# Method-based Problem Diagnosis
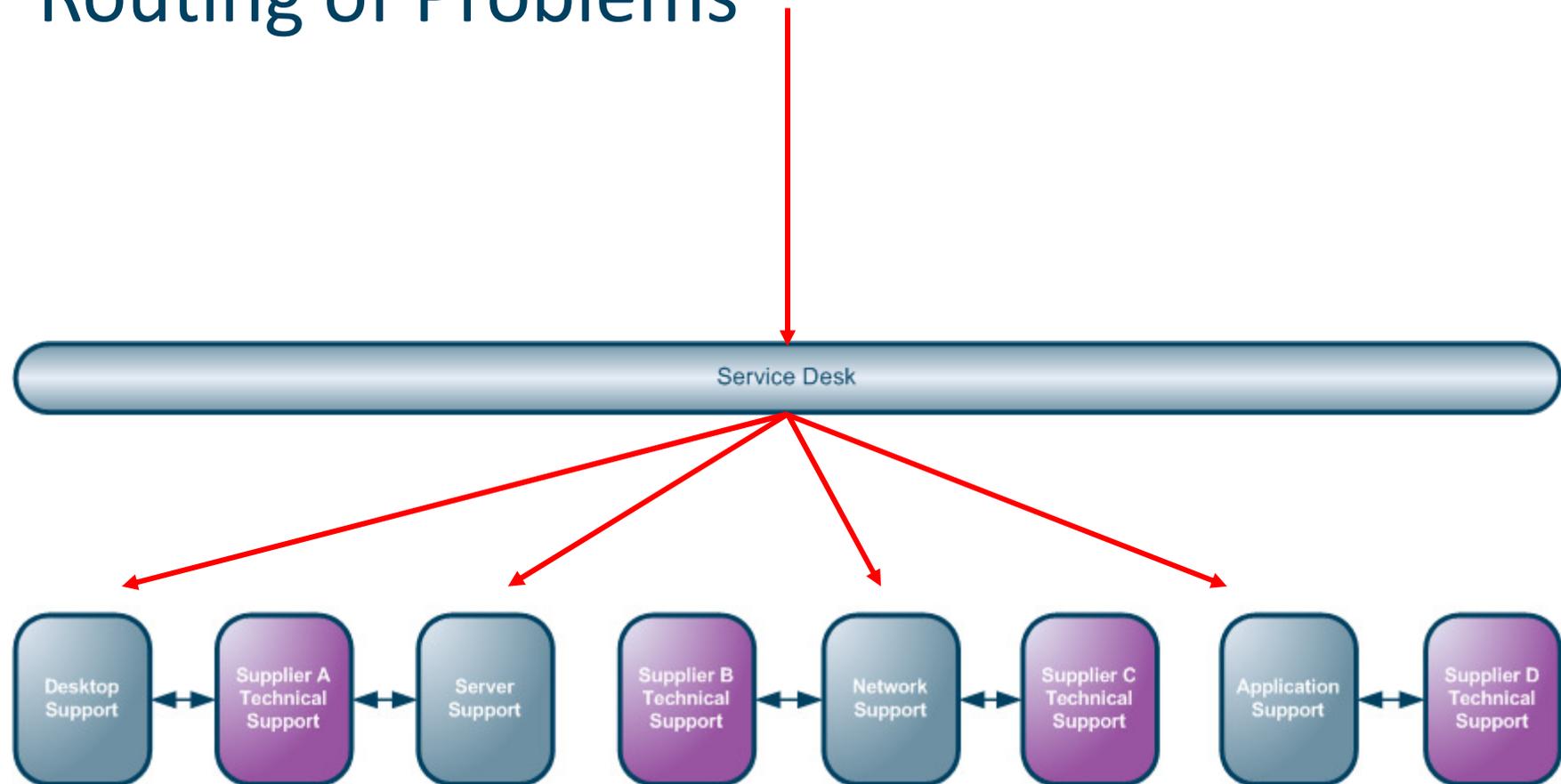
Presented by:

Paul Offord FBCS CITP

Development Director, Advance7

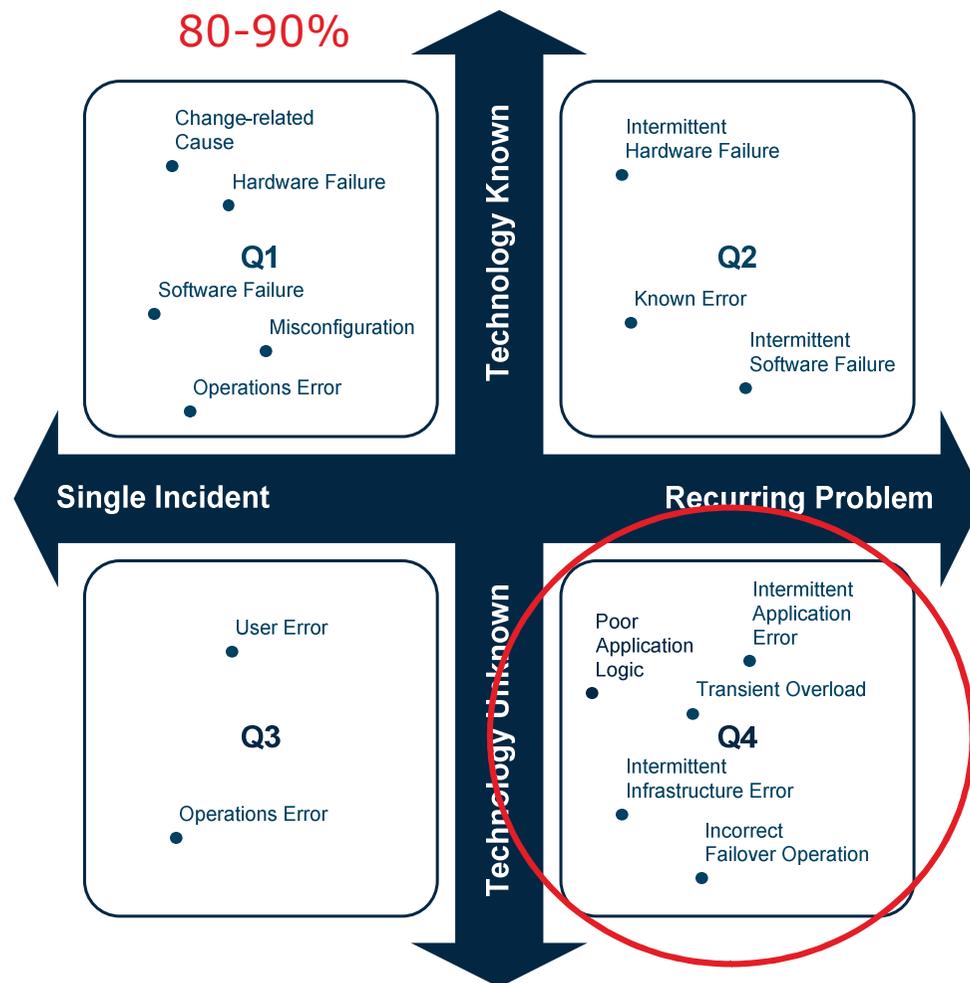Chair of the itSMF Problem Management SIG

# Agenda

- What's the issue?

- What is everyone else doing?

- Does ITIL or COBIT help?

