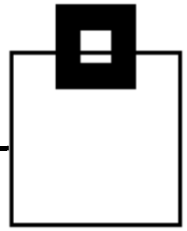

Access Path Recovery for Db2 11 + 12 using RUNSTATS Rescue

Still important in an AI/ML world?

Roy Boxwell, SEG

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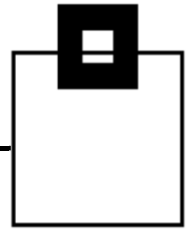
RUNSTATS Rescue – Why?



A fact of life is:

- Access Paths change…
  - Sometimes they get better…
  - Sometimes they don't!

Why does that happen? The classic reasons are:

- Statistics changes
- Index changes
- Any other reason… (APAR, Version, Rainy day etc.)

Wouldn't it be great if you could „turn back time“ – To get the last „good“ statistics and then be rescued from your bad access path!

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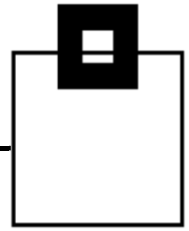
RUNSTATS Rescue – Db2 Help?



What does Db2 offer when this situation occurs?

For Static SQL – Plan Stability and BIND QUERY

- Original Package
- Previous Package
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Does Plan Management work all the time?

With Schema changes it fails… (View, Index etc.)

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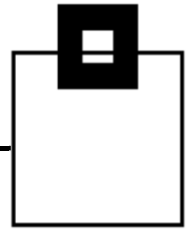

For Dynamic SQL you get:

Dynamic SQL – BIND QUERY

However BIND QUERY has one major limitation:

"Ensure that object names and SQL keywords in the statement text are specified by uppercase characters, especially for dynamic SQL statements."

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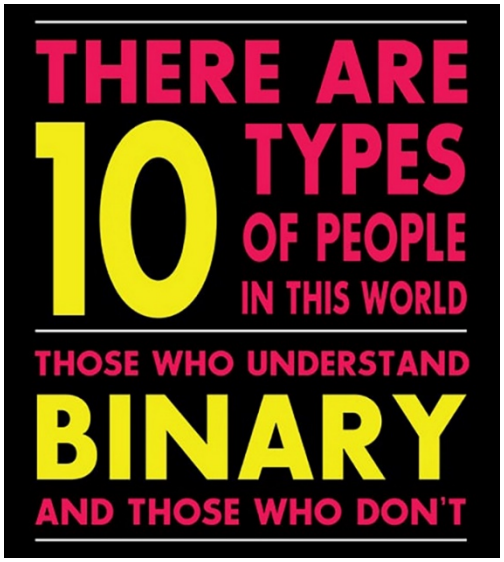

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RUNSTATS Rescue – Db2 Help?

New in Db2 12 is:

IBM Analytics

Dynamic Plan Stability

- DB2 12 plan – base infrastructure
  - Opaque parameter CACHEDYN_STABILIZATION
  - Capture
    - Command with / without monitoring
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  - APPLCOMPAT is part of matching criteria
- Key DB2 12 limitations
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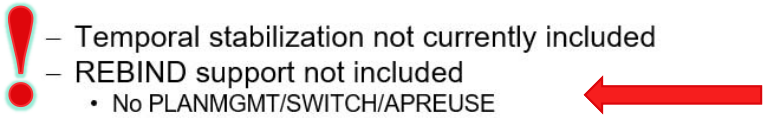

How many SQLs are “worth” locking down? Top 10, 20?

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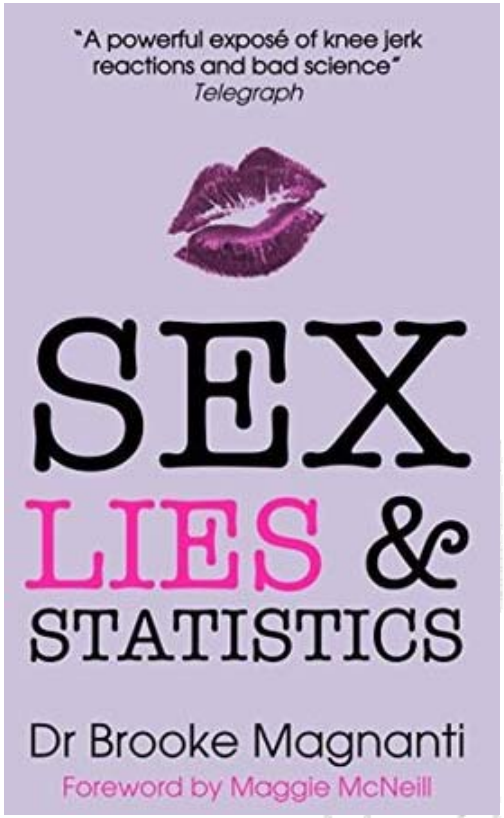

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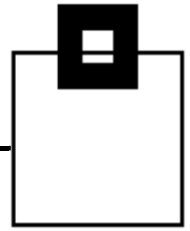
RUNSTATS AI/ML – Db2 Help?



Well, as you are all aware, AI and ML should come and rescue us from bad access paths as well.

How?

The problem is the well known outlier problem. The AI/ML learns on 1000's of SQLs that all run "nominally".

When your application gets a deviant or outlier access path that the AI/ML has not seen before how will it react? Launch all nukes? Ignore it and hope to learn more for next time… or something completely different?

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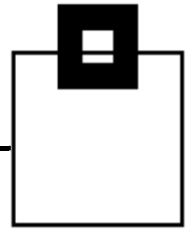
RUNSTATS Rescue at a glance



- Keeps a stats repository and allows to consistently restore statistics
- Quick and easy to use
- Supports dynamic SQL out-of-the-box
- Supports static SQL where Plan Management fails:
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- In future slides shortened to be **RR**

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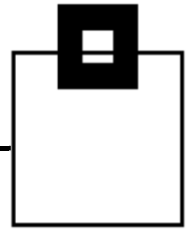
RUNSTATS Rescue procedure



