

IBM IMS Connect for Enterprise Workloads

Fundi Software



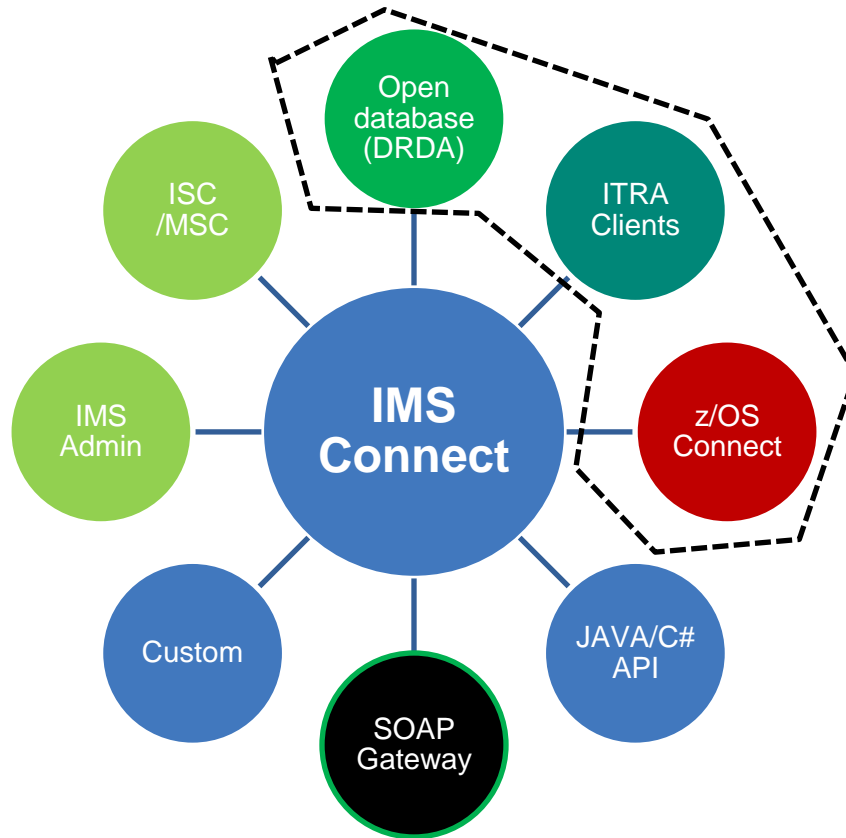
Overview

- Introduction: IMS Connect, why it increasingly matters
- Evolution of typical IMS Connect architectures
- Impact and challenges of growing workloads
- Strategies for addressing these challenges
- Conclusions

IMS Connect History

- 1997 – ITOC Get's a User's Guide
- 1998 – Visual Age for Java – Connecting to IMS using Java (“e-business”)
- 2004 – IMS V9 – “IMS Connect” becomes an integrated component
- WebSphere TM Resource Adapter (from distributed) Support
- 2009 – IMS V11 – IMS Open Database
- 2011 – IMS Management Console
- Now z/OS Connect

IMS Connect: state of the union



IMS Connect characteristics

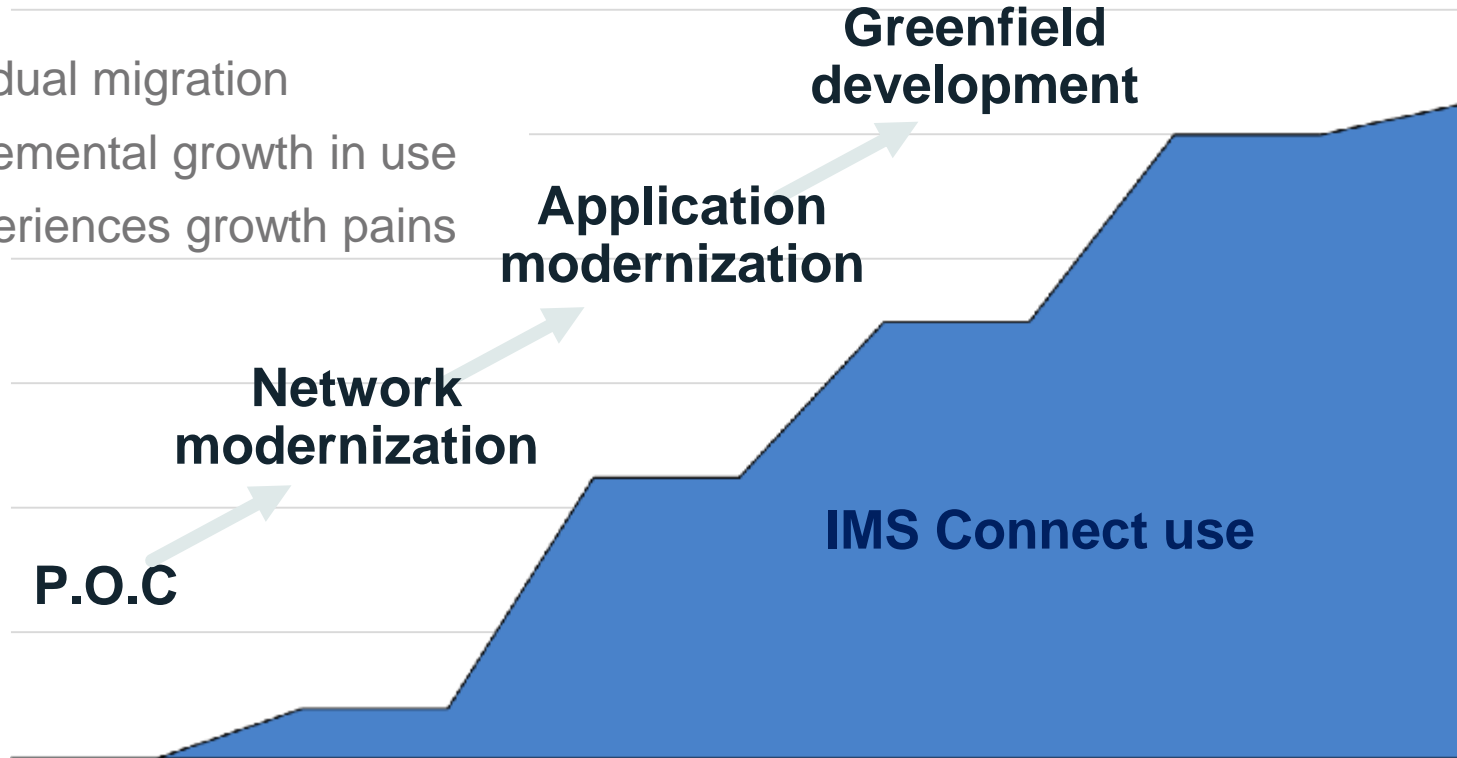
- Lightweight
- Own address space
- Extensible: messages processed via user exits
- Simple to configure and set up
- Propriety IRM protocol (except for open database)

IMS Connect Extensions

- Companion tool for IMS Connect
- Available since just before IMS V9
- Originally developed for routing and exit management
- Used for event collection
- Recent years show a strong shift towards routing and exit management
- Why?

