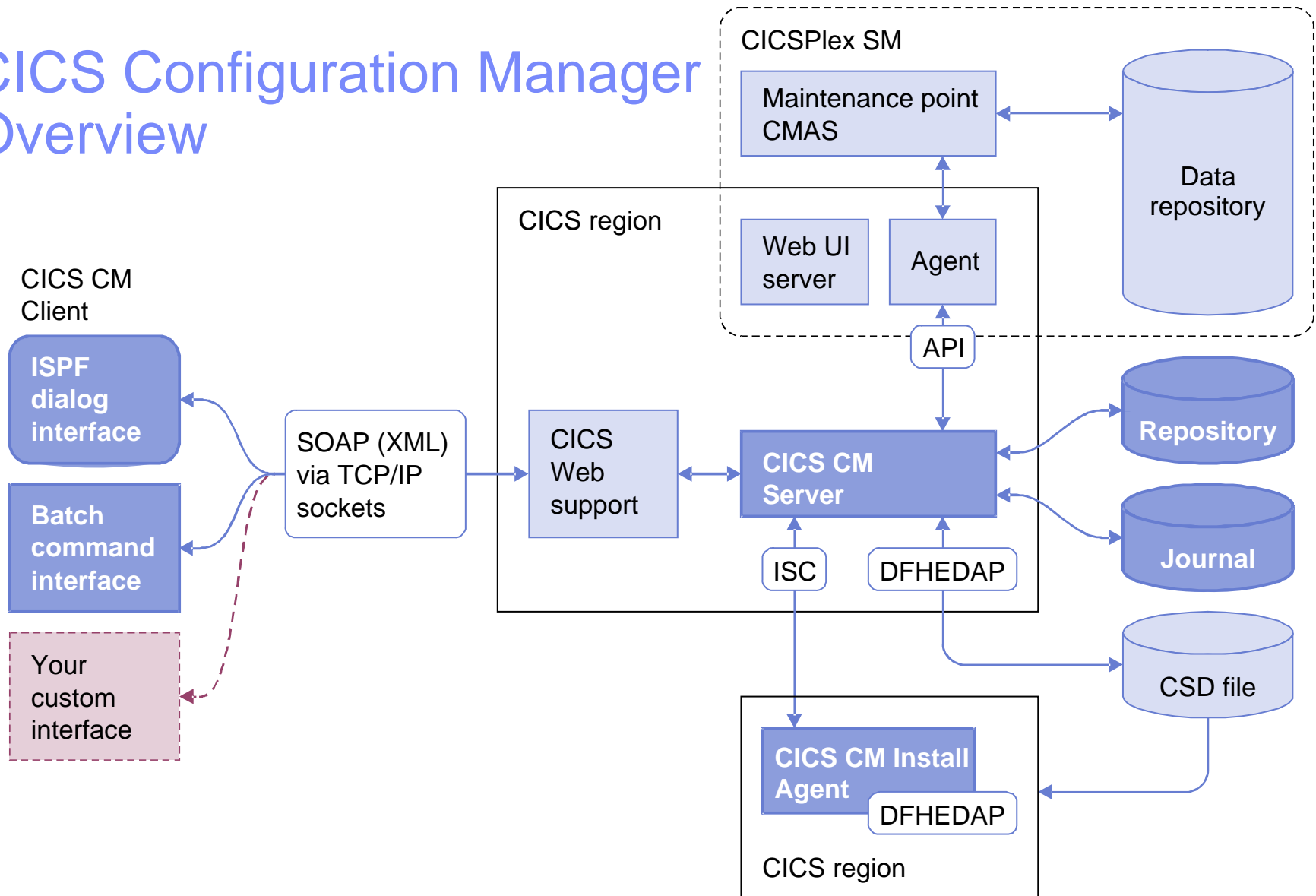
- FILLER = 'NACTCNA1----WORKING STORAGE'
- DEBUG-EYE
  - DEBUG-TRANID = 'NACT'
  - DEBUG-TERMID = 'TC59'
  - DEBUG-TASKNO = 0000118
- FILLER = ''
- DEBUG-COMMAREA-ADDR = X'40C1D5C4'
- MSG-LIST
- ACCTMNU1
- ACCTMNUO
- ACCTDTLI

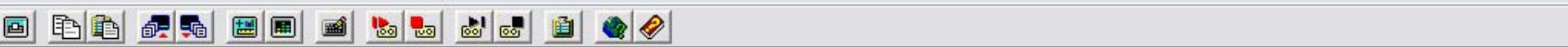
Memory Debug Console

Memory Monitors Memory Renderings

Empty panels for memory monitoring and rendering.