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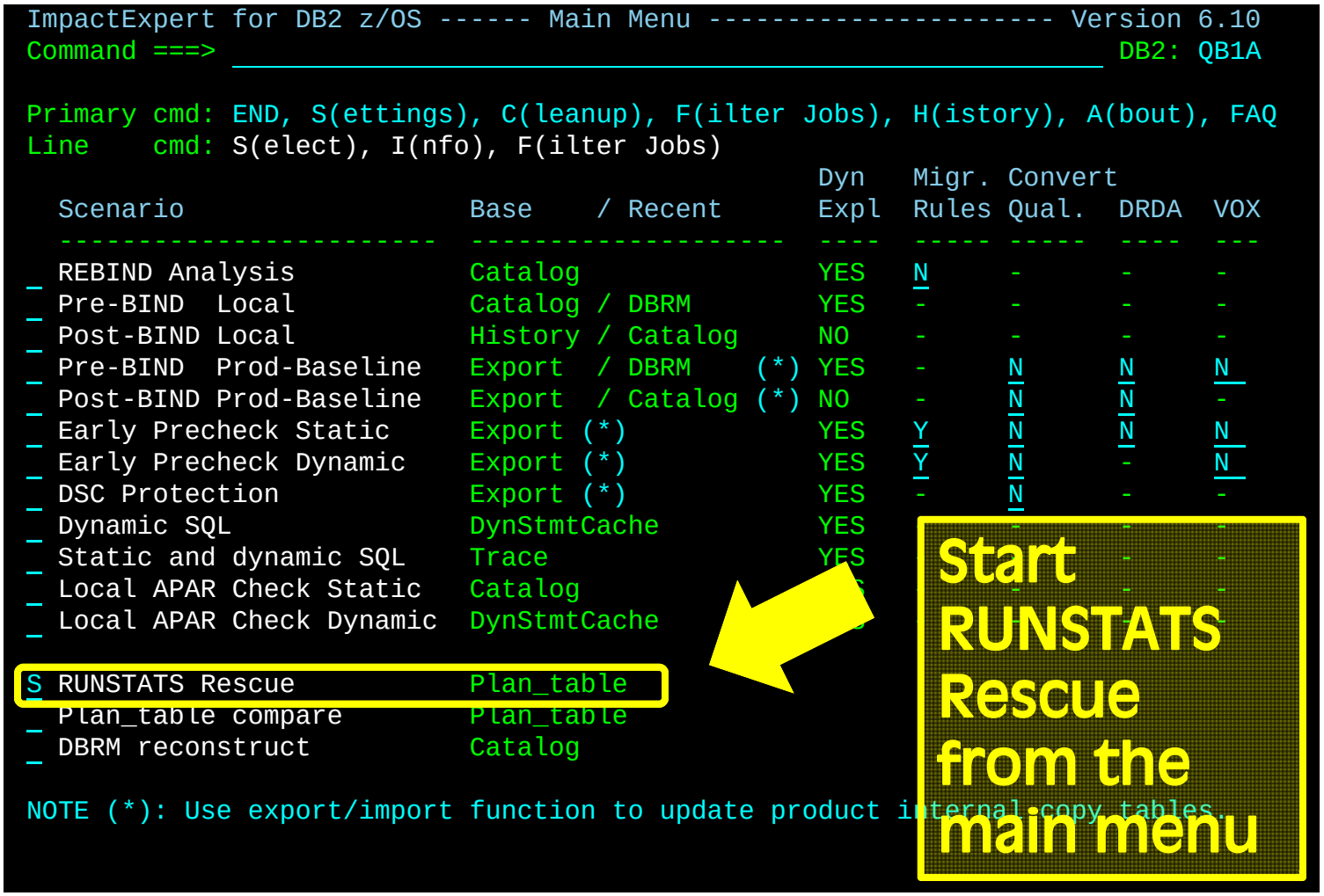
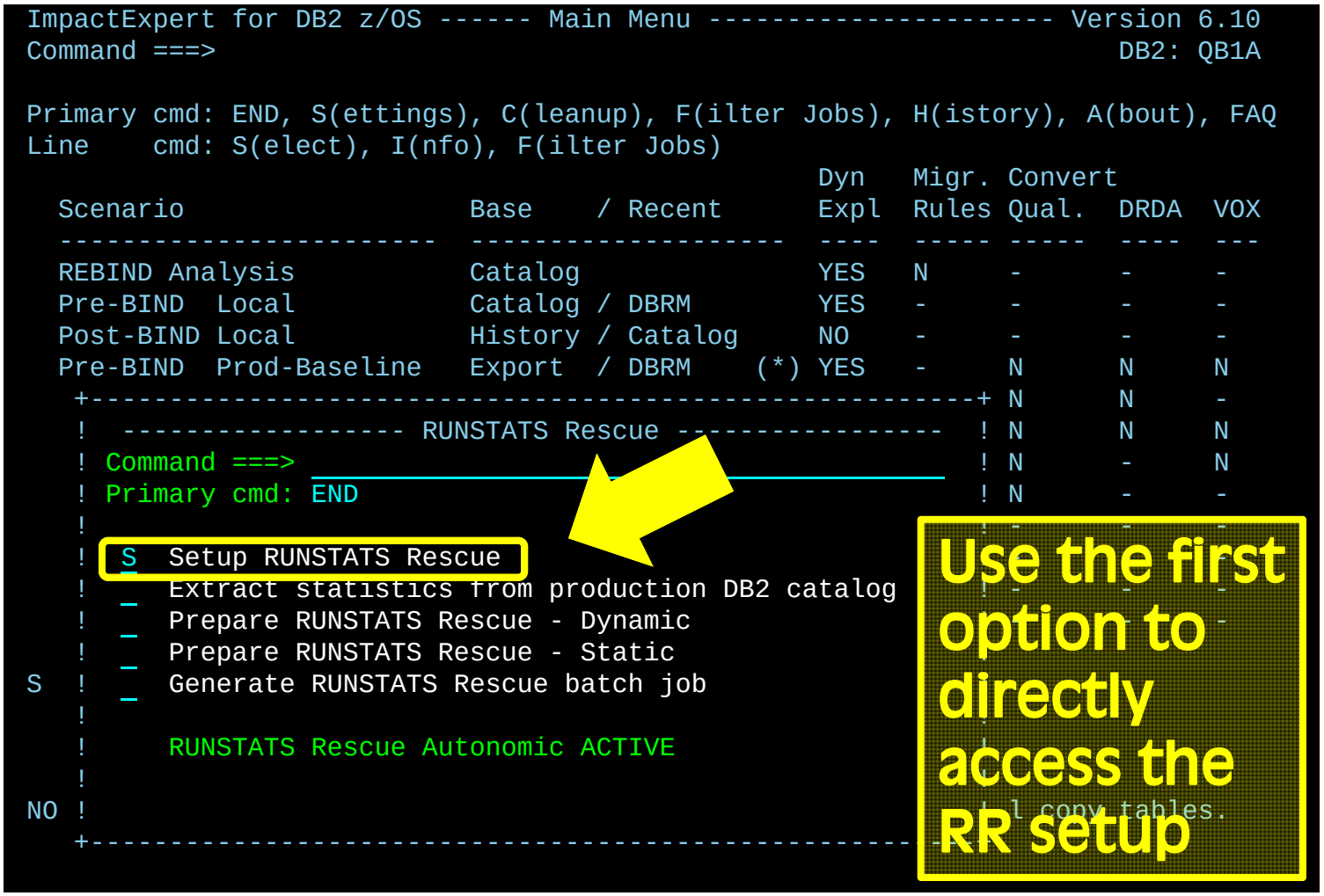
RUNSTATS Rescue – Embedded or Stand-alone



RUNSTATS Rescue – setup



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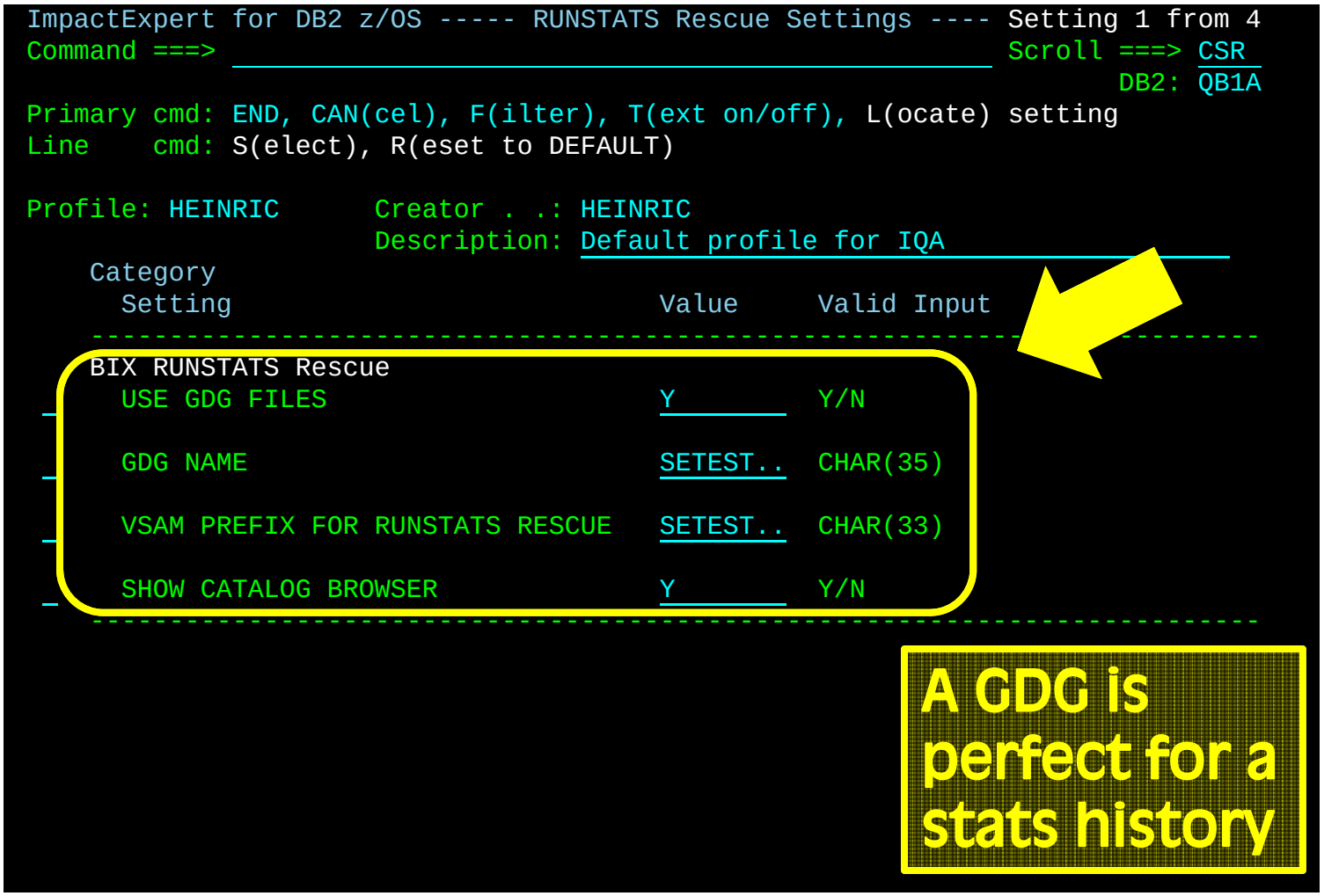