Profile of an IMS Connect customer

- Gradual migration
- Incremental growth in use
- Experiences growth pains



IMS Connect Growing pains

Cost of down time

Performance limits

Clients coded to
an inflexible
topology

Workload type changing

Consolidation versus
redundancy

Increasing
customization
needs

Operations and
maintenance
challenges

With pain comes requirements

- Greater scalability
- Higher availability
- Improved security
- Cost containment: consistency, fewer customizations, greater flexibility
- Requirements must be met **while minimizing the disruption to existing client code and existing client instances**

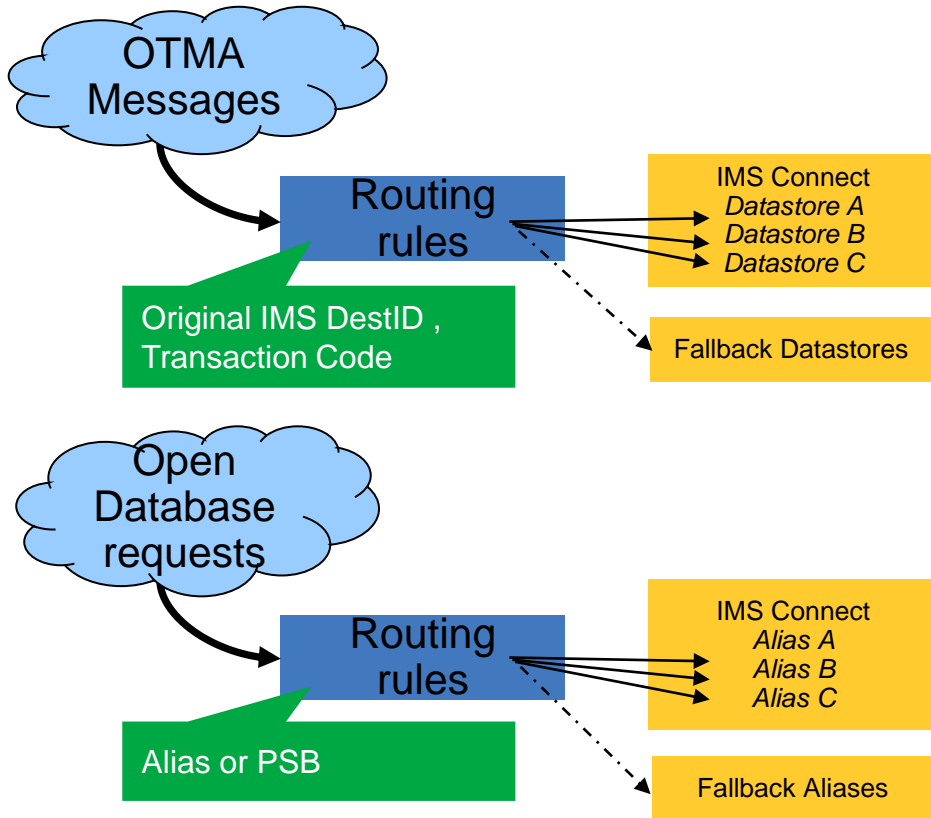
Meeting the challenges

- Use routing to improve parallelism, add redundancy, and provide abstraction (insulation) to clients
- Consider additional security
- Centralize the management of client option
- Centralize operational management
- Use IMS Connect instrumentation to tag the various workloads

Customizing exits

- Can provide a short-term fix for some requirements
- Open database offers simple round-robin routing
- Maintenance over time
- Can only refresh BPE Exits, not message exits

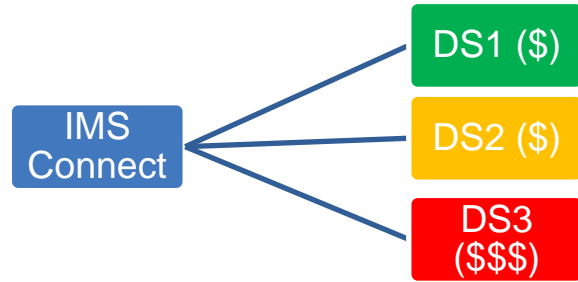
User Story: Manage workload by attributes



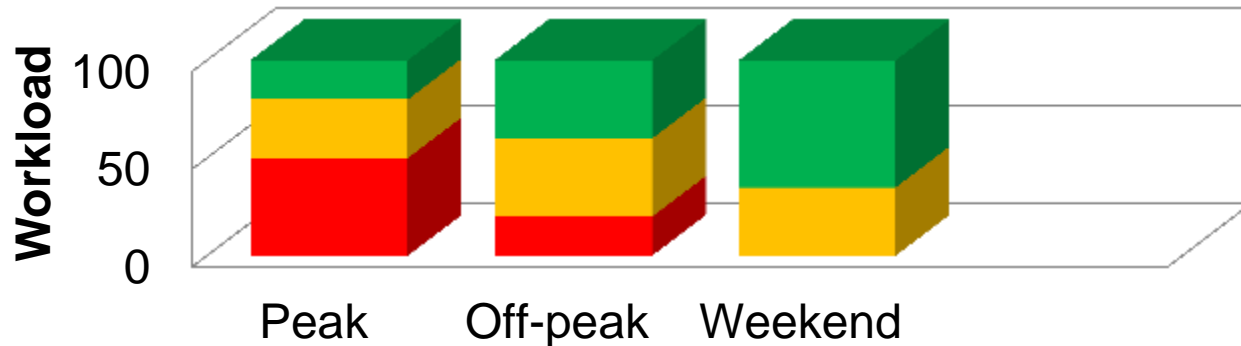
- OTMA routing includes the ability to qualify by transaction code as well as datastore
- Open Database routing support can qualify by the alias name or PSB
- Generic destinations.
- Parallelism
- Optional fallback (flood or down)



User Story: Manage message distributions



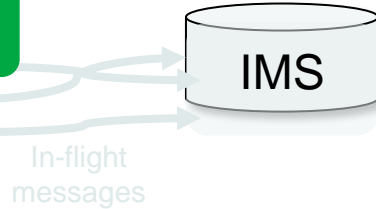
- Capacity weights allow you to dynamically favour certain destinations
- Switch from one plan to another with z/OS Explorer plug-in.
- Or batch automation....