# CICS Configuration Manager Overview





File Settings Help

Edit

URImap

Command ==>

```

URImap . . . : DFHRSURI
Group . . . : DFHWSAT
Location . . . : DEMOCICS.COMMON.CICSTS31.DFHCSO
Change Date . . : 2006/01/30 06:31:54
Description . . :

```

More: +

Status . . . . .	<u>ENABLED</u> +	Default	Alternative Values
Usage . . . . .	<u>PIPELINE</u> +	ENABLED	DISABLED
		SERVER	CLIENT PIPELINE

Universal Resource Identifier

```

Scheme . . . . . HTTP +      HTTP      HTTPS
Host . . . . . *
Path . . . . . /cicswsat/RegistrationService

```

Associated CICS Resources

```

TCPIPservice
Analyzer . . . . . NO +      NO      YES
Converter . . . . .
Transaction . . . . . CPIH      CWBA

```

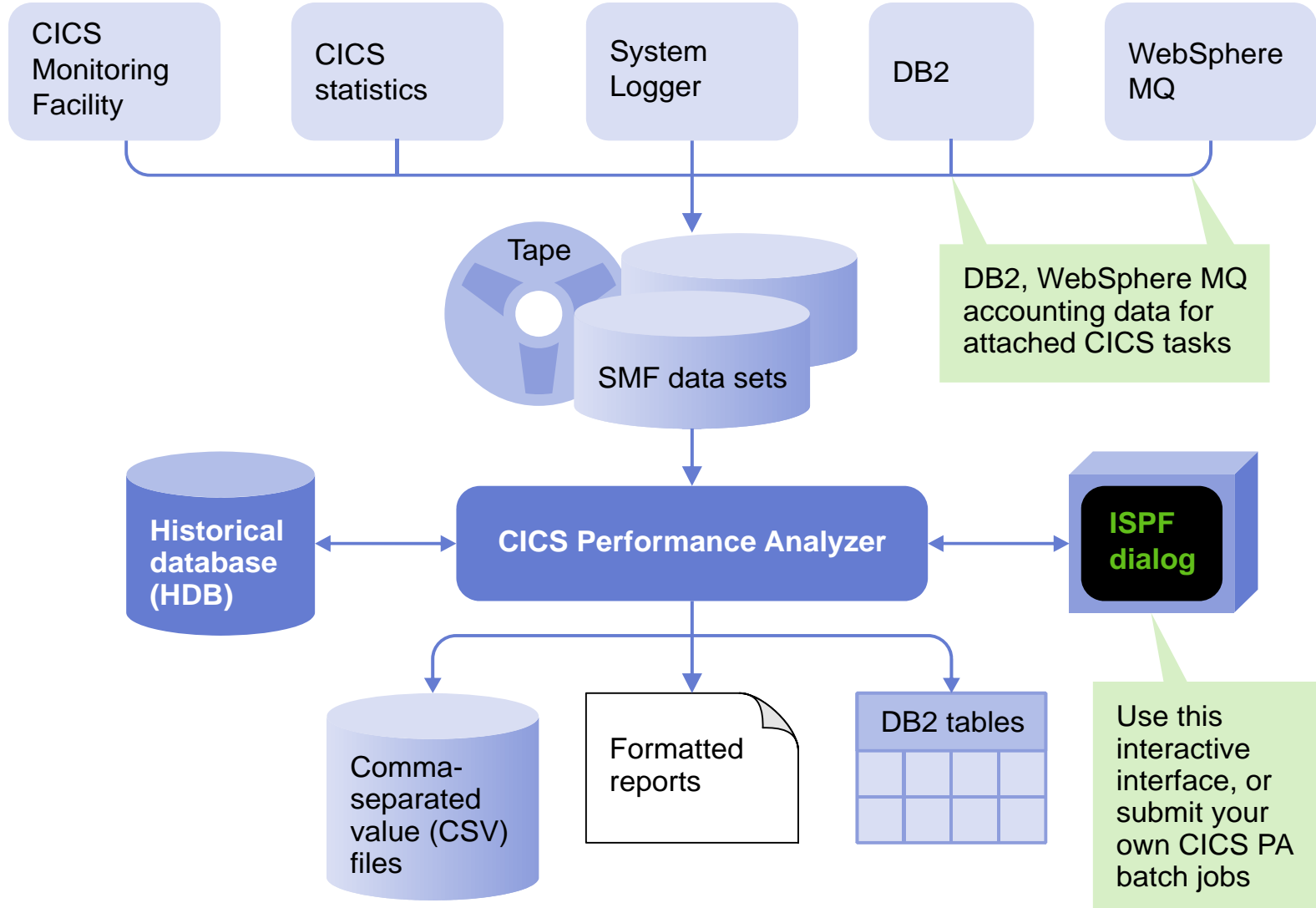


# CICS Transaction Server for z/OS Version 3.1 Support

- CICS Performance Analyzer provides customized reports ...
  - ▶ Custom reports are provided which enables extensive performance analysis of the many new functions introduced in CICS Transaction Server V3.1
  - ▶ Detailed and summary reports provided include ...
    - Transaction CPU Analysis – including CICS TCB usage for ...
      - OPENAPI Applications, XPLink, ...
    - Web services applications
    - CICS Web support and Secure Sockets Layer (SSL) enhancements
    - Application Transformation - inter-program data transfer ...
      - Channel Container usage, Program request channel activity, ...
  - ▶ Online Statistics Reporting is available for all CICS statistics data ...
    - Including the new statistics data on the CICS resources for Web services ...