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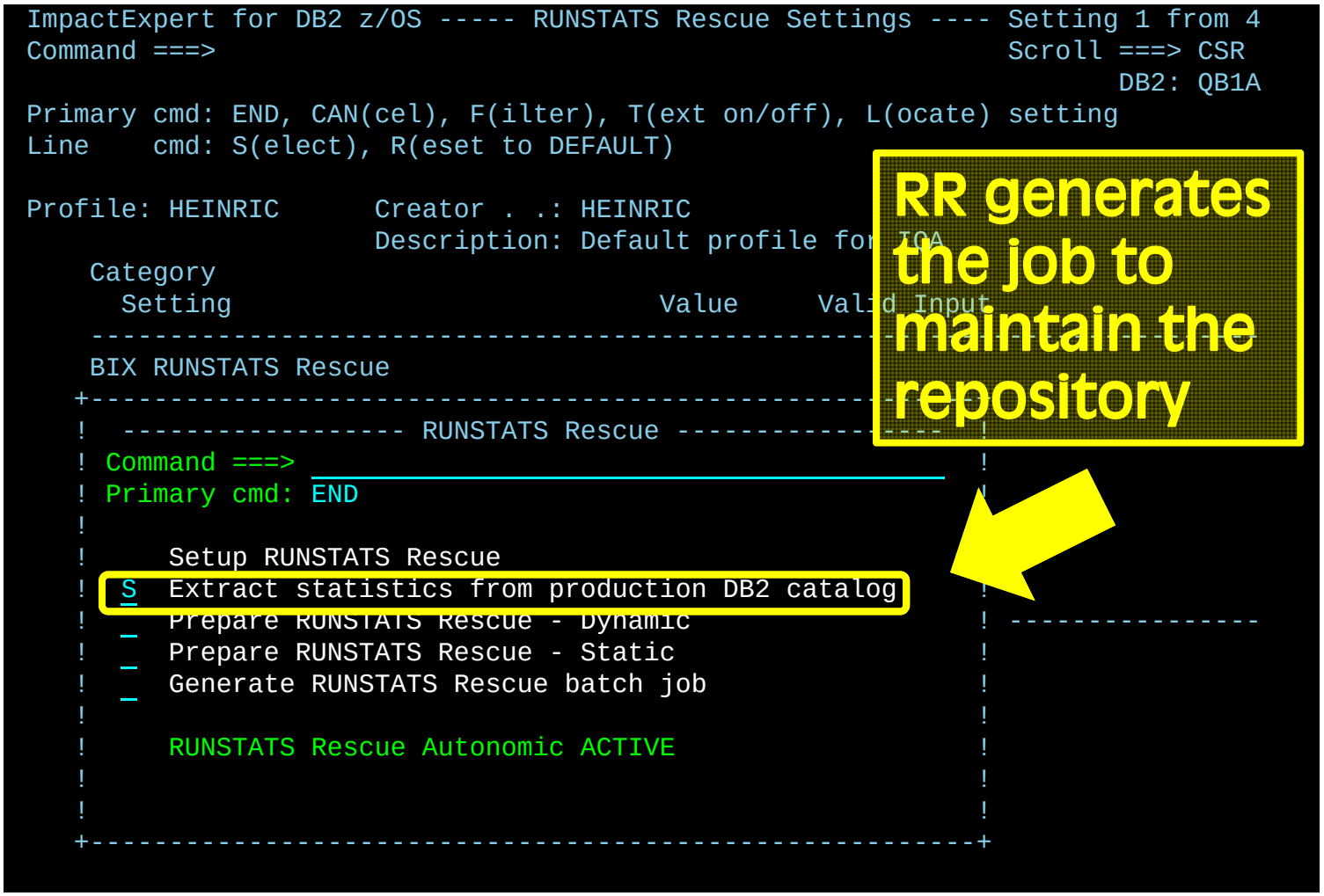
RUNSTATS Rescue – statistics repository



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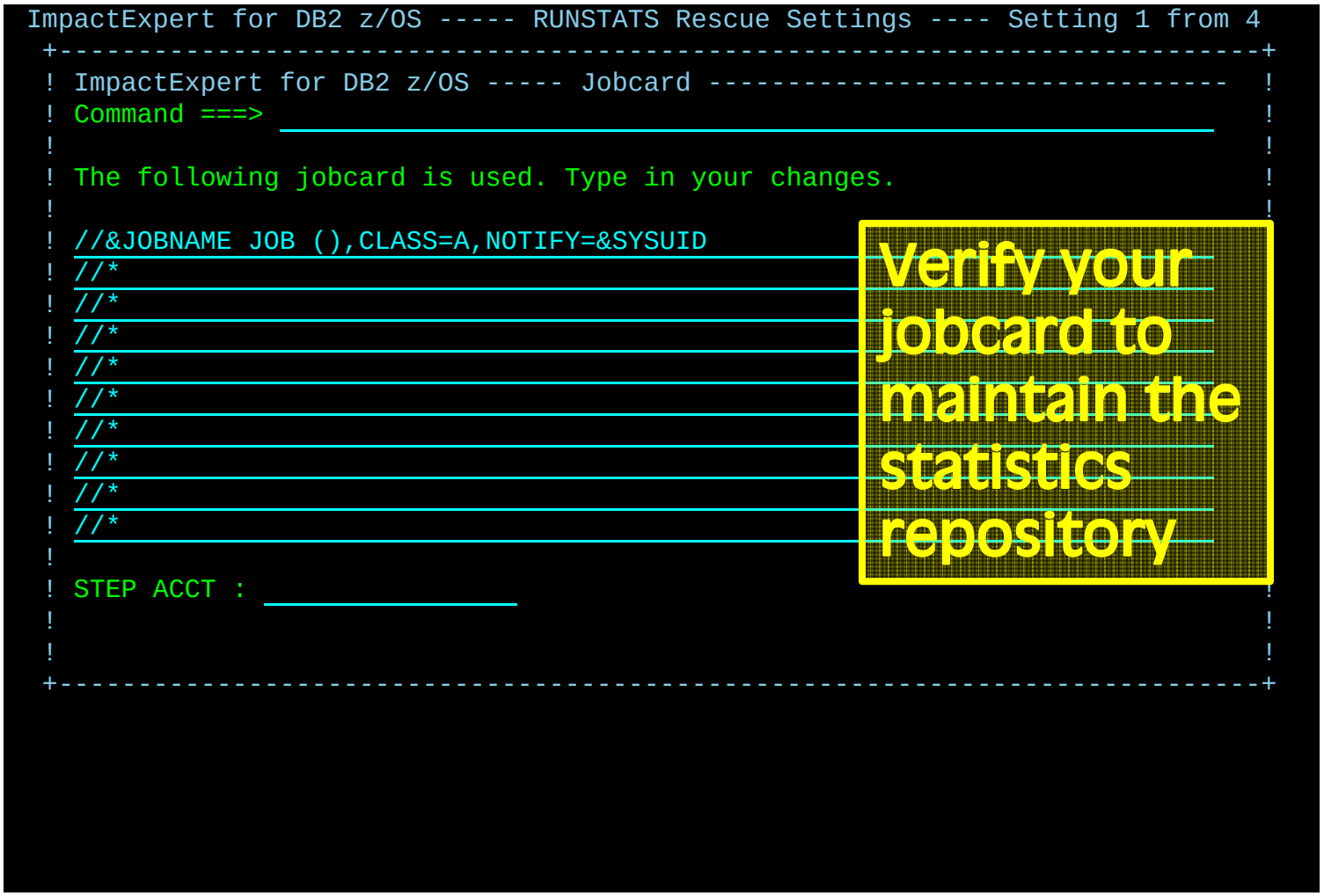

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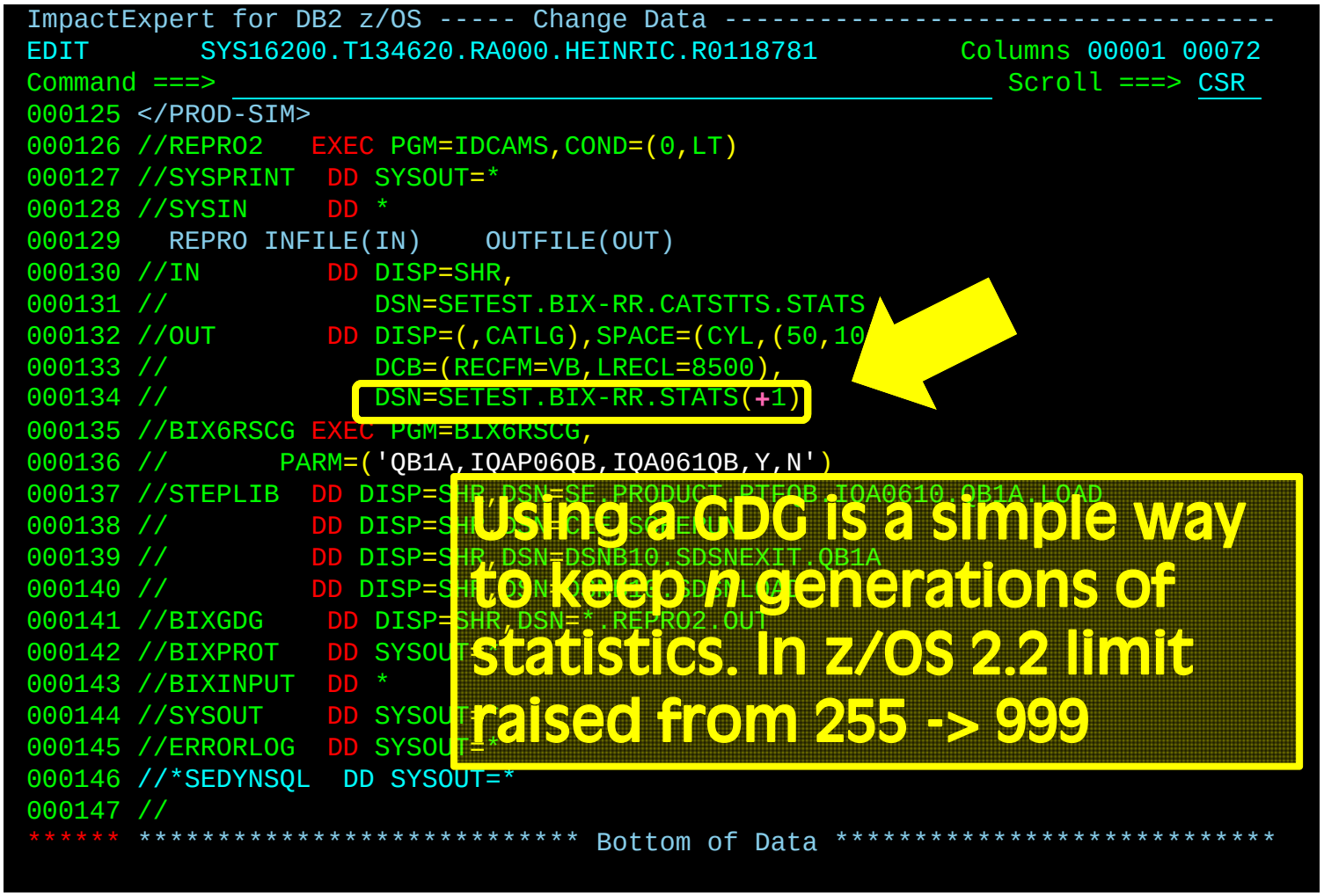

