SQL tuning:
the necessity, the benefits,
a business case

Kurt Struyf
Competence Partners

Agenda

- The importance of SQL tuning
- The project start up, a business case
- Overview of techniques and strategies
  - Access Path Follow Up
  - Developer training
  - Actively chasing MIPS
- The return on investment
- Questions

SQL the blessing and the curse

- The blessing :
  SQL is extremely powerful and when logical correct, it will return an answer.

- The curse:
  SQL is extremely powerful and when logical correct, it will return an answer.
  (even if it almost takes forever)

A Basic SQL Statement

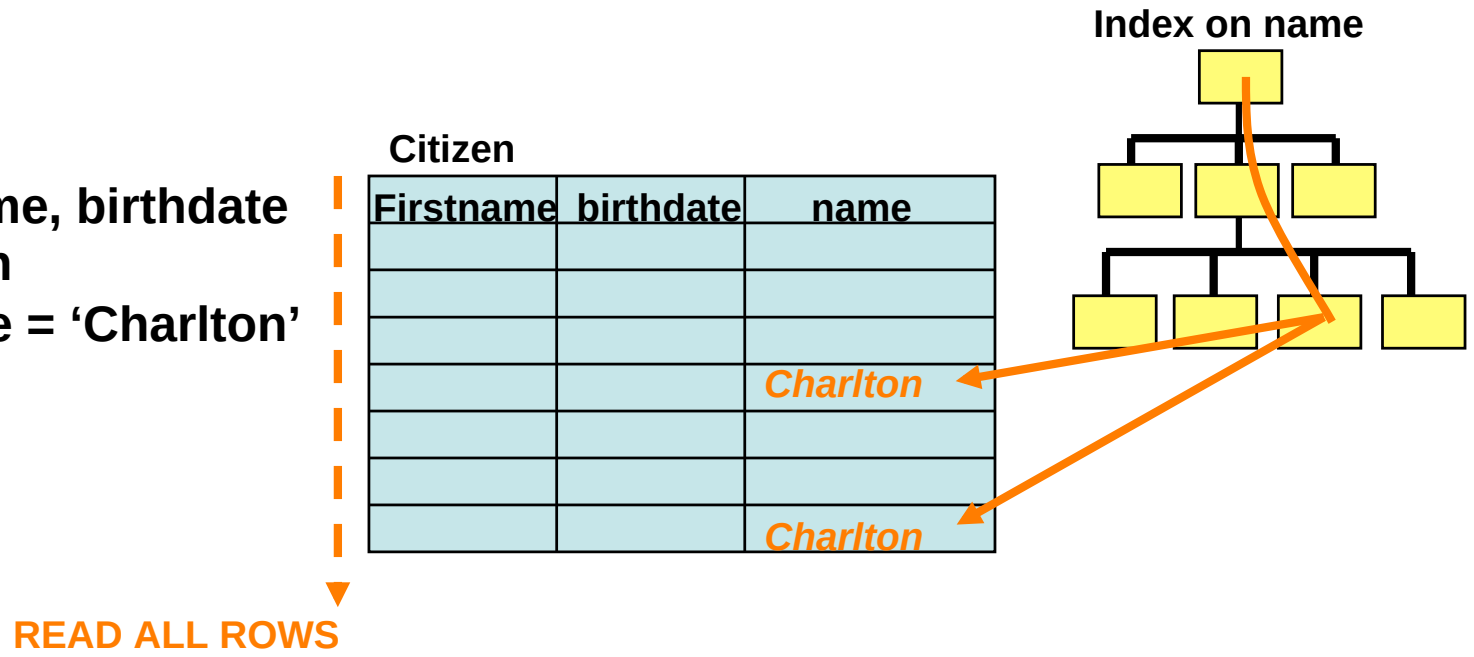
SELECT ➔ *wanted information*

FROM ➔ *table(s) containing info*

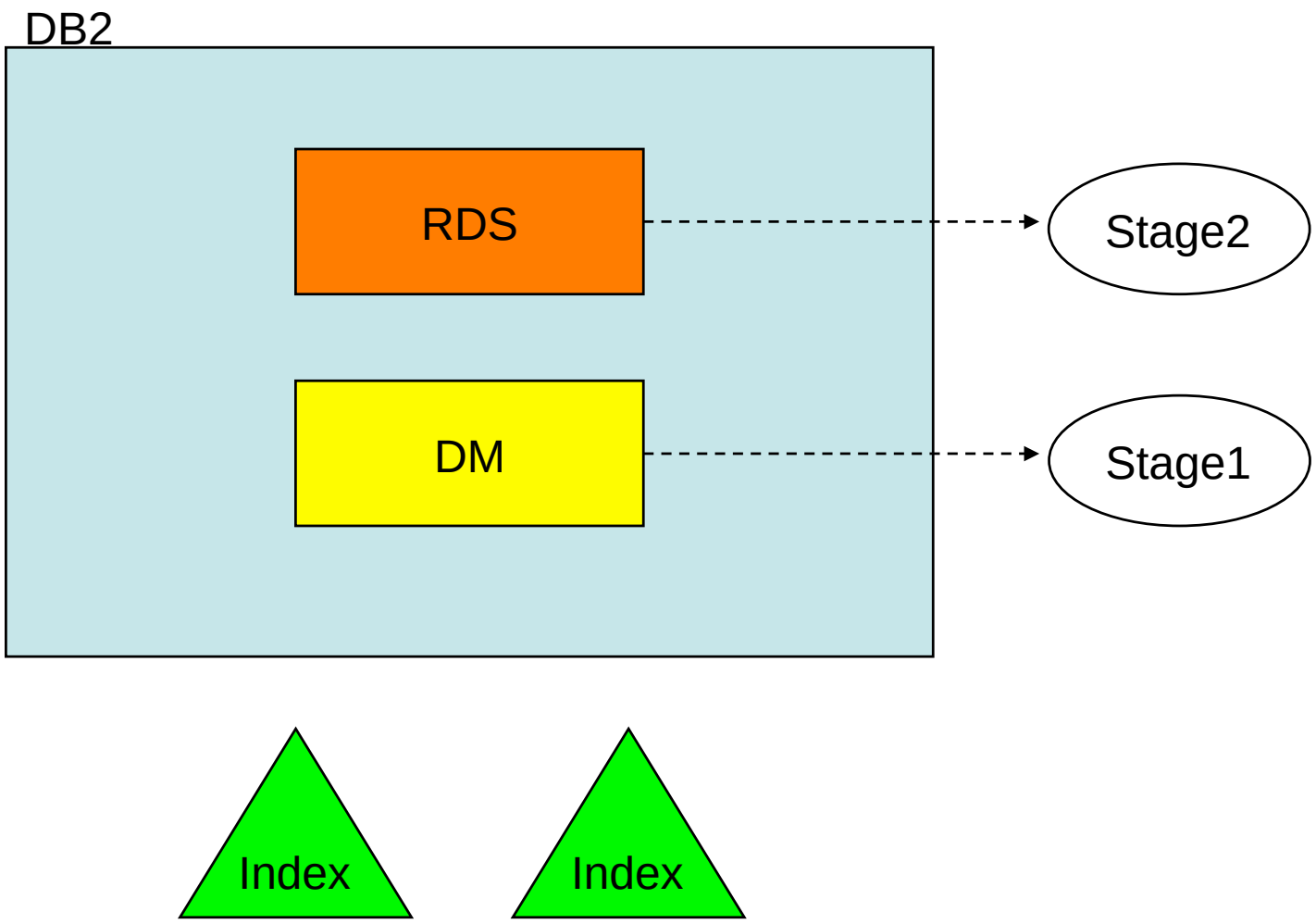
WHERE ➔ *the logical conditions*

Example:

Select Firstname, birthdate
from Citizen
where name = ‘Charlton’