      - PIPELINE, URIMAP, and WEBSERVICE
    - And the CICS Web support enhancements to TCP/IP Services



# CICS PA Overview



1 V1R4M0

CICS Performance Analyzer  
Performance List

+  
 OLIST0001 Printed at 11:16:32 9/05/2006 Data from 10:24:43 8/24/2006 APPLID STM4IRT2 Page  
 Transaction CICS Web Support (CWS) Request Activity - Detail

Tran	Userid	TaskNo	Stop Time	WBRCV	WBChrIn	WBSEND	WBChrout	WBBROWSE	WBEXTRAC	WB READ	WB WRITE	WB Total
TPME	RAIMAN	57770	10:24:43.284	0	0	0	0	0	0	0	0	0
WRIT	RAIMAN	57771	10:24:43.340	141	5728	139	4635	5	6	6	6	320
TPME	RAIMAN	57772	10:24:43.361	0	0	0	0	0	0	0	0	0
TPME	RAIMAN	57773	10:24:43.451	0	0	0	0	0	0	0	0	0
WRNO	RAIMAN	57774	10:24:43.519	334	11957	314	10886	8	5	6	4	671
WRNO	RAIMAN	57775	10:24:43.532	239	49728	257	44098	6	8	8	6	524
WRWB	RAIMAN	57776	10:24:43.532	528	6946	513	6234	14	2	8	4	1069
TPME	RAIMAN	57777	10:24:43.594	0	0	0	0	0	0	0	0	0
TPME	RAIMAN	57779	10:24:43.717	0	0	0	0	0	0	0	0	0
WRDF	RAIMAN	57778	10:24:43.739	471	2345	487	2275	5	6	4	2	975
TPME	RAIMAN	57780	10:24:43.814	0	0	0	0	0	0	0	0	0
WRCI	RAIMAN	57781	10:24:43.955	23	6989	22	6832	7	5	6	8	71
WRNO	RAIMAN	57782	10:24:44.023	229	43467	267	42863	12	10	10	10	538
WRNO	RAIMAN	57783	10:24:44.035	433	58932	423	53665	16	12	14	12	910
WRNO	RAIMAN	57784	10:24:44.068	198	32463	175	29874	12	12	14	13	424
TPME	RAIMAN	57785	10:24:44.123	0	0	0	0	0	0	0	0	0
TPME	RAIMAN	57786	10:24:44.196	0	0	0	0	0	0	0	0	0
TPME	RAIMAN	57787	10:24:44.356	0	0	0	0	0	0	0	0	0
TPME	RAIMAN	57788	10:24:44.534	0	0	0	0	0	0	0	0	0