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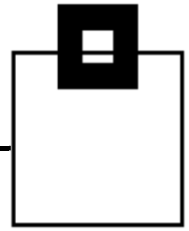
RUNSTATS Rescue procedure



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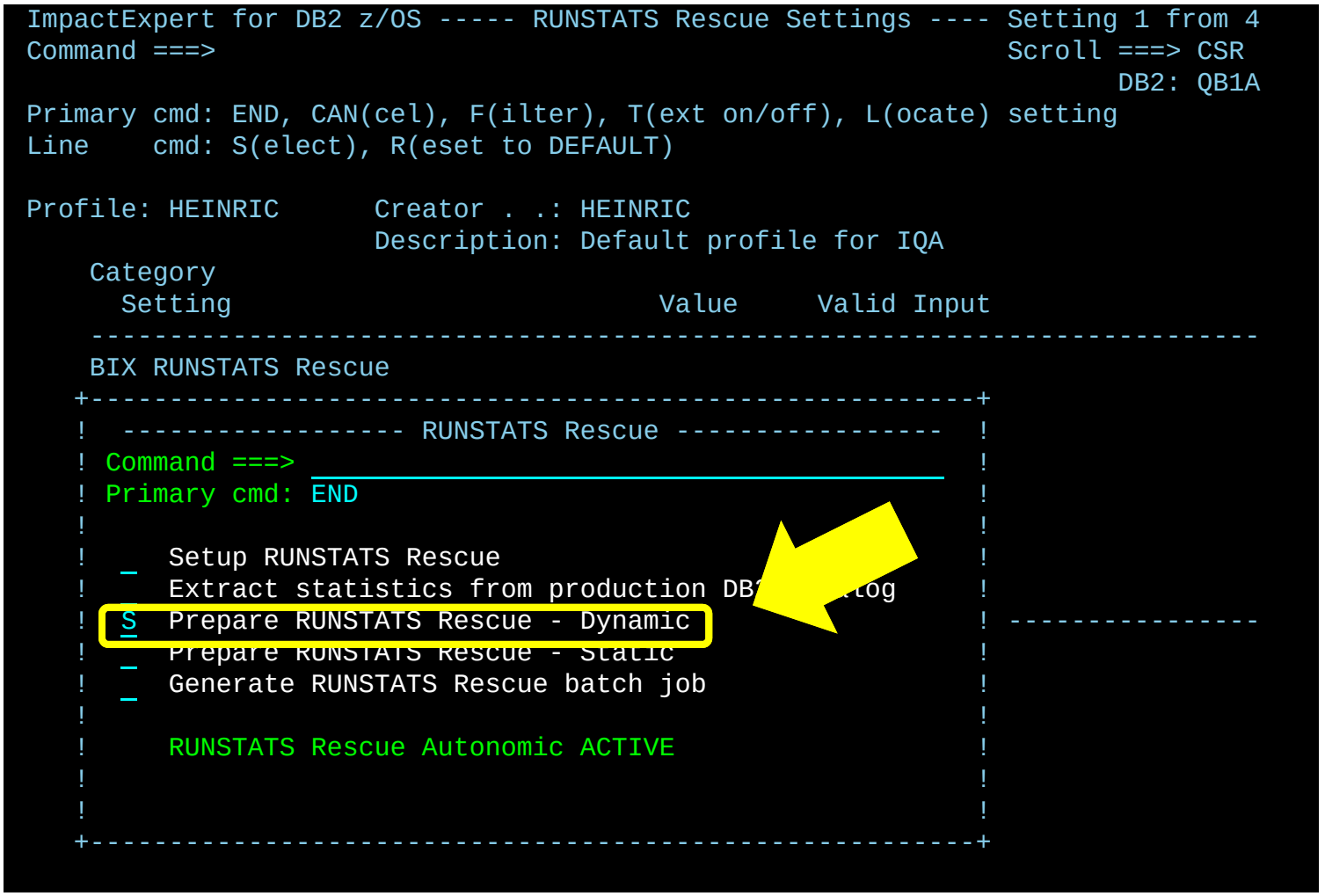
RUNSTATS Rescue – dynamic SQL



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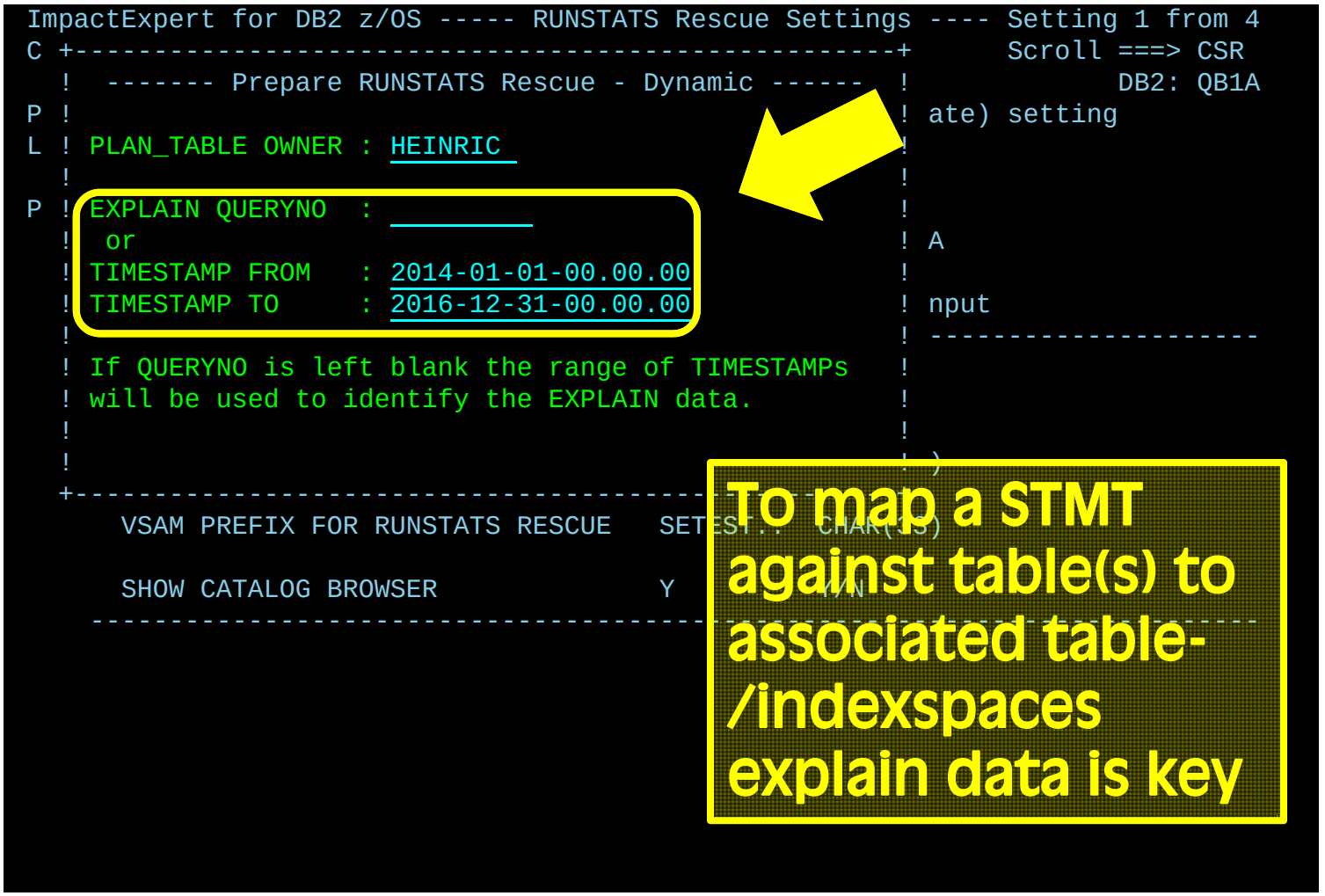