Index, Stage1, Stage2



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Before situation

- No Time spend looking at SQL statements
  - Only elapsed problems handled

GOOD ENOUGH IS **NEVER GOOD ENOUGH**

  - Nobody taking charge of bad SQL

BAD PERFORMING SQL, **NOT MY PROBLEM**

Before situation

- No idea of processing cost in organization
  - processor time drives cost

KNOW WHAT DRIVES YOUR BILLING

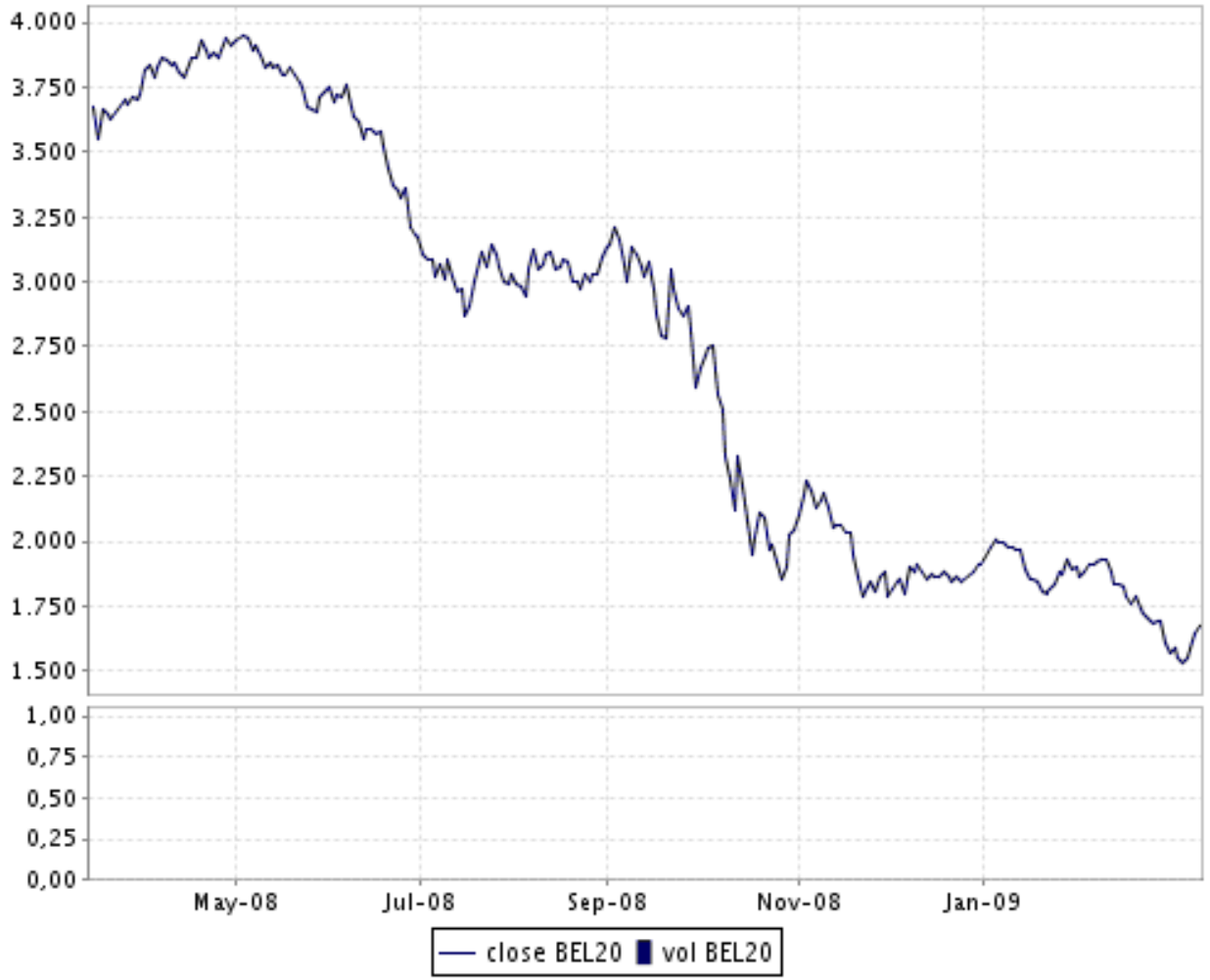
Before situation

- Release weekends hide substandard SQL
  - Small CPU increase not noticed
  - Difficult to identify problem query in program

BIG CHANGES LEAVE **BIGGER POTENTIALS**

Need To Reduce Cost

Financial Crisis hit



How?