User Story: do not interrupt in-flight work

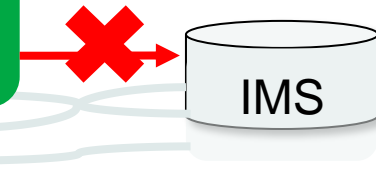
1. Active IMS system used by three IMS Connects

ICON 2 Datastore for IMSA
ICON 3 Datastore for IMSA



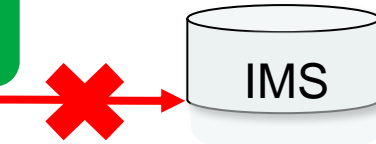
2. Drain initiated stopping new transactions to IMS system. Workload is routed to other IMS systems

ICON 2 Datastore for IMSA
ICON 3 Datastore for IMSA



3. When all activity has completed the IMS system can be brought down safely

ICON 2 Datastore for IMSA
ICON 3 Datastore for IMSA



- Drain in-flight work before IMS shut down.
- Coordinate manually using z/OS Explorer Plugin
- Use commands and batch automation.

4. When the IMS system is restarted, IMS Connect Extensions automatically resumes routing workload to it.



Security

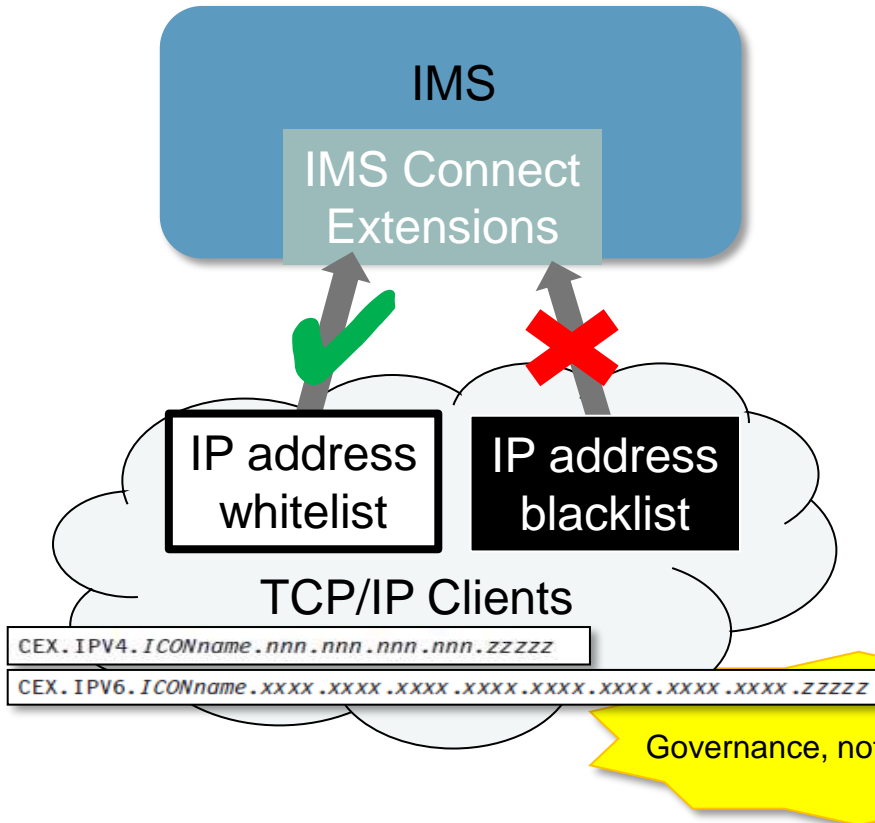
What does IMS Connect provide?

- Password, Passticket and Password Phrase verification
- ACEE caching
- Automatically monitors RACF Event Notification Facility (ENF) events for changes.

What additional security could you need?

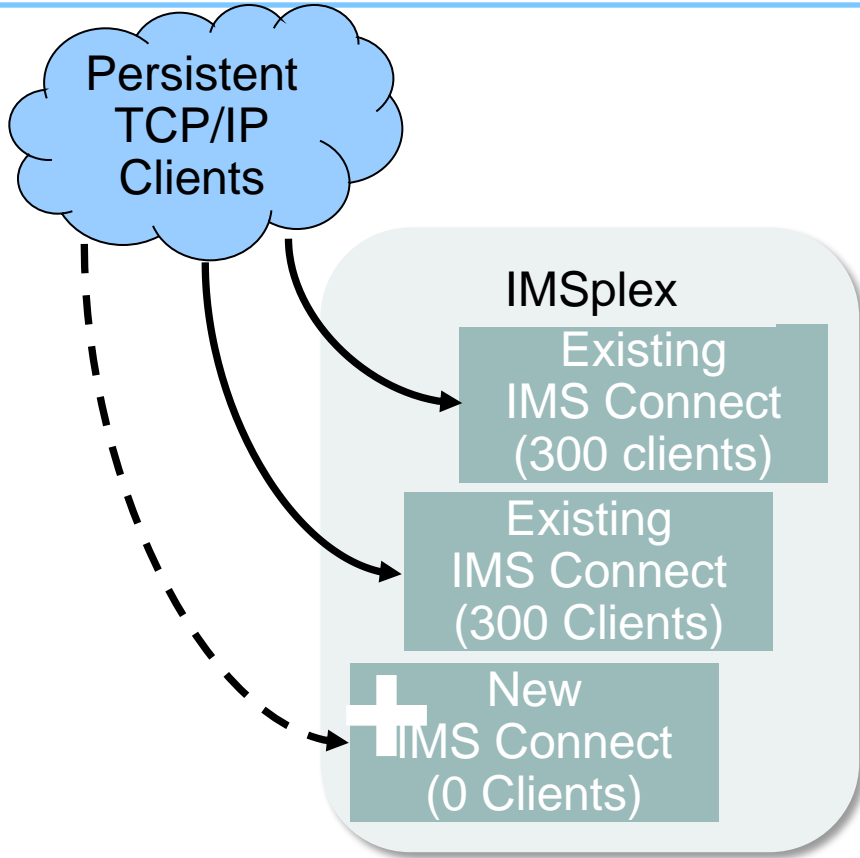
- Access control by system name, client IP address and port
- Consistent implementation for both traditional OTMA clients and Open Database clients

User Story: limit IP address access



- Manage access to IMS Connect systems based on the IMS Connect system a client is connecting through and the IP address they are connecting from.
- Security rules (RACF or other) can be used to produce *whitelists*
- Rules can be formed to produce *blacklists* that reject access from certain IP addresses or address ranges.
- Access can be restricted further based on the IMS Connect port being used by the client.

