Connecting the dots…
identifying business unit drivers (mainframe)

and using them for capacity planning!

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Prelude

- This is somewhat technical –
  - Primarily mainframe / z/OS oriented presentation
  - Some twists for distributed => z/OS measurement
  - Not all-inclusive – mainframe data has too much, too far-sweeping for a ~45 minute session
- Like the BBC World Service states = “The main points, once again…”
Questions… ???

• Problems with isolating work along lines of business?
• Where is it coming from?
• Who’s / what’s causing it to occur?
• What impact does it have on z/OS capacity and tuning?
More questions ...???

- Subsystems
  - IMS
  - CICS
  - DB2
  - MQSeries
  - WebSphere
- Distributed links
  - DDF, Application Directed Activity, or APPDIRAC
Adding to the mix….

There’s an overwhelming amount of raw data …

… and a major effort’s needed to turn it into some useful INFORMATION!
To start... on z/OS alone....

And note that I haven't even mentioned MQSeries...or batch work
And when distributed systems get involved.. DDF, APPDIRAC
Most critical challenges…

- Tying all this subsystem data together to represent normal business work processes

And …

- Identifying the business activities that generate it, and those that they support!
Let’s start to connect the dots

• Data sources that we have available
• Those we must refine, and set parameters for
• Those we must set up in order to exploit
The business objective of connecting the dots in our ocean of data...

Performance ...

Capacity requirements ...

Resource acquisition ....

**Cost containment !!!

!!!!!!! $$

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This can be Multi-faceted

(as can anything else here)
Before I go on ....

You’re going to have to sit back and think about this ....

And you’re probably going to have to ask some questions ...
Questions you need to ask

• What are (and aren’t) the CRITICAL – “Loved One” applications and business drivers?

• How do they run?
  • High level – systems, platforms
  • Lower levels – subsystems, servers

• Can we identify them?
Connecting the dots ….

- A single transaction – as viewed by the end user – can touch many points

- Users consider a “transaction” to be a single process

- Measurement, capacity planning, and performance analysis requires a horizontal approach --
“But, it’s all ONE transaction, or interaction??”

This user doesn’t have to worry about the paths her work follows, but to follow her work – YOU DO!

Complete your sessions evaluation online at SHARE.org/BostonEval
Questions you need to ask

• What are the CRITICAL – “Loved One” applications and business drivers?

• How do they run?
  • High level – systems, platforms
  • Lower levels – subsystems, servers

• Can we identify them?
First of all, BATCH!

- Easiest to identify, assuming standards are in place

- Many fields that you can use to identify ownership

- Quite simple – Fields in SMF type 30 identification section and usage stats from that record.
Batch

- Categorization can include
  - Account code
  - Submitter
  - Job Name (or part of job name)
  - Initiator class
  - RACFID
  - Service Class
  - Report Class
Next – the subsystems

- CICS
- DB2
- IMS
- MQSeries
- WebSphere

- Remember – some of these CAN and do interconnect -
CICS - high level information

- SMF 30 – region-level activity
  - Critical to have its interval recording active
  - Does not contain individual transactional data
  - CAN be useful if a CICS processing region is dedicated to one line-of-business, or “LOB”
CICS – lower level (transactions)

- Extremely powerful, but some assembly required! Sources include …
  - CMP 110 performance records
  - MainView for CICS
  - The Monitor from Allen Systems Group

- Literally scores of fields to key on!
- Let’s look at some of them …
What’s Available?

- Just to start –
  - Resources used (CPU, I/O)
  - Response time
  - Calls to other subsystems (more on that)
  - More than enough fields to use as keys to build line-of-business reporting units

Transaction name, terminal it ran on, program name, user-id, special user field, type of transaction, priority, group ID, IP address, server name, remote system ID, 20-40 more depending on input source
MRO – Multi-Region Operation in CICS

- Transactions may trigger other CICS transactions running on other CICS regions

- One transaction can link to another one.

- Here are dots to connect – different transactions triggered by one CICS transaction

- UOWID (in MXG) – Unit of Work ID; composite with UOWIDCHR, UOWTIME
So… an MRO scenario (CICS only)

Simply – as the transaction travels – using the UOWID – link all three together, calculate response times, CPU times, and so forth…
So you’ve tied it all together – and connected the dots

• What now? Assuming you’ve identified work by region and transaction (there are other fields)

• Fields for establishing ownership - this is not all of them…
  • The CICS Terminal name
  • The program name executed
  • User-id
  • Special customizable user application field
CICS fields for identifying ownership

• Digging through the CMP 110 – additional fields
  • LUNAME
  • Remote System ID
  • Client ID address

• TMON and MainView for CICS data have other fields that can be used for identifying ownership – consult your manuals
Now – what about CICS calling other subsystems?