- Defining current cost
  - Amount of service units/ MIPS
  - Identify “expensive” time frame
  - Cost of one MIPS per year
    - Customer1 pays 1000Euro/mips/year to outsourcer
    - Customer2 pays average 500Euro/mips/year
    - And you?
- Defining target
  - E.g. minimum 400 MIPS
- SQL taskforce (DBA and Developers)
  - 1 FTE (0,5 for each aka 100 man days)

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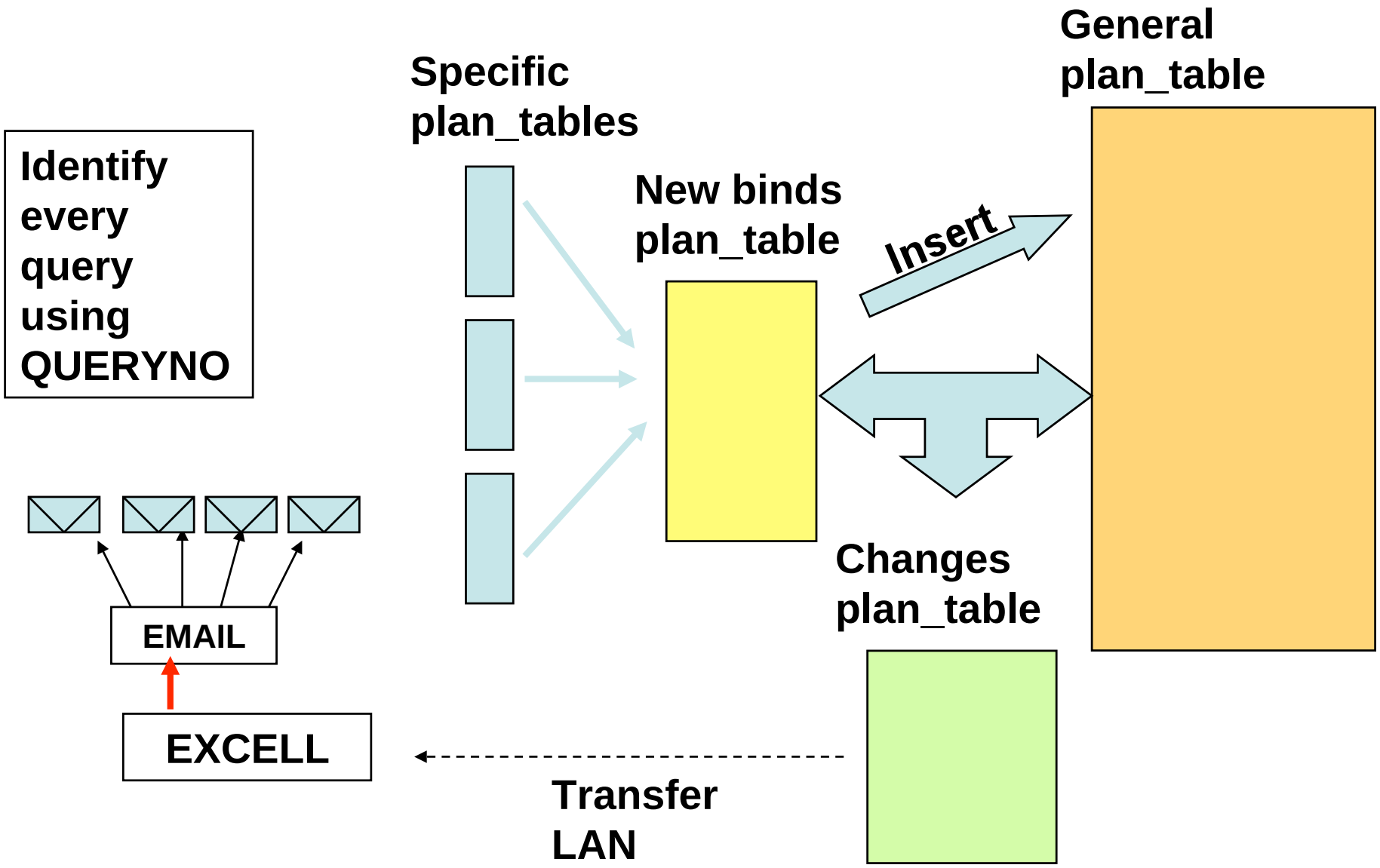
Access Path Follow Up