User Story: redistribute persistent sessions



When an IMS Connect system is restarted after maintenance, established persistent socket sessions on other IMS Connect systems remain in place. The newly started IMS Connect is underutilized and the sysplex workload appears out of balance.

You can also drain persistent sessions

Centralized management of client options

- Transaction options (expiration, IRM Timer values, client ID cancellation)
- Duration of persistent sessions
- Message translation between any code pages (such as EBCDIC <=> ASCII)
- Extended RSM feedback

Fine tuning options by transaction

Removes the need to customize exits

Restrict client session life

Changes are immediate

Key features: Centralized monitoring and control



Eclipse
or ISPF

```
File Option Help  
-----  
_ Stop IMS 1 link  
_ View TOKYO sessions  
_ Stop NY sessions  
  
F1 - Help F2 - Scroll
```

And REXX
for
Automation

```
/* REXX */  
address LINK "CEXRENV INIT"  
address CEX  
"CONNECT HOST=FTSD,"||,  
"PORT=13883,HWSID=HWS1,  
"SWITCH TYPE=JOURNAL"  
address LINK "CEXRENV TERM"
```

Growing workloads mean more IMS Connect
instances

Beyond VIEWHWS

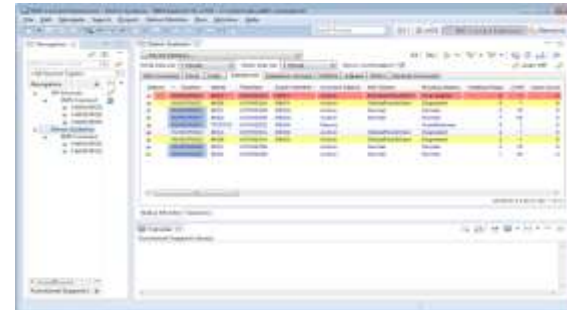
VIEWHWS

- Output in system-specific joblogs.
- Output is cluttered and fills spool.
- Difficult to filter, search, sort, summarize and export.
- Displays don't provide leads to command actions.

```
R 212.VIEWHWS
R 212.VIEWHWS
R 212.VIEWHWS
PORT=1101  STATUS=ACTIVE  KEEPAV=0 NAME=OC-7 EDIT=  TIMEOUT=
CLIENTID USERID  TRANCODE  DATASTORE  STATUS  SECOND CLNTPORT IP-A
DUDCLA01 CEX001  IMSB      CONN      00 17550 172.01
DUDCLA02 CEX001  IMSA      CONN      00 17550 172.01
DUDCLA03 CEX001  IMSA      CONN      00 17550 172.01
UNTR001  CEX001  IVPREX0  IMSA      CONN      00 17551 172.01
MS00001  CEX001  PART     IMSA      RCNV WFCN  00 17540 172.01
MS00001  CEX001  PART     IMSA      RCNV      00 17547 172.01
TOTAL CLIENTS=8  RCVM=1  READ=3  CONN=4  XMIT=0  OTHER=0
PORT=1102  STATUS=ACTIVE  KEEPAV=0 NAME=OC-3 EDIT=  TIMEOUT=
CLIENTID USERID  TRANCODE  DATASTORE  STATUS  SECOND CLNTPORT IP-A
DUDCLMB1 CEX001  IMSA      CONN      00 17557 172.01
DUDCLA03 CEX002  IMSA      CONN      00 17556 172.01
TOTAL CLIENTS=2  RCVM=0  READ=0  CONN=2  XMIT=0  OTHER=0
```

IMS Connect Extensions

- Consolidated output from multiple systems.
- Output is tabulated.
- Built-in filtering and sorting.
- Instant export to spreadsheet applications.
- Context actions:
perform commands directly against objects in table.



Move beyond /VIEWHWS with the Status Monitor

The screenshot shows the IMS Connect Extensions Status Monitor interface. The main window displays a table of resource instances with columns for Status, System, Name, TMember, Super Member, Connect Status, MS Status, Routing Status, Waiting Reply, CWR, and Input Count. The table is filtered to show instances for the 'Demo Systems' group. A context menu is open over the table, showing options like 'Route Drain', 'Start', and 'Upd Capacity Weight ...'.

| Status | System | Name | TMember | Super Member | Connect Status | MS Status | Routing Status | Waiting Reply | CWR | Input Count | Ac |
|--------|----------|--------|---------|--------------|----------------|-----------------|----------------|---------------|-----|-------------|----|
| Active | HWSOPG51 | MSA | XCFMCDG | MEM1 | Active | MemberFloorSevr | Unavailable | 0 | 1 | 205 | |
| Active | HWSOPG51 | MSB | XCFMCDG | MEM1 | Active | GlobalFloodWarn | Degraded | 0 | 1 | 0 | |
| Active | HWSOPG51 | MSC | XCFMCOB | MEMA | Active | Normal | Normal | 0 | 0 | 0 | |
| Active | HWSOPG51 | MSD | XCFMCOB | MEMA | Active | Normal | Normal | 0 | 30 | 0 | |
| Diagon | HWSOPG51 | TESTDS | XCFMZZZ | MEMA | Diagon | | AutoResume | 0 | 1 | 0 | |
| Active | HWSOPG52 | MSA | XCFMCDG | MEM2 | Active | GlobalFloodWarn | Degraded | 0 | 1 | 7 | |
| Active | HWSOPG52 | MSB | XCFMCDG | MEM2 | Active | GlobalFloodWarn | Degraded | 0 | 1 | 0 | |
| Active | HWSOPG52 | MSC | XCFMCOB | | Active | Normal | Normal | 0 | 0 | | |
| Active | HWSOPG52 | MSD | XCFMCOB | | Active | Normal | Normal | 0 | 30 | | |

The Status Monitor view provides you with:

- Tabbed views of each resource type.
- Context actions against resource instances like drain, stop, and start.
- Sortable, searchable, and filterable sysplex view of resources.
- Summarise, save, and export the session list as a CSV file.
- Auto-update highlighting any criteria.
- Many more session attributes.