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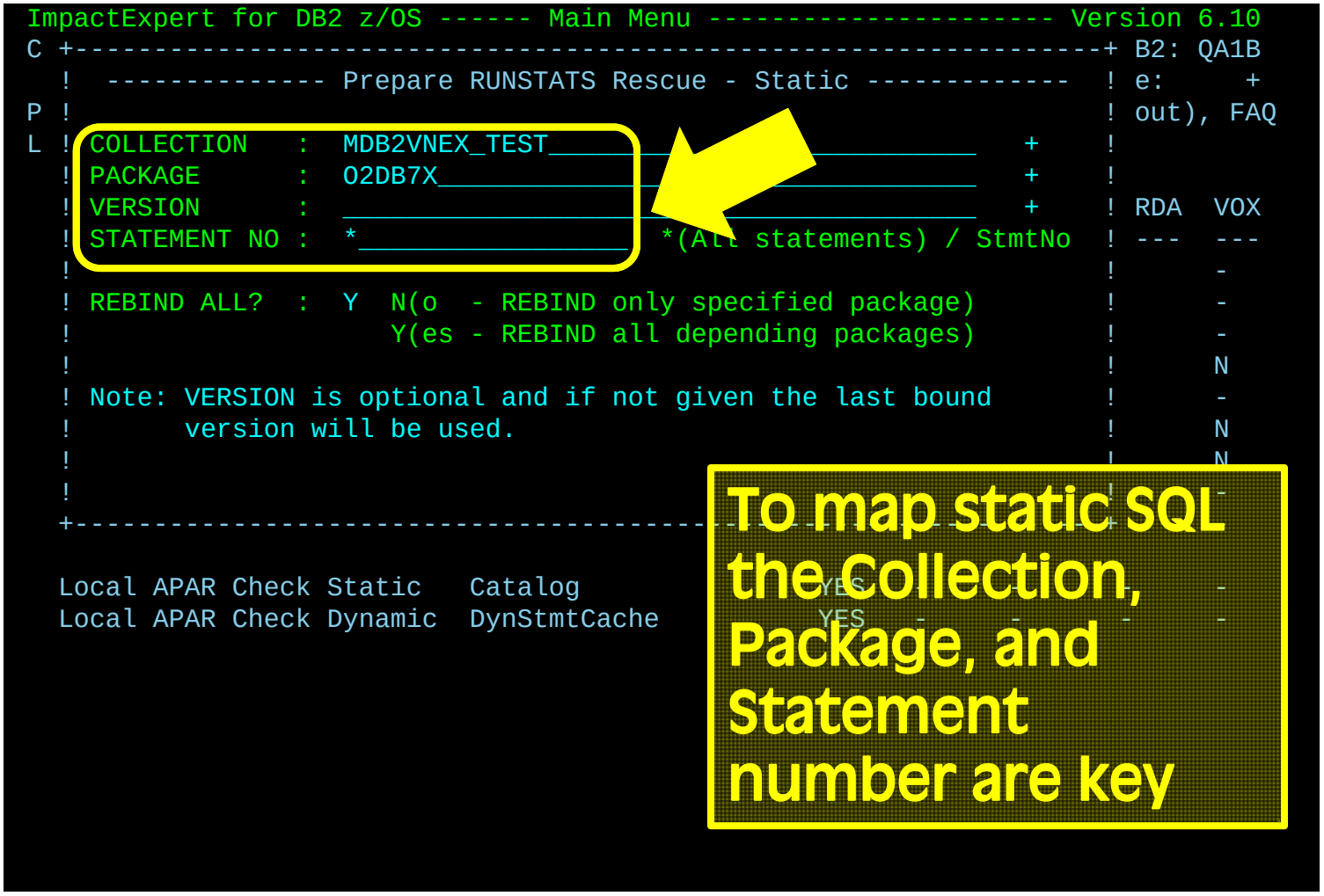

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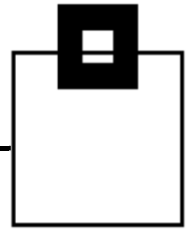

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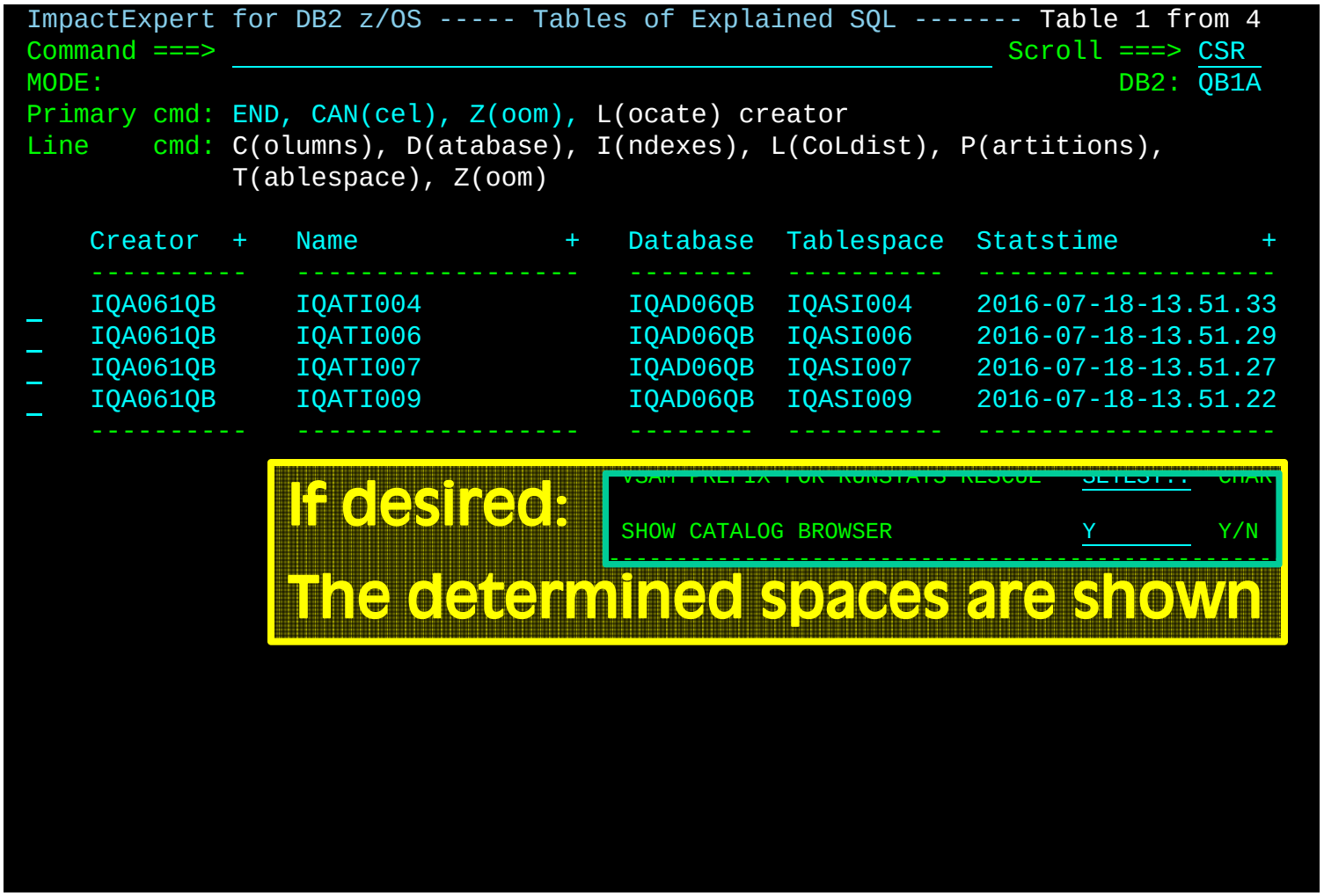

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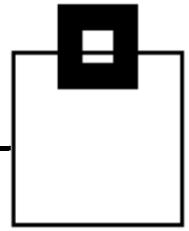