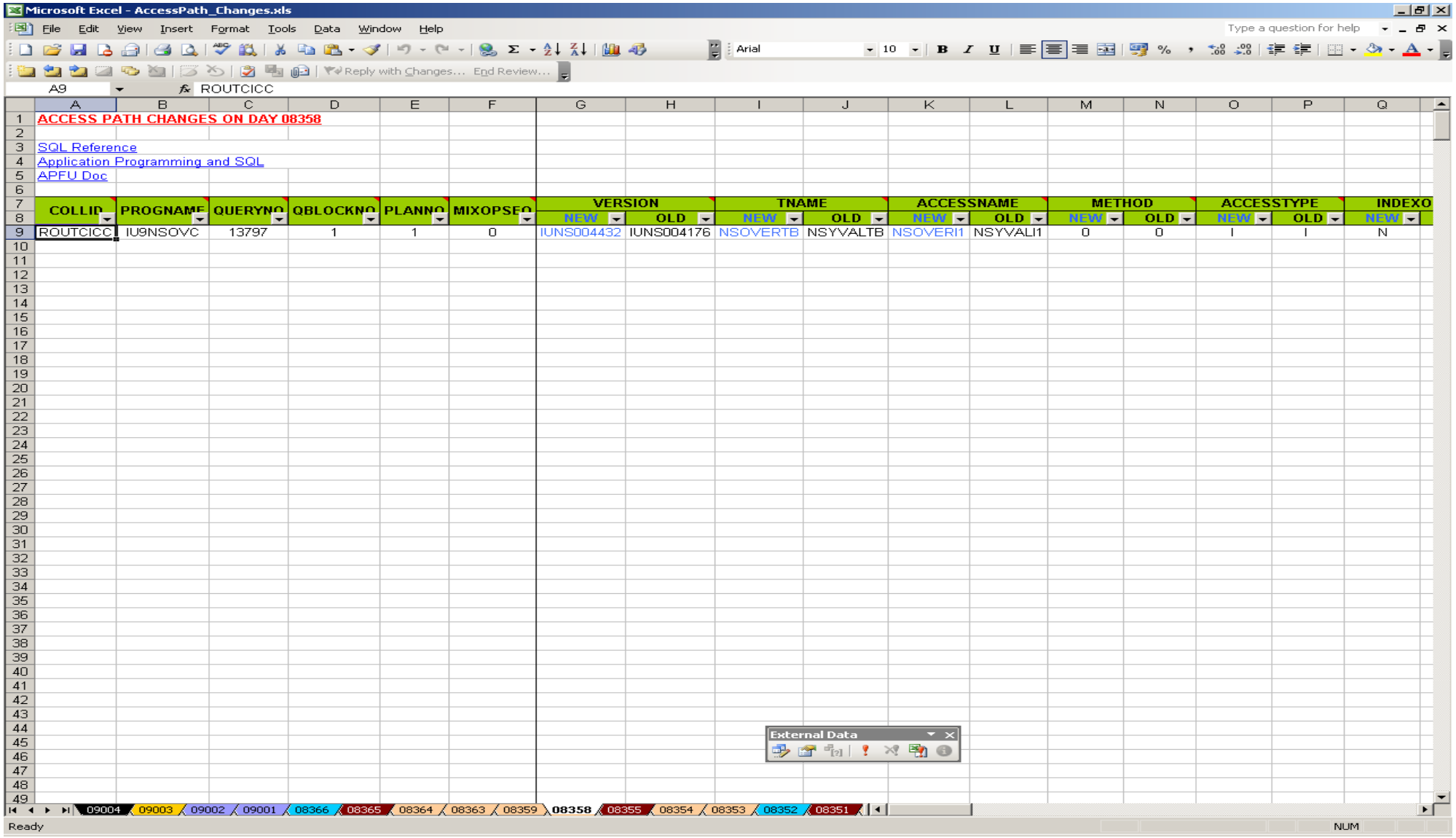
- Understand your current access paths
- Identify potential bad access paths
- Be alert when access paths change in production or even before

- Helps with following problems :
  - “good enoughs”
  - Nobody taking charge
  - Release weekend: Small CPU increases
  - Release weekend: Identifying problem Query