- Route Drain
- Route Drain with AUTORESUME
- Route Resume
- Start
- Upd Capacity Weight ...
- Hide all-Zero Value Columns
- Manage list layout
- Reset List to Default Layout
- Show all Columns
- Summarize/Group ...
- Properties
- Manage/Define List Filters
- Find the Value After Current Position
- Find the Value Before Current Position

Move beyond /VIEWHWS with Sessions Display

Properties view...

| System | Session Type | Port | Socket | Event Key |
|----------|--------------|------|--------|----------------|
| HWSOPGS1 | OTMA | 411 | 8 | CDCC1FE58B0992 |
| HWSOPGS1 | OTMA | 4101 | 6 | CDCC1FE58BA384 |
| HWSOPGS1 | OTMA | 4101 | 8 | CDCC1FE59BCDE1 |
| HWSOPGS1 | OTMA | 4101 | 8 | CDCC1FE5A18FF9 |
| HWSOPGS1 | OTMA | 4102 | 9 | CDCC1FE5A6F531 |
| HWSOPGS1 | OTMA | 4102 | 10 | CDCC1FE5A6CFE8 |

Network Status
Stop Selected Sessions
Hide all-Zero Value Columns
Hide Blank Columns
Manage list layout
Reset List to Default Layout
Show all Columns
Summarize/Group ...
Properties

Property Value

| | |
|--------------------|--|
| Client | |
| Client Family | IPv4 |
| Client IP | 172.17.69.32 |
| Client Port | 4484 |
| Event record trace | |
| Trace Back Events | 41 Message sent to OTMA3E Message E... |
| IMS Connect | |
| Client Id | DUDCL01 |
| Event Key | CDCC1FE58BA38404 |
| Exit Defined | Yes |
| IRM Timer | 81 |
| Last Trace Time | 2014-09-23 09.44.34.557877 |
| Port | 4101 |
| Session Type | OTMA |
| Socket | 6 |
| Start Time | 2014-09-23 09.44.34.554424 |
| Trigger Type | |
| User Id | CEX001 |
| Wait Time | 0-00.00.38.415112 |
| Misc | |
| AltTxnCode | |
| AltTxnLength | |
| AltTxnOffset | |

The sessions view provides you with:

- Context actions to cancel sessions and get network status.
- Sortable, searchable, and filterable Sysplex view of sessions.
- Ability to summarize, save, and export the session list as a CSV file.
- Auto-update highlighting any criteria.
- Many more session attributes.

Restart the datastore

- Click to stop the datastore
- Perform maintenance
- Click to start the datastore

| IMS Connects | Ports | Exits | Datstores | Datastore Groups | ODBMs | Aliases | MSCs | Remote Connects | |
|--------------|----------|-------|-----------|------------------|----------------|------------|----------------|-----------------|-----|
| Status | System | Name | TMember | Super Member | Connect Status | IMS Status | Routing Status | Waiting Reply | CWR |
| ● | HWSOPGS1 | IMSA | XCFMICDA | MEM1 | Active | Normal | Normal | 4 | 1 |
| ● | HWSOPGS1 | IMSB | XCFMICDA | MEM1 | Active | Normal | SusAutoRes | 0 | 1 |
| ● | HWSOPGS1 | IMSC | XCFMICDB | MEMA | Active | Normal | Normal | 0 | 10 |
| ● | HWSOPGS1 | IMSD | XCFMICDB | MEMA | Active | Normal | Normal | 0 | 30 |

| IMS Connects | Ports | Exits | Datstores | Datastore Groups | ODBMs | Aliases | MSCs | Remote Connects | |
|--------------|----------|-------|-----------|------------------|----------------|------------|----------------|-----------------|-----|
| Status | System | Name | TMember | Super Member | Connect Status | IMS Status | Routing Status | Waiting Reply | CWR |
| ● | HWSOPGS1 | IMSA | XCFMICDA | MEM1 | Active | Normal | Normal | 4 | 1 |
| ■ | HWSOPGS1 | IMSB | XCFMICDA | MEM1 | Inactive | Normal | AutoResume | 0 | 1 |
| ● | HWSOPGS1 | IMSC | XCFMICDB | MEMA | Active | Normal | Normal | 0 | 10 |
| ● | HWSOPGS1 | IMSD | XCFMICDB | MEMA | Active | Normal | Normal | 0 | 30 |

| IMS Connects | Ports | Exits | Datstores | Datastore Groups | ODBMs | Aliases | MSCs | Remote Connects | |
|--------------|----------|-------|-----------|------------------|----------------|------------|----------------|-----------------|-----|
| Status | System | Name | TMember | Super Member | Connect Status | IMS Status | Routing Status | Waiting Reply | CWR |
| ● | HWSOPGS1 | IMSA | XCFMICDA | MEM1 | Active | Normal | Normal | 4 | 1 |
| ● | HWSOPGS1 | IMSB | XCFMICDA | MEM1 | Active | Normal | Normal | 0 | 10 |
| ● | HWSOPGS1 | IMSC | XCFMICDB | MEMA | Active | Normal | Normal | 0 | 10 |
| ● | HWSOPGS1 | IMSD | XCFMICDB | MEMA | Active | Normal | Normal | 0 | 30 |

No sessions waiting –
datastore drained

Datastore Drain

- Recall: Take datastores offline without disrupting active sessions
- Mark the datastore as requiring a drain
- Status changed to suspended

The screenshot displays two instances of the IMS Datastores table. The top table shows all datastores in a 'Normal' state. The bottom table shows the same datastores, but the 'IMSC' datastore has a routing status of 'SusAutoRes' and a 'Waiting Reply' count of 3. A context menu is open over the 'SusAutoRes' cell, with 'Route Drain with AUTORESUME' selected. Green arrows indicate the flow of information: from the 'SusAutoRes' cell to the menu, and from the menu back to the 'SusAutoRes' cell.