- RPR – an IT-specific diagnosis method

- Case studies

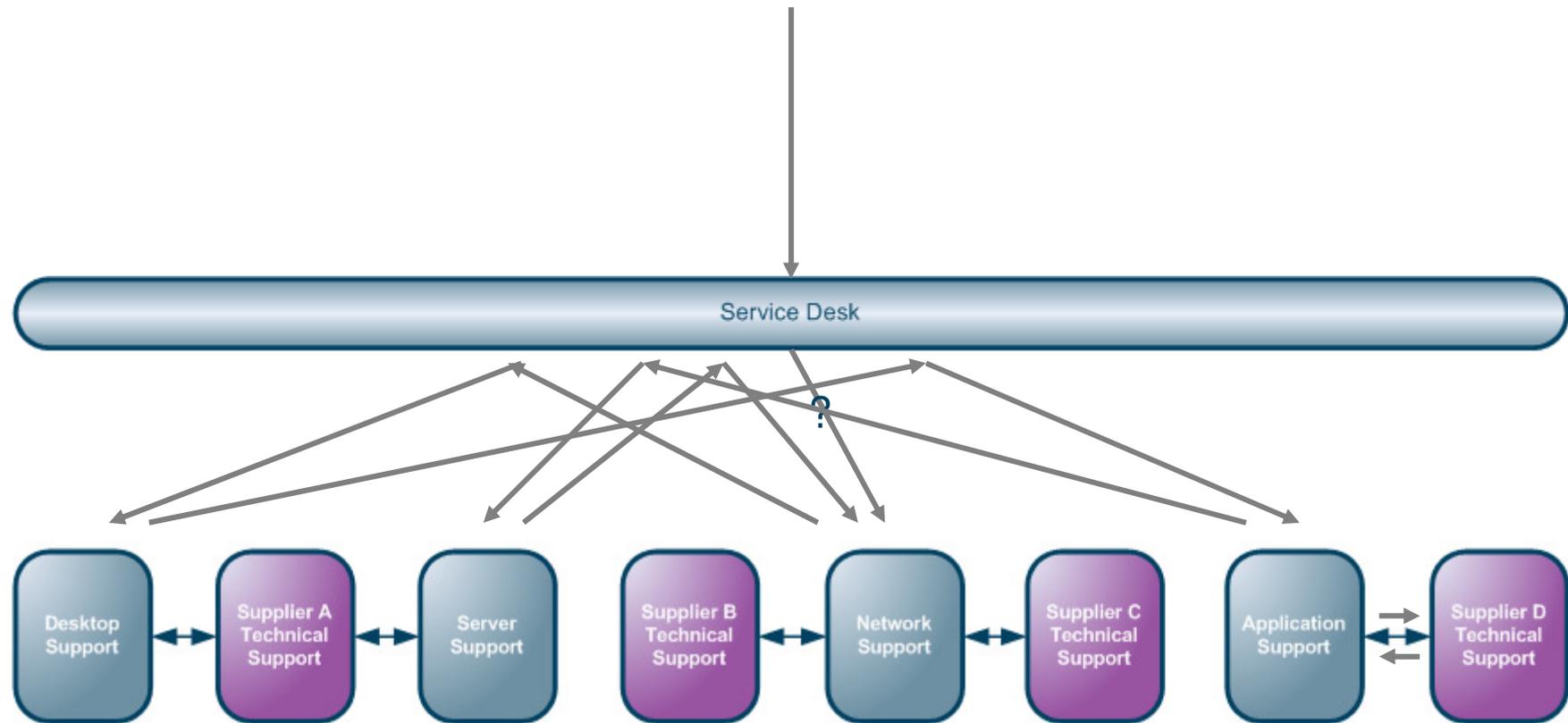- Other methods

# Routing of Problems

# Grey Problems



80-90%

**Technology Known**

**Technology Unknown**

**Single Incident**

**Recurring Problem**

**Q1**
- Change-related Cause
- Hardware Failure
- Software Failure
- Misconfiguration