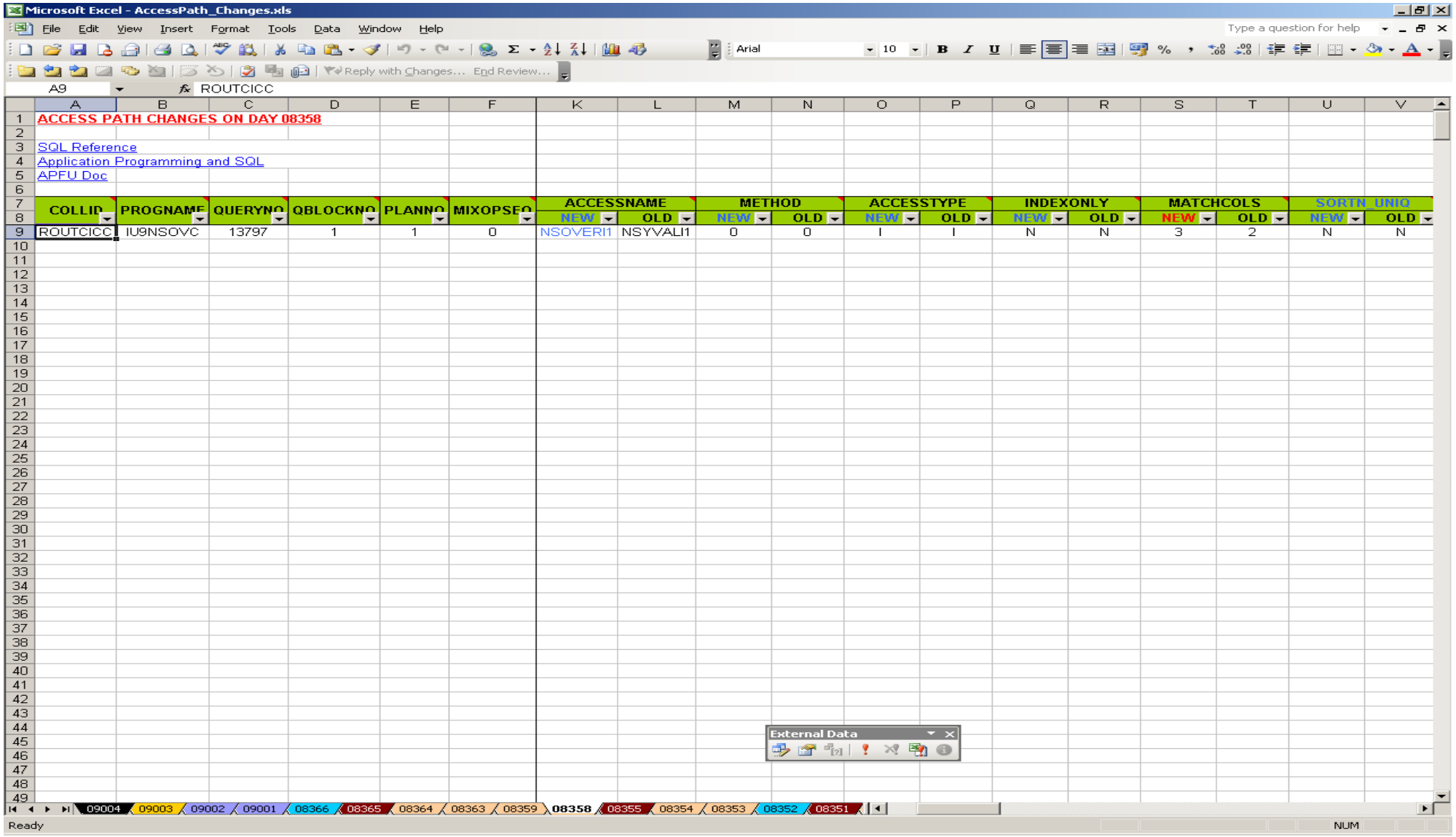
Access Path Follow Up



Access Path Follow Up



Access Path Follow Up



Access path : cost columns

COST_CATEGORY		PROCMS		PROCSU	
NEW	OLD	NEW	OLD	NEW	OLD
A	A	15	1	235	6

- **COST_CATEGORY:**
  - **A: Indicates that DB2 had enough information to make a cost estimate without using default values.**
  - **B: Indicates that some condition exists for which DB2 was forced to use default values.**
- **PROCMS: The estimated processor cost, in milliseconds, for the SQL statement**
- **PROCSU: The estimated processor cost, in service units, for the SQL statement**