| IMS Connects | Ports | Exits | Datastores | Datastore Groups | ODBMs | Aliases | MSCs | Remote Connects | | |
|--------------|----------|-------|------------|------------------|----------------|------------|----------------|-----------------|-----|--|
| Status | System | Name | TMember | Super Member | Connect Status | IMS Status | Routing Status | Waiting Reply | CWR | |
| ● | HWSOPGS1 | IMSA | XCFMICDA | MEM1 | Active | Normal | Normal | 6 | 1 | |
| ● | HWSOPGS1 | IMSB | XCFMICDA | MEM1 | Active | Normal | Normal | 4 | 10 | |
| ● | HWSOPGS1 | IMSC | XCFMICDB | MEMA | Active | Normal | Normal | 0 | 10 | |
| ● | HWSOPGS1 | IMSD | XCFMICDB | MEMA | Active | Normal | Normal | 0 | 30 | |

| IMS Connects | Ports | Exits | Datastores | Datastore Groups | ODBMs | Aliases | MSCs | Remote Connects | | |
|--------------|----------|-------|------------|------------------|----------------|------------|----------------|-----------------|-----|--|
| Status | System | Name | TMember | Super Member | Connect Status | IMS Status | Routing Status | Waiting Reply | CWR | |
| ● | HWSOPGS1 | IMSA | XCFMICDA | MEM1 | Active | Normal | Normal | 6 | 1 | |
| ● | HWSOPGS1 | IMSB | XCFMICDA | MEM1 | Active | Normal | SusAutoRes | 3 | 1 | |
| ● | HWSOPGS1 | IMSC | XCFMICDB | MEMA | Active | Normal | Normal | 0 | 10 | |
| ● | HWSOPGS1 | IMSD | XCFMICDB | MEMA | Active | Normal | Normal | 0 | 30 | |

Route Drain

Route Drain with AUTORESUME

Route Resume

Stop

Update Capacity Weight ...

Update Commands: IMS Connect

New in V2.4

The screenshot shows the IMS Connect interface with the 'Update' menu open. The 'Update' menu item is highlighted, and a sub-menu is displayed with the following options: 'Event Collection Level ...', 'Session Message Limit ...', 'ODBM Routing Plan ...', and 'OTMA Routing Plan ...'. A green arrow points from the 'Update' menu item to the sub-menu, and another green arrow points from the sub-menu to the 'Event Coll. Level' column in the table below.

| OTMA Routing Plan | ODBM Routing Plan | Event Coll. Level | Msg. Limit | Limit Threshold |
|-------------------|-------------------|-------------------|------------|-----------------|
| PEAK | | 4 | Active | 50 |
| PEAK | WEEKENDS | 4 | Inactive | 0 |

- Dynamically change
- OTMA/ODBM Routing Plans
 - Event Collection Level
 - Message Limits
 - Single or multiple systems

Update capacity weight

New in V2.4
Update CWR:
- GUI or Batch
- Zero CWR

IMS Connects Ports Exits **Datastores** Datastore Groups ODBMs Aliases MSCs Remote Connects

| Status | System | Name | Member | TMember | XCF Group | Connect Status | IMS Status | Routing Status | Waiting Reply | CWR | S |
|--------|----------|------|---------|----------|-----------|----------------|------------|----------------|---------------|-----|---|
| ● | HWSOPGS1 | IMSA | DM1IMSA | XCFMICDA | XCFGDEV | Active | Normal | Normal | 2 | 1 | M |
| ● | HWSOPGS1 | IMSB | DM1IMSB | XCFMICDA | XCFGDEV | Active | Normal | Normal | 8 | 1 | M |
| ● | HWSOPGS1 | IMSC | DM1IMSC | XCFMICDB | XCFGDEV | Active | Normal | Normal | 0 | 0 | M |
| ● | HWSOPGS1 | IMSD | DM1IMSD | XCFMICDB | XCFGDEV | Active | Normal | Normal | 0 | 30 | M |
| ■ | HWSOPGS1 | IMSE | DM1IMSE | XCFMICDA | XCFGDEV | Discon | Normal | AutoResume | 0 | 1 | M |
| ● | HWSOPGS1 | IMSF | DM1IMSF | XCFMICDA | XCFGDEV | Active | Normal | Normal | 4 | 1 | M |
| ● | HWSOPGS1 | IMSG | DM1IMSG | XCFMICDA | XCFGDEV | Active | Normal | Normal | 2 | 1 | M |
| ● | HWSOPGS1 | IMSH | DM1IMSH | XCFMICDA | XCFGDEV | Active | Normal | Normal | 2 | 10 | M |
| ● | HWSOPGS1 | IMSI | DM1IMSI | XCFMICDA | XCFGDEV | Active | Normal | Normal | 1 | 30 | M |

Route Drain
Route Drain with AUTORESUME
Route Resume
Stop
Update Capacity Weight ...

Capacity Weight Rating
Update Selected Datastores
Capacity Weight Rating: 25
Acceptable field values are numbers in the range 1 - 100 and 0.
Note: A value of zero has a special meaning. It indicates that the datastore is a candidate for routing.

Capacity Weight Rating
Confirm Changes

| Name | System | Old Value | New Value |
|------|----------|-----------|-----------|
| IMSC | HWSOPGS1 | 0 | 25 |
| IMSD | HWSOPGS1 | 30 | 25 |

Use case: But now I want to automate it...

Master your operations with automation

The CEX host command environment for REXX enables IMS Connect Extensions commands to be embedded in REXX programs, which allows more flexible automation of IMS Connect operations.

- Programs can connect to multiple IMS Connects.
- Use REXX features such as variables and conditional logic.
- Integrate with other host command environments (MVS, CONSOLE, TSO).
- Submit programs interactively as well as in batch.

Use the flexibility of REXX

Single REXX to control multiple systems

Integrate with other host command environments

Automate routine operational activities

working REXX samples

User story: Management reporting

- Why now?
 - Nature of the workload
- Historical summary
- Why focus on IMS Connect (as opposed to IMS or further upstream)?
 - All web facing activity
- Long term trends more important