- Operations Error

**Q2**
- Intermittent Hardware Failure
- Known Error
- Intermittent Software Failure

**Q3**
- User Error
- Operations Error

**Q4**
- Poor Application Logic
- Intermittent Application Error
- Transient Overload
- Intermittent Infrastructure Error
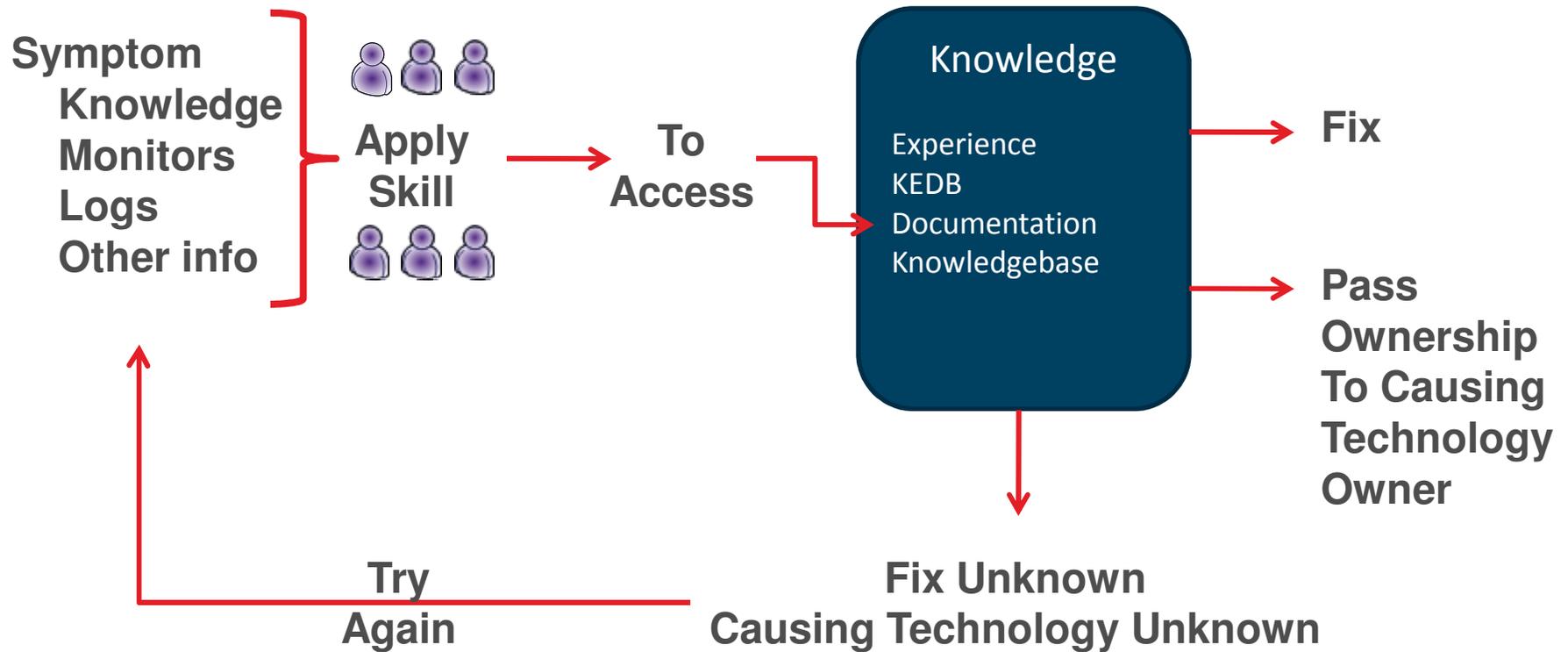- Incorrect Failover Operation