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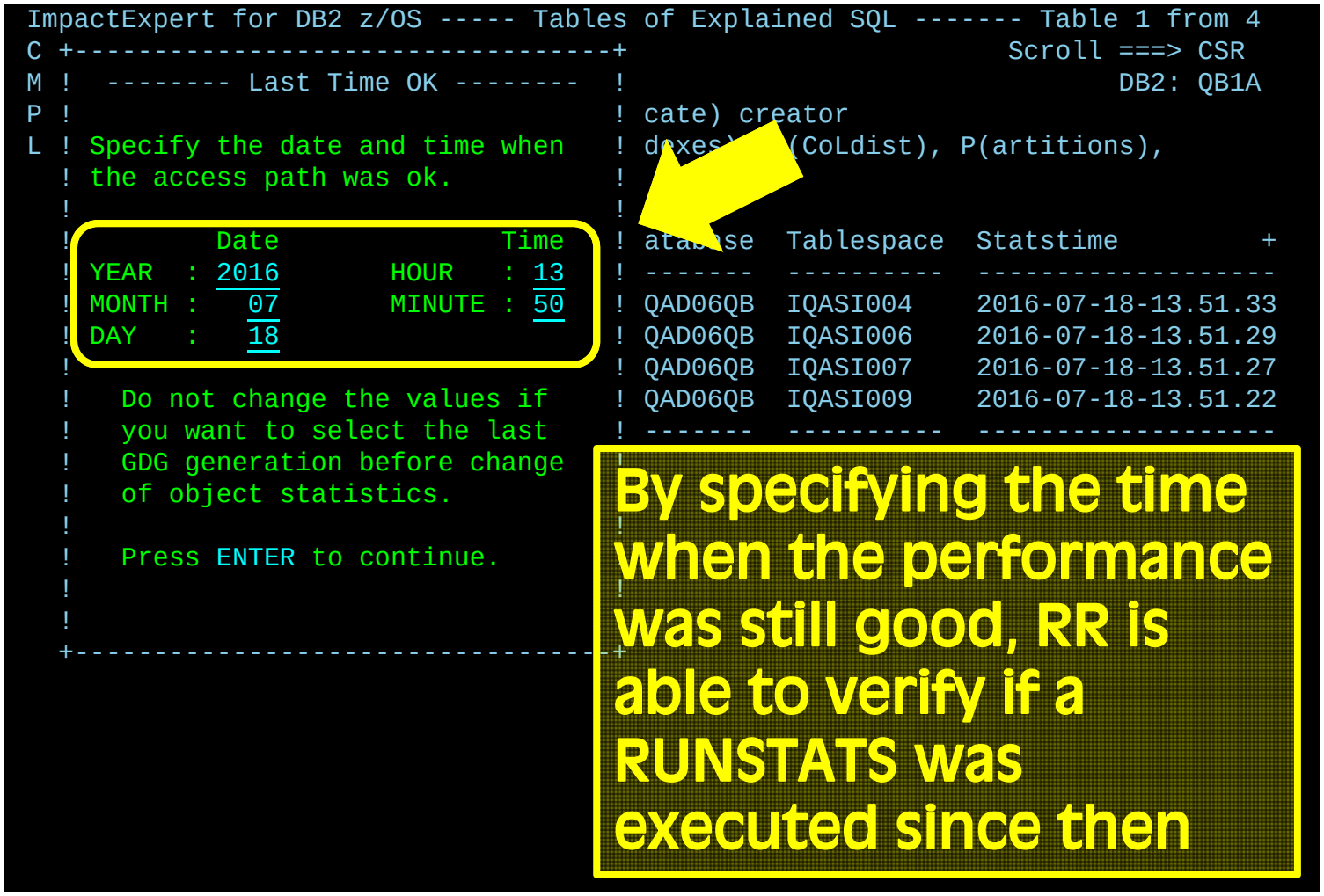

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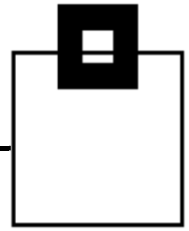

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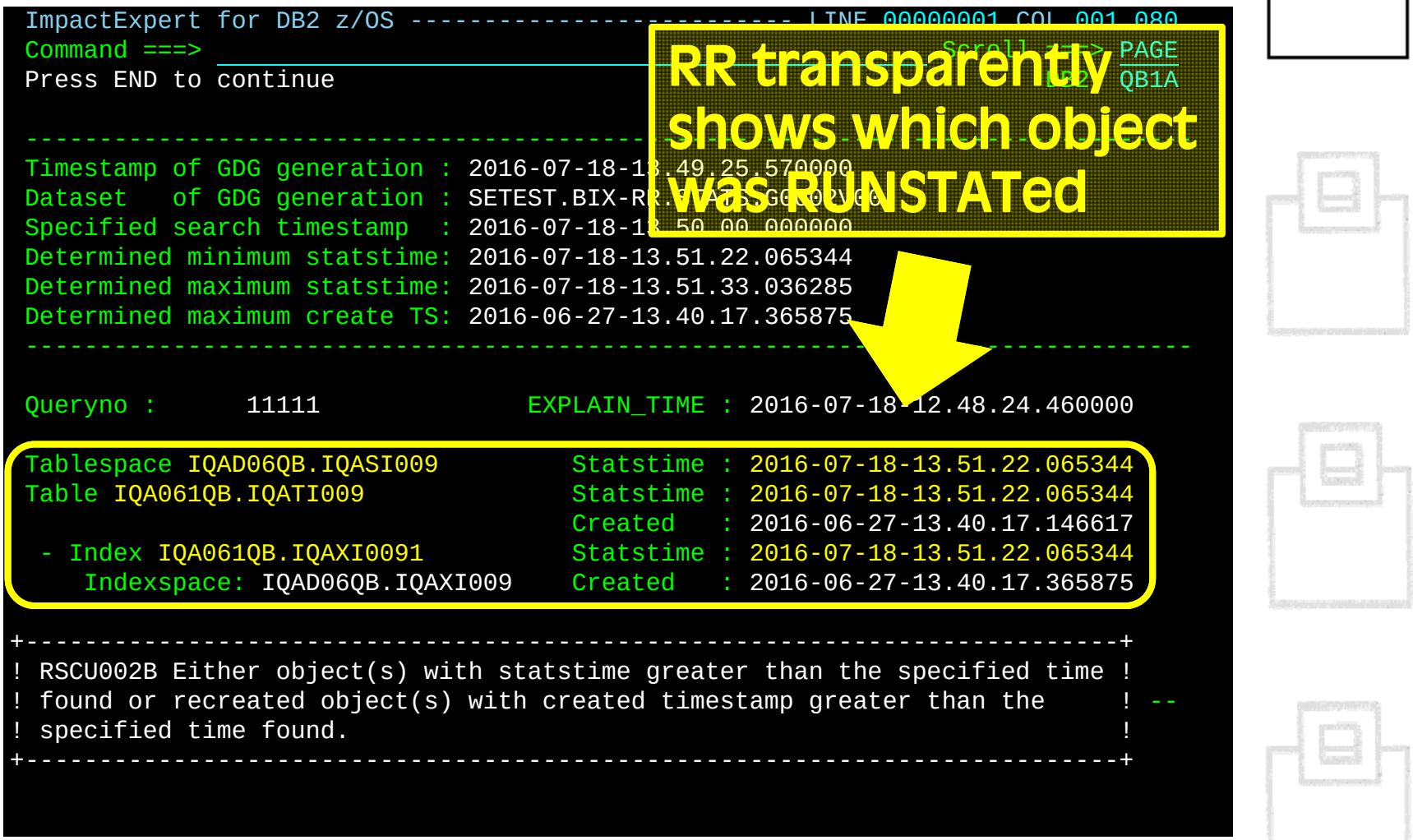

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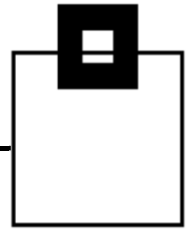