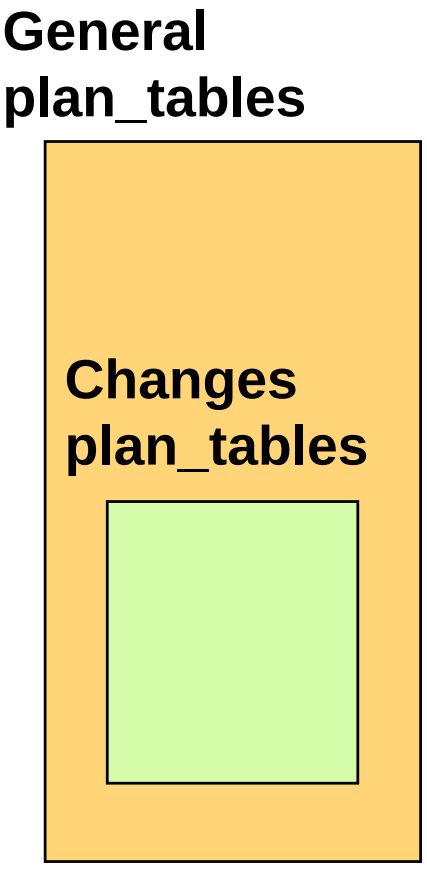
Access Path Follow Up

Use information to predict impact

- Detect access path changes early on
- If new cost higher in pre-prod, look at execution numbers in production

Detect problem SQL, instantly after release weekend

- Application ran fine, after release weekend performance problems ➔ only look at changed access paths



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Developer Training

TRAIN YOUR **DEVELOPMENT** PEOPLE

Developer Training

- 2,5 hour sessions **obligated** for all developers (150 developers = 47md)
- Explain the cost of SQL
  - Provide practical examples of sub standard SQL and their improvements
  - Introduce new CPU reducing features: e.g. Multi Row Fetch
- Explain CPU cost of company
  - Make developers aware of the money they can save !

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Actively Chase MIPS

- Identifying Big DB2 CPU spenders
  - Absolute big spenders
    Big spenders have big potential, even if the seperate statements seem cheap.
  - Big spenders per SQL
    Investigate why that expensive :
    - » Bad access path
    - » Wrong cluster sequence
    - » Wrong table design : e.g. insert
  - Place daily information in tables

Actively Chase Mips

- Identify frequently executed packages
  - Potential big impact when small changes
  - Calculate impact potential in a pre-prod environment

ANYTHING TIMES 20.000.000 IS A LOT

Actively Chase Mips

Shoot down bad access paths during release weekend

DON’T WAIT TILL MONDAY MORNING

Actively Chase Mips

Checking and blocking bad SQL code

- Automated basic SQL rules checking

Actively Chase Mips

Know what happens on your system,
during your expen$ive window

Know what you pay for !