- DB2 – most common, most of interest
- MQSeries
- IMS

DB2 requires accounting trace records to be active – they can be voluminous
DB2 SMF transactional information

- SMF record type 100
  - System-wide information

- SMF record type 101
  - Transactional detail information
  - A few notes….

- Reference the START TRACE command
DB2 info --

- Statistics trace for type 100
  - For class 1

- Accounting traces critical
  - SMF 101 account record for DB2
  - For class 1 and 2
  - Package info – class 7 and 8
  - Package buffer info – class 10 (optional)
a scenario (CICS – DB2 )

This is a little more complex than a previous slide – we must add the DB2 accounting information – from the SMF 101 – and tie it together with the UOW info found there.
So we tie --

- The UOWID fields from the 110 records for CICS (or TMON or MV/CICS)

- Along with the UOWID fields from the 101 records

  - Adding CPU time, carving response time, and I/O
  - Delineating the two subsystems (performance measurement)
  - Declare ownership of the “transaction” by the CICS transaction
DB2 data – more keys to isolate and identify ownership

- Connection type -
  - 12 different types, including CICS connection
  - If DB2 is called by IMS, CICS, or MQSeries, usually the connection type is set by the caller
  - But there are many fields to determine ownership or classification
    - Plan, package, correlation id, end user work station, authorization id, CICS connecting transaction, IMS PSB, and others
A review

• CICS transactions that call other CICS transactions
  • UOW fields – link them together, the calling transaction becomes the “head of the chain” and the identifier

• CICS transactions that call DB2
  • The same, match/join/sort on UOW fields
Now what …

• You’ve asked questions …
  • Who owns the transactions?
  • Is there a way – some other criteria, that makes this transaction / transaction set peculiar to a particular line of business?

• Group them together as “applications”

• Use these applications to drive your capacity plan …
Let’s examine a few more…

- CICS-MQ connection

- MQSeries employs SMF 115 & 116 records
  - Seven connection types (similar to DB2)
  - Commonly used fields
    - Correlation-ID
    - CICS Transaction

- MQSeries has IMS, Channel, Server connections as well
But you might also have IMS activity spawned from CICS – identify these by connection type, PSB or MPP..

You have more dots to connect!
But … DB2 from Distributed Systems?

- SMF 101 record contains “too much”!
  - Connection type = usually APPDIRAC
  - Identifies it quickly, usually has no other connection
  - It comes in “from the outside” of the mainframe
But … DB2 from Distributed Systems?

- SMF 101 record contains many fields
  - Identifiers? – just a small set
    - Correlation-id passed from the requestor
    - End-user id,
    - End user workstation
    - DB2 Operator ID,
    - DB2 Authorization ID
    - Location
    - Plan
    - Package
    - And a compendium of accounting fields
Business Application ACCT

Batch Jobs ACCT

Code ACCT

CICS transactions
ACC*

App owning
CICS region

MQ Series
CICS connection

DB2 subsystem
Acct plans

File owning
CICS region

DB2 Application Directed Activity (from a source external to the z/OS environment)

External location?
IP address???
Notes on IMS

- Can be matched to DB2, CICS, MQSeries
- Various key fields available for identification
  - Transaction
  - PSB
  - Class
  - Node
  - Lterm
  - Authorization ID
  - Signon security value

- Matching more difficult – timestamp match
Notes on IMS

- Most common sources of raw input for transactional data =
  - IMS logs
  - Also – MainView for IMS Type x’FA’ records
Notes on WebSphere

- Uses SMF type 120 and 121

- No connection via UOWID, solitary
  - J2EE container name and activity
  - Websphere transactional data activity can include =
    - Cell - Node - Server - Instance

- No real “dots to connect” to other subsystems
General notes…

- If you DON’T have a tool in place, start out by matching UOW fields – from different sources.

- You would “work backwards” – the DB2 connection type is CICS, what transaction has a common UOWID, e.g.

- Talk with your applications developers!
General comments

• Make an effort to determine who owns what
  • Better communication within the enterprise
  • Everyone now knows the capacity planner
  • You know your user community

• Inform your communities of their own DP activity
  • They may be surprised
  • Anomaly or expected behavior?
The end result….

• Lines of business are identified
• Subsystem uses are identified within lines of business
• Better grip on resource usage =
  • Better performance
  • More business agility
  • Better resource control & use
  • Improved resource acquisition processes
You won’t lose your way......if you do it correctly !!!!!!