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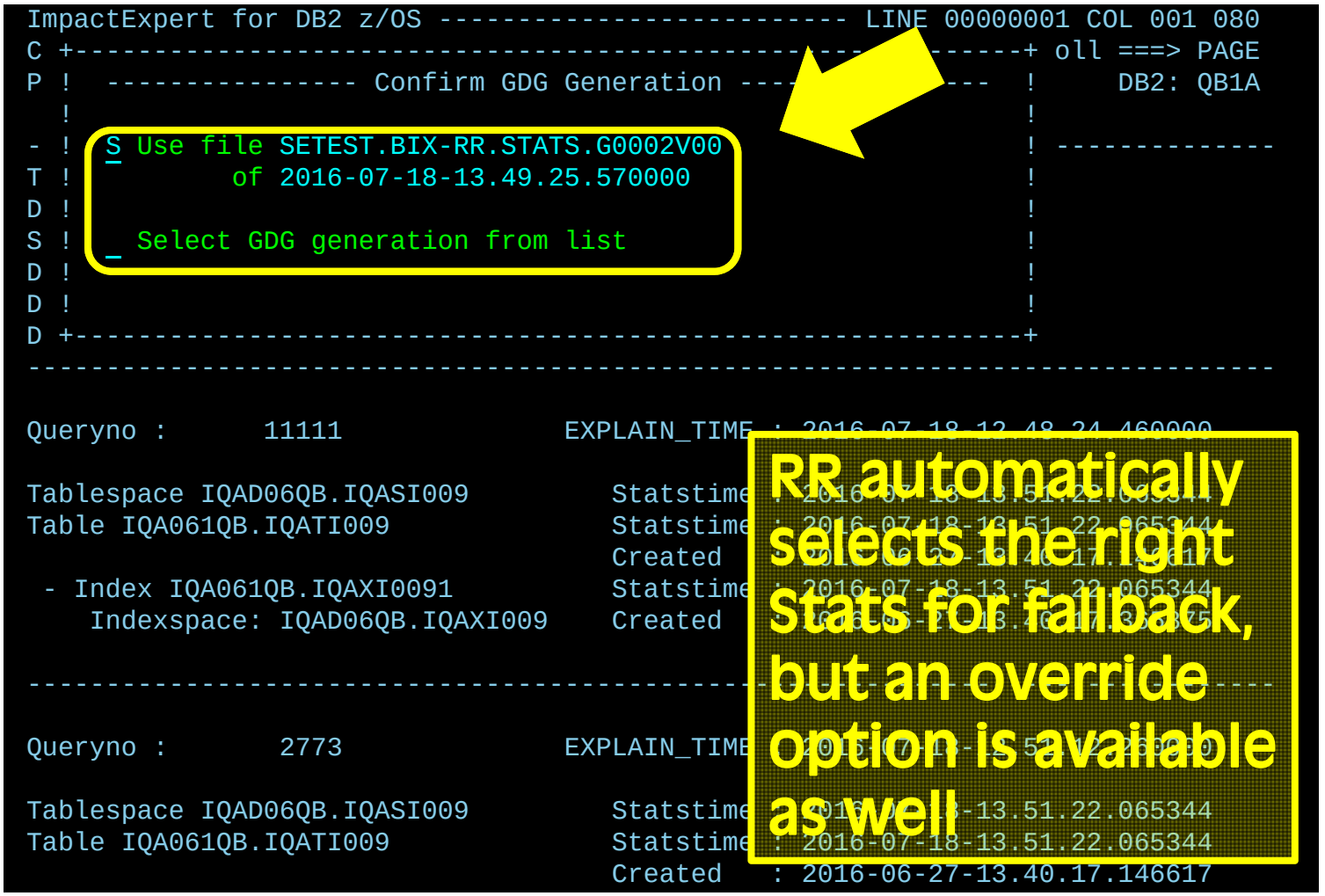

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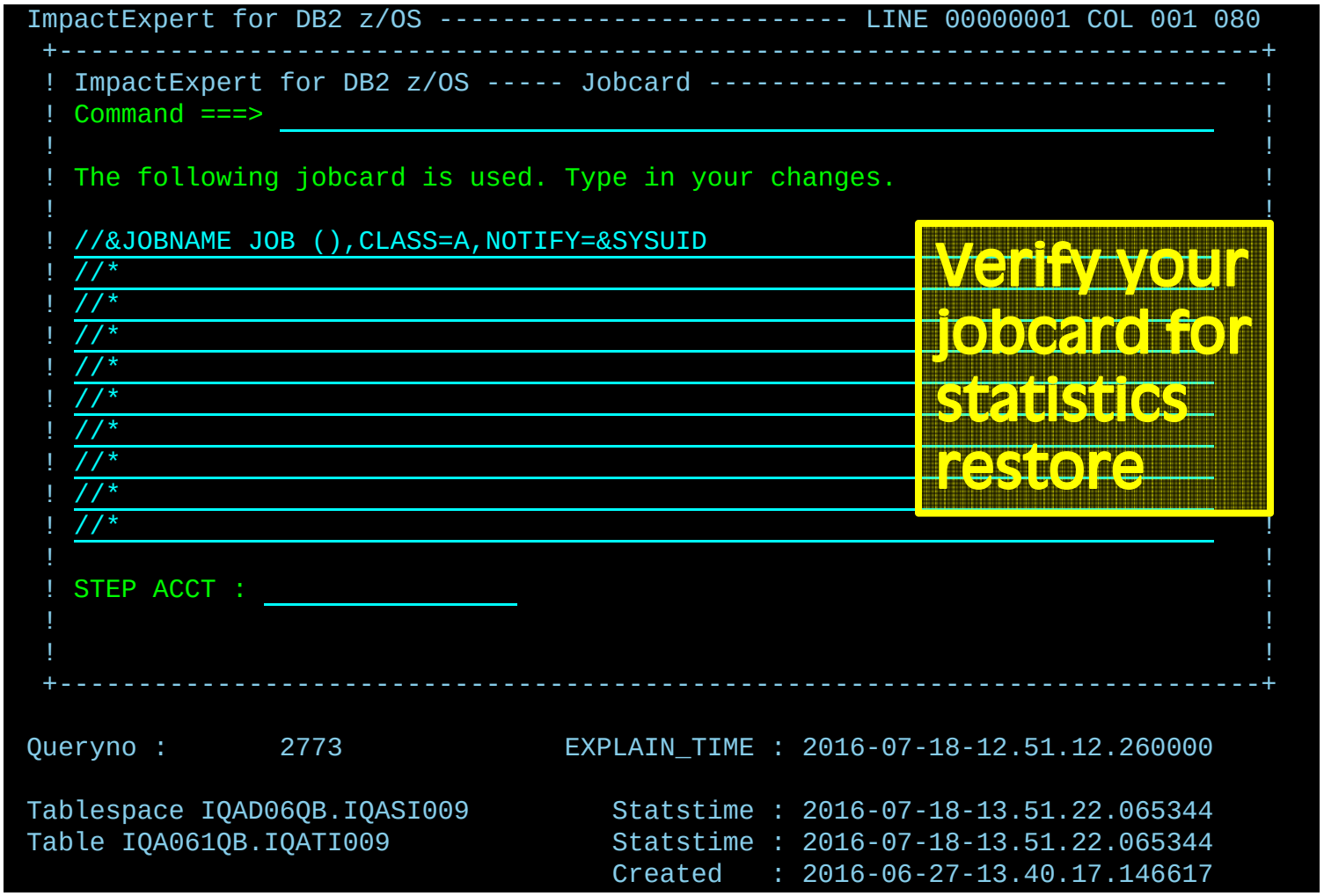

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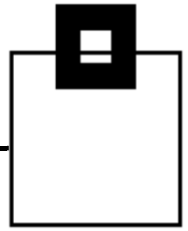

```
ImpactExpert for DB2 z/OS ----- Change Data ----------------------------------
EDIT       SYS16200.T134620.RA000.HEINRIC.R0118781         Columns 00001 00072
Command ===> ____________________________________________  Scroll ===> CSR
000106 //          DD DISP=SHR,DSN=CEE.SCEERUN
000107 //          DD DISP=SHR,DSN=DSNB10.SDSNEXIT.QB1A
000108 //          DD DISP=SHR,DSN=DSNB10.SDSNLOAD
000109 //SYSOUT    DD SYSOUT=*
000110 //ERRORLOG DD SYSOUT=*
000111 //BIXINPUT DD DISP=OLD,DSN=*.REPRO.IN1
000112 //PDB2OUT   DD SYSOUT=*,RECFM=FBA
000113 //PDB2RUNI DD DISP=OLD,DSN=SETEST.BIX-RR.STATS.GDG
000114 //PDB2RUNO DD DISP=OLD,DSN=SETEST.BIX-RR.CATSTTS.RESCUE
000115 //PDB2IN    DD *
000116 <PROD-SIM>
000117   <DB2-SYSTEM ALIAS-CREATOR="IQA061QB"
000118               CATALOG-CREATOR="SYSIBM"
000119               GTT-IX-BPOOL="BP0"
000120          >
000121   </DB2-SYSTEM>
000122 </PROD-SIM>
000123 //PDB2TSIN DD *
000124 IQAD06QB.IQASI004
000125 IQAD06QB.IQASI006
000126 IQAD06QB.IQASI007
000127 IQAD06QB.IQASI009
000128 //
****** ***************************** Bottom of Data ****************************
```

Extract job is tailored for execution

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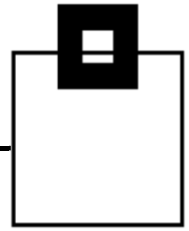
RUNSTATS Rescue procedure