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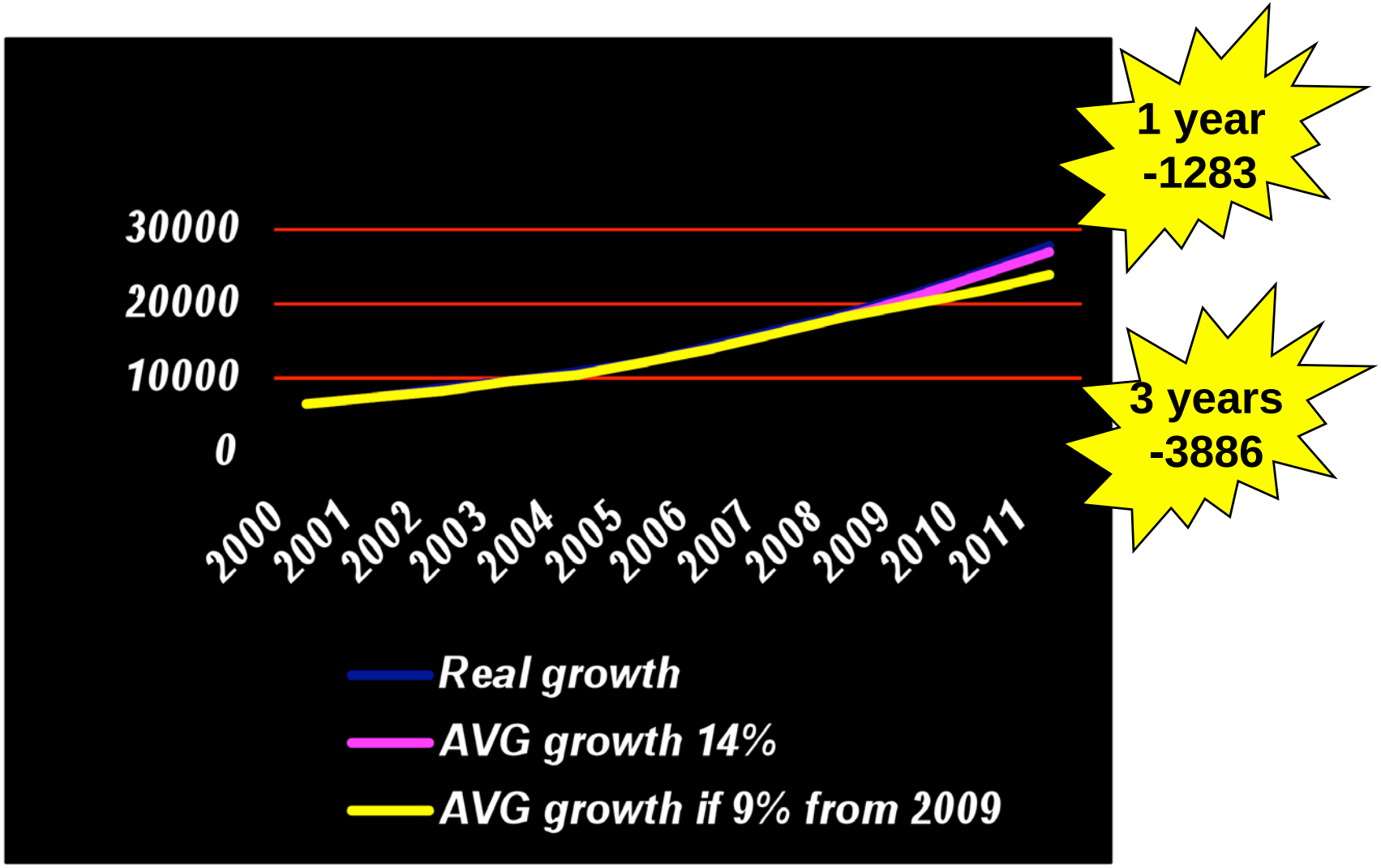
Return On Investment

- Access Path Follow Up
  - – Cost 40 md at 700€ - 28.000€
  - – Follow up 20 md/year - 14.000€
  - – 250 Saved MIPS at 500€ 125.000€
  - – Profit after FIRST YEAR **83.000€**

PROFIT second YEAR **111.000€**

Return On Investment



Return On Investment

- Developer Training
  - Course 47 md at 650€ -30.550€
  - 4 days consultancy 1000€ - 4.000€

  - 3% benefit = 600 MIPS @ 500/year 300.000€

  - Profit after FIRST YEAR **265.450€**

- 3% benefit after third year	**1.098.990€**

Return On Investment

- Actively chasing MIPS (ongoing)
  - 100 md dev at 650€ -65.000€
  - 90 md consultant at 700€ -63.000€

  First 15days
  - Insert CICS
    150 MIPS at 500/year 75.000€
  - Rewrite “diabolical” online query
    12 steps→3 steps 90 MIPS 45.000€

  - Almost break even after 15days **-8.000€**

Return On Investment

- Actively chasing MIPS (continued)
  - Almost break even after 15days **-8.000€**

  “Know what you pay for”
  - Replanify maintenance jobs
    150 MIPS at 500/year 75.000€
  - Tune running batch
    250 MIPS at 500/year 125.000€

  - Profit after 1,5 month **192.000€**

Return On Investment

- Conclusion:

  It pays to invest in SQL tuning!

  ➔ train your developers
  ➔ know your access paths
  ➔ know big spenders/frequent spenders
  ➔ know your processor cost
  ➔ good response times
  doesn’t mean all is well !

Questions ?

Kurt.struyf@cp.be

Senior Consultant
competence partners
www.cp.be