1 V1R4M0

CICS Performance Analyzer  
Performance List

+  
 OLIST0001 Printed at 11:16:32 9/05/2006 Data from 10:24:43 8/24/2006 APPLID STM4IRT1 Page  
 Transaction CICS Web Support (CWS) Request Activity - Detail

Tran	Userid	TaskNo	Stop Time	WBRCV	WBChrIn	WBSEND	WBChrout	WBBROWSE	WBEXTRAC	WB READ	WB WRITE	WB Total
WRDF	RAIMAN	56942	10:24:43.324	47	3467	43	3267	8	8	6	6	118
WRPA	RAIMAN	56943	10:24:43.325	67	6249	65	6029	9	5	8	6	160
TPME	RAIMAN	56944	10:24:43.338	0	0	0	0	0	0	0	0	0
WRIT	RAIMAN	56945	10:24:43.346	235	11204	235	10974	12	14	14	12	522
TPME	RAIMAN	56946	10:24:43.350	0	0	0	0	0	0	0	0	0
WROI	RAIMAN	56941	10:24:43.378	246	12043	243	11987	14	15	14	14	546
WRIT	RAIMAN	56947	10:24:43.444	0	0	0	0	0	0	0	0	0
TPME	RAIMAN	56948	10:24:43.451	0	0	0	0	0	0	0	0	0
TPME	RAIMAN	56949	10:24:43.624	0	0	0	0	0	0	0	0	0
WRWB	RAIMAN	56950	10:24:43.788	46	3326	44	3105	6	5	4	2	107
TPME	RAIMAN	56951	10:24:43.793	0	0	0	0	0	0	0	0	0
WRNO	RAIMAN	56952	10:24:43.880	676	18737	683	17435	23	18	15	12	1427
WRDF	RAIMAN	56953	10:24:44.041	68	5789	64	5320	8	6	8	4	158

1 V1R4M0

CICS Performance Analyzer  
Performance List

+  
 0LIST0001 Printed at 10:08:40 9/05/2006 Data from 10:24:43 8/24/2006 APPLID STM4IRT2 Page  
 Transaction CPU Analysis and Extract - Detail

Tran	Userid	TaskNo	Stop Time	Response Time	Dispatch Time	Dispatch Count	User CPU Time	Suspend Time	Suspend Count	Dispwait Time	Dispwait Count	QRModDly Time	QRModDly Count
TPME	RAIMAN	57770	10:24:43.284	.0202	.0201	2	.0004	.0000	2	.0000	1	.0000	
WRIT	RAIMAN	57771	10:24:43.340	.0023	.0007	4	.0005	.0016	4	.0000	3	.0000	
TPME	RAIMAN	57772	10:24:43.361	.0003	.0003	2	.0002	.0000	2	.0000	1	.0000	
TPME	RAIMAN	57773	10:24:43.451	.0003	.0003	2	.0002	.0000	2	.0000	1	.0000	
WRNO	RAIMAN	57774	10:24:43.519	.0562	.0014	3	.0005	.0548	3	.0000	2	.0000	
WRNO	RAIMAN	57775	10:24:43.532	.0683	.0013	3	.0004	.0669	3	.0000	2	.0000	
WRWB	RAIMAN	57776	10:24:43.532	.0103	.0005	4	.0005	.0098	4	.0000	3	.0000	
TPME	RAIMAN	57777	10:24:43.594	.0004	.0004	2	.0002	.0000	2	.0000	1	.0000	
TPME	RAIMAN	57779	10:24:43.717	.0086	.0086	1	.0003	.0000	1	.0000	0	.0000	
WRDF	RAIMAN	57778	10:24:43.739	.0963	.0008	4	.0004	.0955	4	.0000	3	.0000	
TPME	RAIMAN	57780	10:24:43.814	.0013	.0012	2	.0002	.0000	2	.0000	1	.0000	
WRCI	RAIMAN	57781	10:24:43.955	.0026	.0009	4	.0005	.0017	4	.0000	3	.0000	
WRNO	RAIMAN	57782	10:24:44.023	.0265	.0006	3	.0004	.0259	3	.0000	2	.0000	
WRNO	RAIMAN	57783	10:24:44.035	.0278	.0006	4	.0004	.0272	4	.0000	3	.0000	
WRNO	RAIMAN	57784	10:24:44.068	.0237	.0006	4	.0004	.0232	4	.0000	3	.0000	
TPME	RAIMAN	57785	10:24:44.123	.0005	.0005	2	.0003	.0000	2	.0000	1	.0000	
TPME	RAIMAN	57786	10:24:44.196	.0004	.0003	2	.0002	.0000	2	.0000	1	.0000	
TPME	RAIMAN	57787	10:24:44.356	.0004	.0004	2	.0002	.0000	2	.0000	1	.0000	
TPME	RAIMAN	57788	10:24:44.534	.0014	.0013	2	.0003	.0000	2	.0000	1	.0000	