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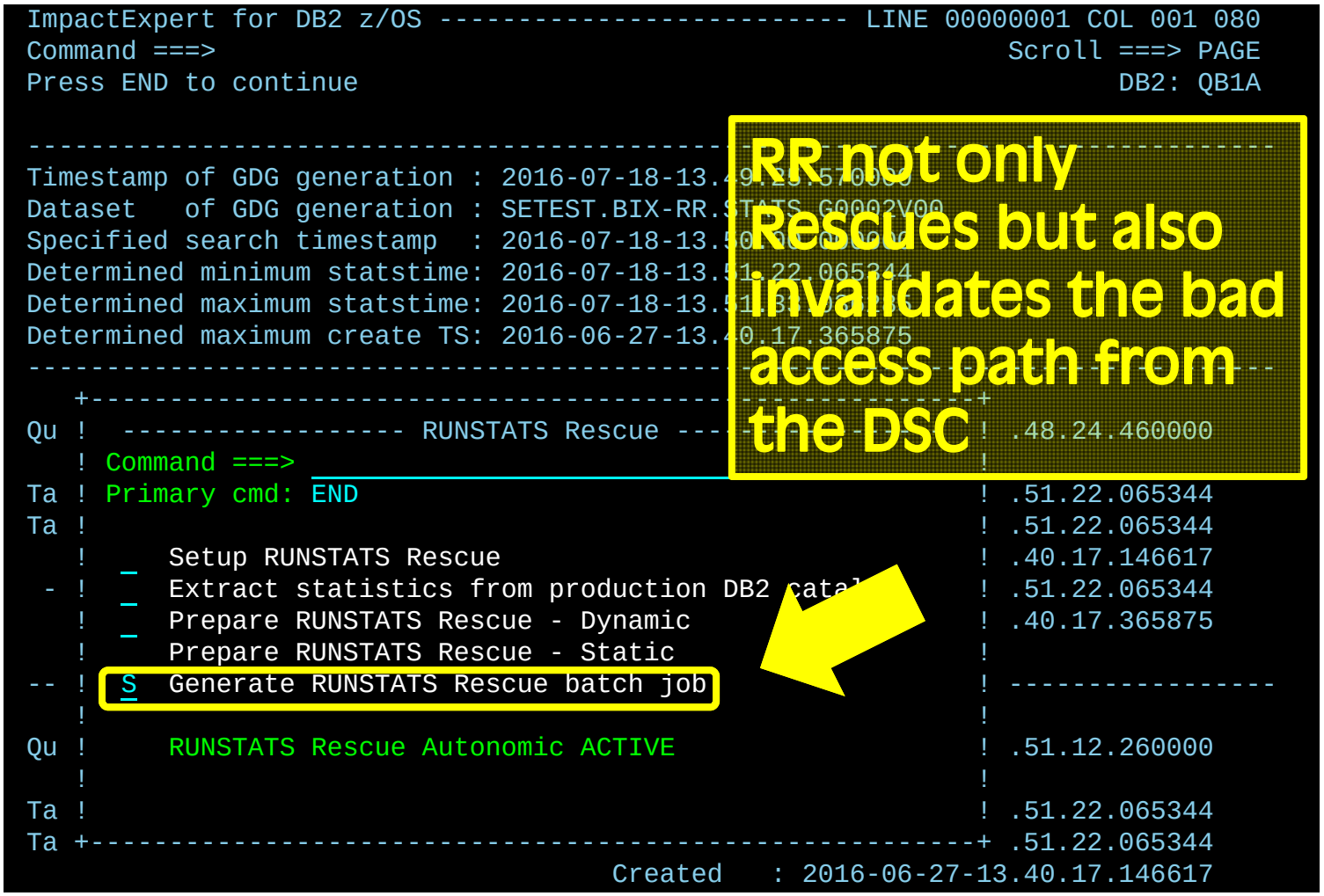
RUNSTATS Rescue – dynamic SQL



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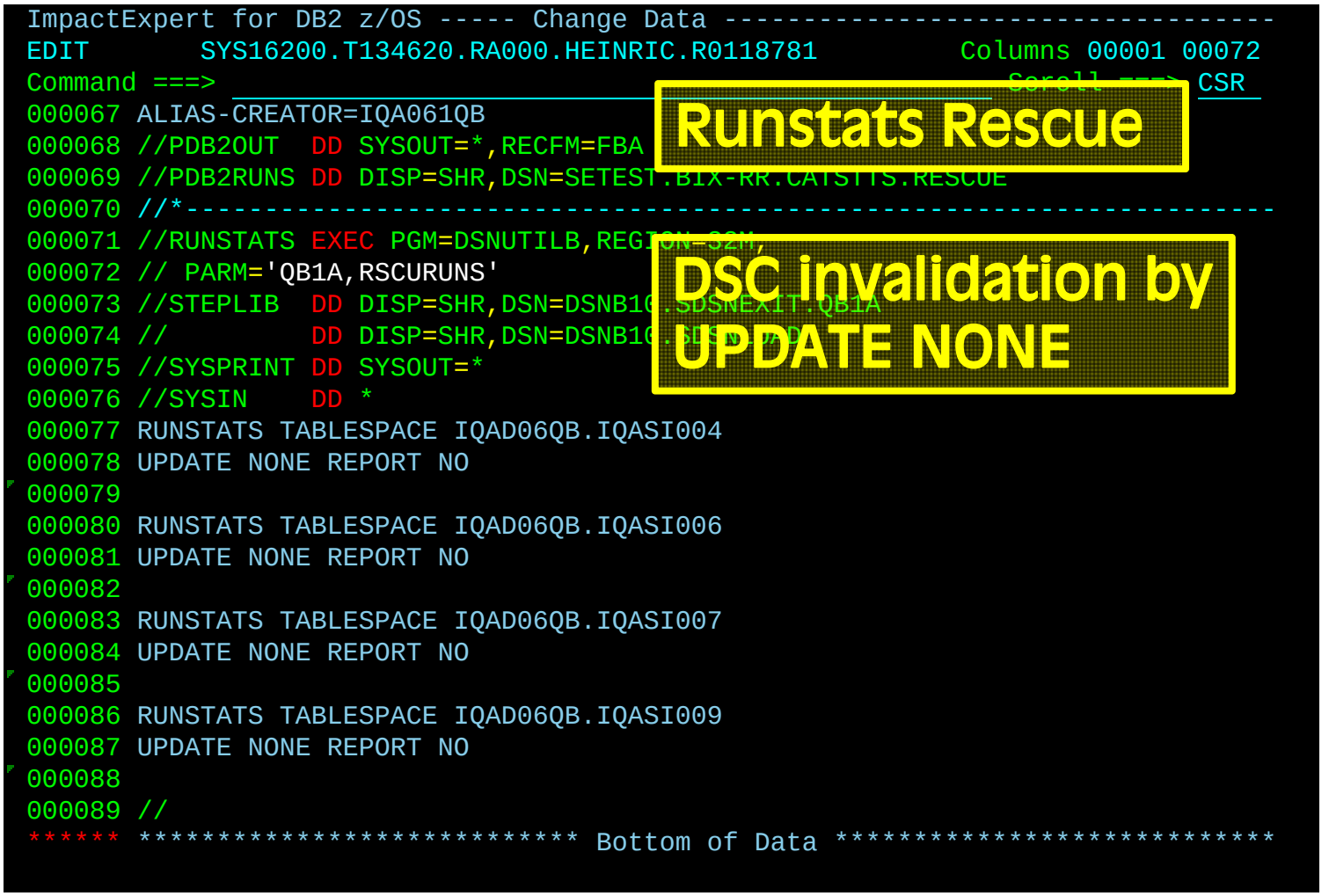
RUNSTATS Rescue – dynamic SQL



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RUNSTATS Rescue – static SQL

- Basically the same as dynamic but the starting data requirement is a package and/or a statement id

- From this basis the rest of RR is the same as dynamic apart from the final recover step where RR generates a REBIND instead of a RUNSTATS of course!

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RUNSTATS Rescue summary I

- When you have 1000's of partitions on a multi tera-byte database - Without a tool you have no chance to react effectively!
- Buys much-needed time during critical events
- Cost-effective and time-saving
- Identifies whether or not RUNSTATS was guilty (ZPARM, SQL New Release, or Bufferpool etc.)

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RUNSTATS Rescue summary II

- Complements IBM-Plan Management where it does not work (any changed object e.g. views, dynamic SQL)
- Saves statistics and recovers back to them using a simple, guided semi-automatic process
- Helps to automate a rescue process
- Guarantees stable Access Paths for Dynamic as well as Static SQL in Db2 11 & 12 and not just for your “Top 10 or 20”

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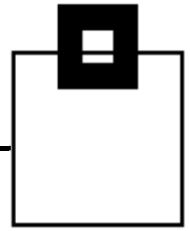
RUNSTATS Rescue – REWE



REWE Success stories … Coming soon…

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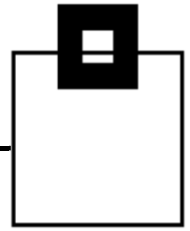
RUNSTATS Rescue – DATEV



DATEV Success stories … Coming soon…

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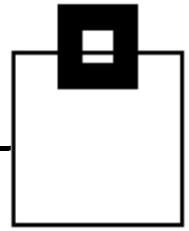
Give and Take Program, Germany 2020



What we GIVE:

1) 90 days free trial – even in production
2) Two webinars covering installation and all pre-reqs
3) Two days – free of charge – onsite support
4) Offer of two days – free of charge – for potential realization of customer requests and enhancements

What we TAKE:

1) Your Real World Experiences
2) Your permission to use the gathered data in our presentations (Anonymous or, if you allow it, with your customer name)

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Give and Take Program, Germany 2020

The 2020 Program offers:

January – March (1Q): Db2 11 + 12 Audit + SIEM (Security Information Event Management) with optional framework Eclipse or ZOWE

April – June (2Q): Access Path Recovery

July – September (3Q): Space Assurance – K-no-w your limits

October – December (4Q): Zowe and SQL Workload Performance for Db2 11 + 12

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Questions???

Many thanks for your attention and now….

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