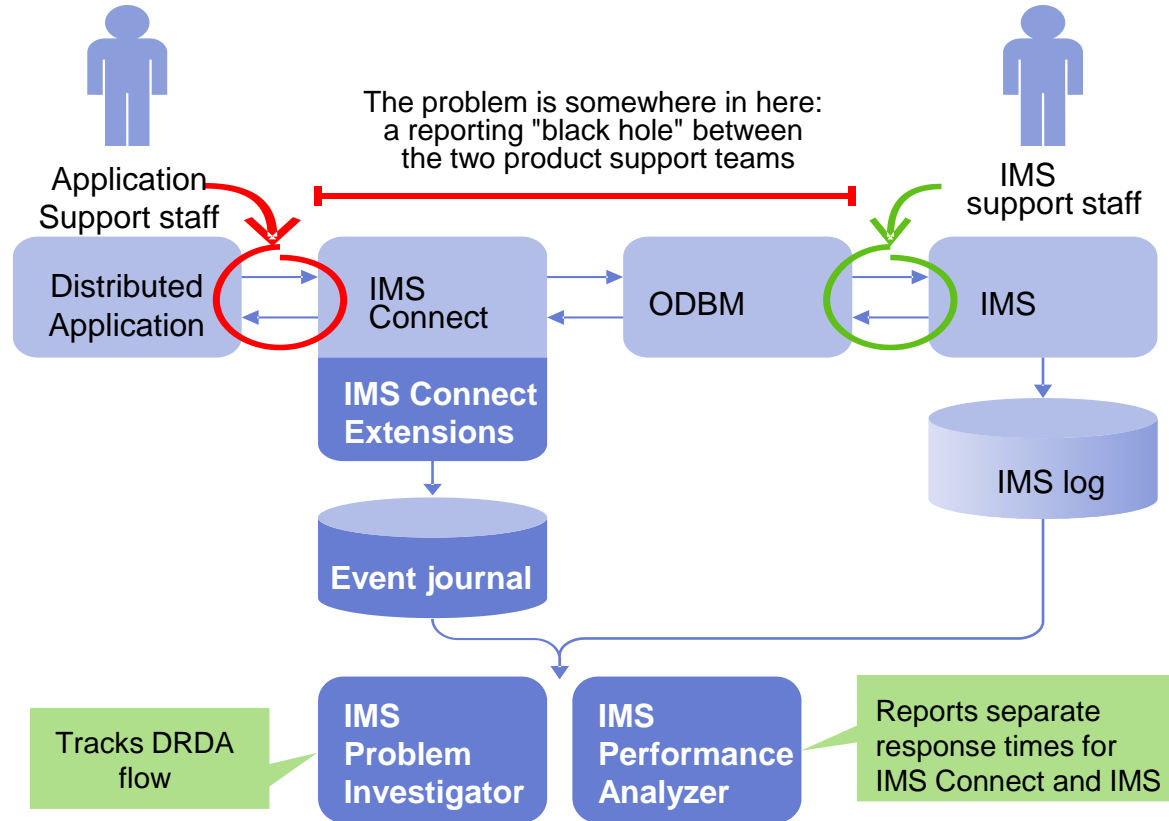
User story: unmasking abstractions

- How do I quickly understand where a problem lies in complex multi-tiered environment?

Response times over 2 seconds!

"Application waits 2 seconds for a response from IMS. Contact IMS support."

"IMS responds in a millisecond."



IMS Connect receives Open Database requests via TCP/IP

IMS Connect calls security and routing exits

IMS Connect forwards requests to ODBM

IMS Processes Open Database request

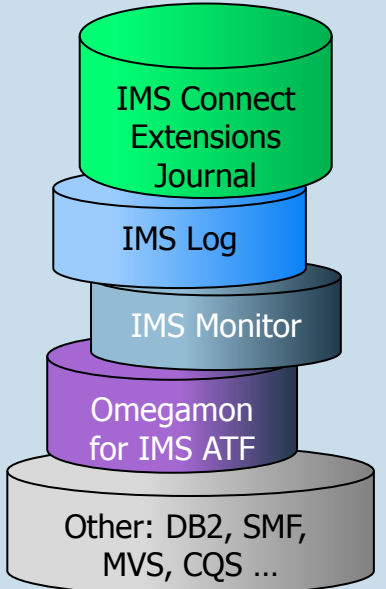
Response returns to client via ODBM & IMS Connect

IMS Connect receives next request from client

DRDA conversation continues until PSB deallocated and socket closes

```
BROWSE CEX000.QADATA.DEMO.LOG.ICON Record 0000598 More: < >
Command ==> Scroll ==> CSR
Navigate < 00.00.01.000000 > Date/Time 2010-03-31 12.51.02.387397
/ _____ Wednesday 2010-03-31 Time (Relative)
--- 003C Prepare READ Socket 13.16.53.026908
--- 0049 READ Socket +0.000118
--- 005B DRDA 1041 EXCSAT-Exchange Server Attributes +0.000125
--- 0049 READ Socket +0.000151
--- 005B DRDA 106D ACCSEC-Access Security +0.000182
--- 005C DRDA 1443 EXCSATRD-Server Attributes Reply Data +0.000204
--- 004A WRITE Socket +0.000310
--- 0049 READ Socket +0.854012
--- 005B DRDA 106E SECCHK-Security Check +0.854020
--- 0063 ODBM Security Exit called +0.854053
--- 0064 ODBM Security Exit returned +0.854126
--- 005C DRDA 1219 SECCHKRM-Security Check Reply Message +0.854142
--- 004A WRITE Socket +0.854230
--- 0049 READ Socket +1.022542
--- 005B DRDA 2001 ACCRDB-Access RDB +1.022551
--- 005D ODBM begin Allocate PSB (APSB) Program=AUTPSB11 +1.022572
--- 0061 ODBM Routing Exit called +1.022582
--- 0062 ODBM Routing Exit returned +1.022740
--- 00AA ODBM Trace: Message sent to ODBM +1.022880
--- 0069 Message sent to ODBM +1.022887
--- 06 BMP Scheduling start TranCode=ODBA02CD Region=0004 +1.024870
--- 4E02 BMP Scheduling start Region=0004 +1.024873
--- 08 Application Start Program=AUTPSB11 Region=0004 +1.025814
--- 5607 Start of UOR Program=AUTPSB11 Region=0004 +1.025815
--- 5616 Start of protected UOW Region=0004 +1.026013
--- 4E03 BMP Scheduling end TranCode=ODBA02CD Region=0004 +1.026018
--- 00AA ODBM Trace: Message received from ODBM +1.028028
--- 006A Message received from ODBM +1.028043
--- 005E ODBM end Allocate PSB (APSB) Program=AUTPSB11 +1.029573
--- 005C DRDA 2201 ACCRDBRM-Access RDB Reply Message +1.029600
--- 004A WRITE Socket 78
--- 0048 Trigger Event for ODBMMSG 8
--- 003C Prepare READ Socket 4
--- 0049 READ Socket 0
--- 005B DRDA 200C OPNQRY-Open Query 5
--- 0049 READ Socket 5
--- 005B DRDA CC05 DLIFUNC-DL/I function 5
--- 0049 READ Socket 5
--- 005B DRDA CC01 INAIB-AIB data 8
--- 0049 READ Socket +1.051689
--- 005B DRDA CC04 RTRVFLD-Field client wants to retrieve data +1.051712
--- 0049 READ Socket +1.051742
--- 005B DRDA CC06 SSALIST-List of segment search argument +1.051787
--- 00AA ODBM Trace: Message sent to ODBM +1.051795
--- 0069 Message sent to ODBM +1.052210
--- 01 DLI GHU Database=AUTOLDB SC=' ' Elapse=0.000364 +1.052221
--- 4E60 DLI Call start Region=0004 +1.052811
--- 4E62 DLA00 start Database=AUTOLDB Region=0004 Func=GU +1.052816
--- 4E63 DLA00 end Region=0004 Seg=DEALER SC=' ' +1.052873
--- 4E61 DLI Call end Region=0004 +1.053029
--- 00AA ODBM Trace: Message received from ODBM +1.053165
--- 006A Message received from ODBM +1.053760
--- 006A Message received from ODBM +1.053771
```