1 V1R4M0

CICS Performance Analyzer  
Performance List

+  
 0LIST0001 Printed at 10:08:40 9/05/2006 Data from 10:24:43 8/24/2006 APPLID STM4IRT1 Page  
 Transaction CPU Analysis and Extract - Detail

Tran	Userid	TaskNo	Stop Time	Response Time	Dispatch Time	Dispatch Count	User CPU Time	Suspend Time	Suspend Count	Dispwait Time	Dispwait Count	QRModDly Time	QRModDly Count
WRDF	RAIMAN	56942	10:24:43.324	.0916	.0395	2	.0006	.0520	2	.0000	1	.0000	
WRPA	RAIMAN	56943	10:24:43.325	.0189	.0005	2	.0005	.0184	2	.0004	1	.0004	
TPME	RAIMAN	56944	10:24:43.338	.0004	.0004	1	.0002	.0000	1	.0000	0	.0000	
WRIT	RAIMAN	56945	10:24:43.346	.0028	.0005	2	.0004	.0023	2	.0000	1	.0000	
TPME	RAIMAN	56946	10:24:43.350	.0003	.0003	1	.0002	.0000	1	.0000	0	.0000	
WROI	RAIMAN	56941	10:24:43.378	.1450	.0400	5	.0004	.1050	5	.0000	4	.0000	
WRIT	RAIMAN	56947	10:24:43.444	.0021	.0006	4	.0004	.0014	4	.0000	3	.0000	
TPME	RAIMAN	56948	10:24:43.451	.0004	.0004	2	.0002	.0000	2	.0000	1	.0000	
TPME	RAIMAN	56949	10:24:43.624	.0007	.0006	2	.0003	.0000	2	.0000	1	.0000	
WRWB	RAIMAN	56950	10:24:43.788	.0037	.0007	4	.0005	.0029	4	.0000	3	.0000	
TPME	RAIMAN	56951	10:24:43.793	.0014	.0014	2	.0002	.0000	2	.0000	1	.0000	
WRNO	RAIMAN	56952	10:24:43.880	.0171	.0008	4	.0005	.0164	4	.0000	3	.0000	
WRDF	RAIMAN	56953	10:24:44.041	.0580	.0007	4	.0005	.0572	4	.0000	3	.0000	

# Summary

IBM CICS and zSeries tools help you ease the migration path to CICS TS V3.1 and then continue to provide ongoing productivity benefits:

- Help manage application availability
- Improve day-to-day administration of CICS systems and applications
- Provide detailed information to support application reuse projects, including SOA implementations
- Improve application understanding and provide audit trails to help achieve regulatory compliance (e.g. Sarbanes-Oxley)





## Further information

### **CICS Tools site**

[www.ibm.com/cics/tools](http://www.ibm.com/cics/tools)

### **Program numbers (licence):**

CICS Configuration Manager	5697-I78
IBM Session Manager	5655-K01
CICS VSAM Recovery	5655-H91
CICS VSAM Copy	5655-L66
CICS VSAM Transparency	5655-I76
CICS Batch Application Control	5697-I94
CICS Performance Analyzer	5655-F38
CICS Interdependency Analyzer	5655-G76
CICS Business Event Publisher	5655-J99
CICS OTTO	5655-I05
CICS Performance Monitor	5655-I46



# Thank You !

In a few moments, we'll begin the Q&A session