Sudden jumps in elapsed or relative times may indicate problems



DRDA requests and responses

```

VIEW
Command ==> _____ Filter
Filter . . . . . DRDAEVENTS +
Description . . . DRDA Requests and responses

/ Log Code + Exc Description
- CON 005B ODBM DRDA command issued
- CON 005C ODBM DRDA command reply
- CON 00AA ODBM Send/Receive Trace
    
```

DDM (**distributed data management**) commands. 'Code points' show flow of DRDA requests and responses

- These code points include:
- DRDA V5 Code points as defined by the Open Group
 - IMS-specific code points

| Code | Description | Date | 2015-04-30 | Thursday | Time (LOCAL) |
|------|-------------|---|------------|----------|-----------------|
| 005B | DRDA 1041 | EXCSAT-Exchange Server Attributes | | | 09.23.59.653612 |
| 005B | DRDA 106D | ACCSEC-Access Security | | | 09.23.59.653639 |
| 005C | DRDA 1443 | EXCSATRD-Server Attributes Reply Data | | | 09.23.59.653656 |
| 005C | DRDA 14AC | ACCSECRD-Access Security Reply Data | | | 09.23.59.653663 |
| 005B | DRDA 106E | SECCHK-Security Check | | | 09.23.59.690552 |
| 005C | DRDA 1219 | SECCHKRM-Security Check Reply Message | | | 09.23.59.691545 |
| 005B | DRDA 1055 | SYNCCCTL-Sync Point Control Request | | | 09.23.59.717168 |
| 005C | DRDA 1248 | SYNCCRD-Sync Point Control Reply | | | 09.23.59.717859 |
| 005B | DRDA 2001 | ACCRDB-Access RDB | | | 09.23.59.887593 |
| 005C | DRDA 2201 | ACCRDBRM-Access RDB Reply Message | | | 09.23.59.995587 |
| 005B | DRDA 200C | OPNQRY-Open Query | | | 09.24.00.223312 |
| 005B | DRDA CC05 | DLIFUNC-DL/I function | | | 09.24.00.223344 |
| 005B | DRDA CC01 | INAIB-AIB data | | | 09.24.00.223384 |
| 005B | DRDA CC04 | RTRVFLD-Field client wants to retrieve data | | | 09.24.00.223414 |
| 005B | DRDA CC06 | SSALIST-List of segment search argument | | | 09.24.00.223432 |
| 005C | DRDA 2205 | OPNQRYRM-Open Query Complete | | | 09.24.00.230294 |
| 005B | DRDA 2006 | CNTQRY-Continue Query | | | 09.24.00.287237 |
| 005C | DRDA 241B | QRYDTA-Query Answer Set Data | | | 09.24.00.287945 |
| 005B | DRDA 2006 | CNTQRY-Continue Query | | | 09.24.00.401372 |
| 005C | DRDA 241B | QRYDTA-Query Answer Set Data | | | 09.24.00.401996 |
| 005B | DRDA 2006 | CNTQRY-Continue Query | | | 09.24.00.426842 |
| 005C | DRDA 220B | ENDQRYRM-End of Query | | | 09.24.00.427392 |
| 005B | DRDA C802 | RLS-Release database locks | | | 09.24.00.441456 |
| 005C | DRDA CA03 | RLSERM-RLSE command has completed normally | | | 09.24.00.441885 |
| 005B | DRDA 1055 | SYNCCCTL-Sync Point Control Request | | | 09.24.00.498253 |
| 005C | DRDA 1248 | SYNCCRD-Sync Point Control Reply | | | 09.24.00.498751 |
| 005B | DRDA 1055 | SYNCCCTL-Sync Point Control Request | | | 09.24.00.531258 |
| 005C | DRDA 1248 | SYNCCRD-Sync Point Control Reply | | | 09.24.00.541405 |
| 005B | DRDA C801 | DEALLOCDB-Deallocate PSB | | | 09.24.00.567558 |
| 005C | DRDA CA01 | DEALLOCDBRM-Name of deallocated PSB | | | 09.24.00.568680 |


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ROWSE      IDDA.SLDSP.IMSLOG.G0026V00 +          Record 00000080 More: < >
Command ===> _____ Scroll ===> CSR
/ _____ Navigate < 00.00.01.000000 >      Date/Time 2016-02-16 09.44.02.176316
/ _____ Tracking _____                Tuesday 2016-02-16 Time (Relative)
___ 0049 READ Socket                               09.48.19.182300
___ 00A4 Event Collection IRM Trace                 +0.000022
___ 003D Message Exit called for READ              +0.000028
___ 00A3 Event Collection OTMA Trace                +0.000071
___ 003E Message Exit returned from READ TranCode=IVTNO +0.000078
___ 00A3 Event Collection OTMA Trace                +0.000180
___ 0041 Message sent to OTMA Type=Transaction     +0.000192
___ 01   Input Message TranCode=IVTNO Source=Connect +0.000528
___ 35   Input Message Enqueue TranCode=IVTNO      +0.000644
___ 31   DLI GU TranCode=IVTNO Region=0002        +0.000712
...
___ 5050 Database ISRT Database=IVPDB1I Region=0002 +0.002012
...
___ 5610 Syncpoint Start of Phase 1 Region=0002   +0.002219
___ 00A3 Event Collection OTMA Trace                 +0.002321
___ 0042 Message received from OTMA Type=Data      +0.002328
___ 00A3 Event Collection OTMA Trace                 +0.004396
___ 0042 Message received from OTMA Type=Commit confirm +0.004405
___ 00A3 Event Collection OTMA Trace                 004449
___ 003D Message Exit called for XMIT                004456

```

z/OS Connect

Conclusions

- Starting with IMS Connect is easy but it can be a poisoned chalice
 - Can be a victim of its own success
- Have a plan for how you will grow your workloads
- Understand that growth is not just more workload but greater variety of workload
- Understand what changes impact clients that you cannot control
- Understand the big picture

Thank You