Grey problems:

- Bounce between technical support teams

- Productivity hit + Loss of sales + High IT workload = High cost

- Lack of method = Slow progress

# Handling Grey Problems

# IT Problem Solving

**Symptom**
**Knowledge**
**Monitors**
**Logs**
**Other info**

**Apply**
**Skill**

**To**
**Access**

**Knowledge**

Experience
KEDB
Documentation
Knowledgebase

**Fix**

**Pass**
**Ownership**
**To Causing**
**Technology**
**Owner**

**Try**
**Again**

**Fix Unknown**
**Causing Technology Unknown**
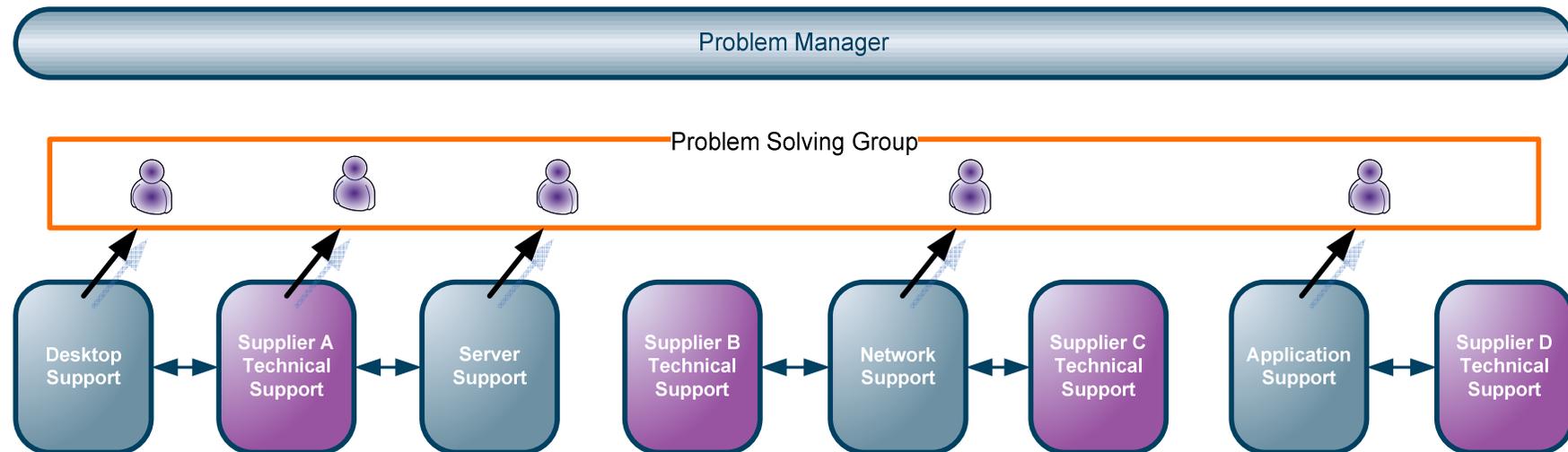
# Typical Activity

- Brainstorm -> Limited use for unusual problems

- Theorise then Make a Change -> Risky

- Perform a Health Check -> Slow & unreliable

- Theorise then Upgrade -> Slow & costly

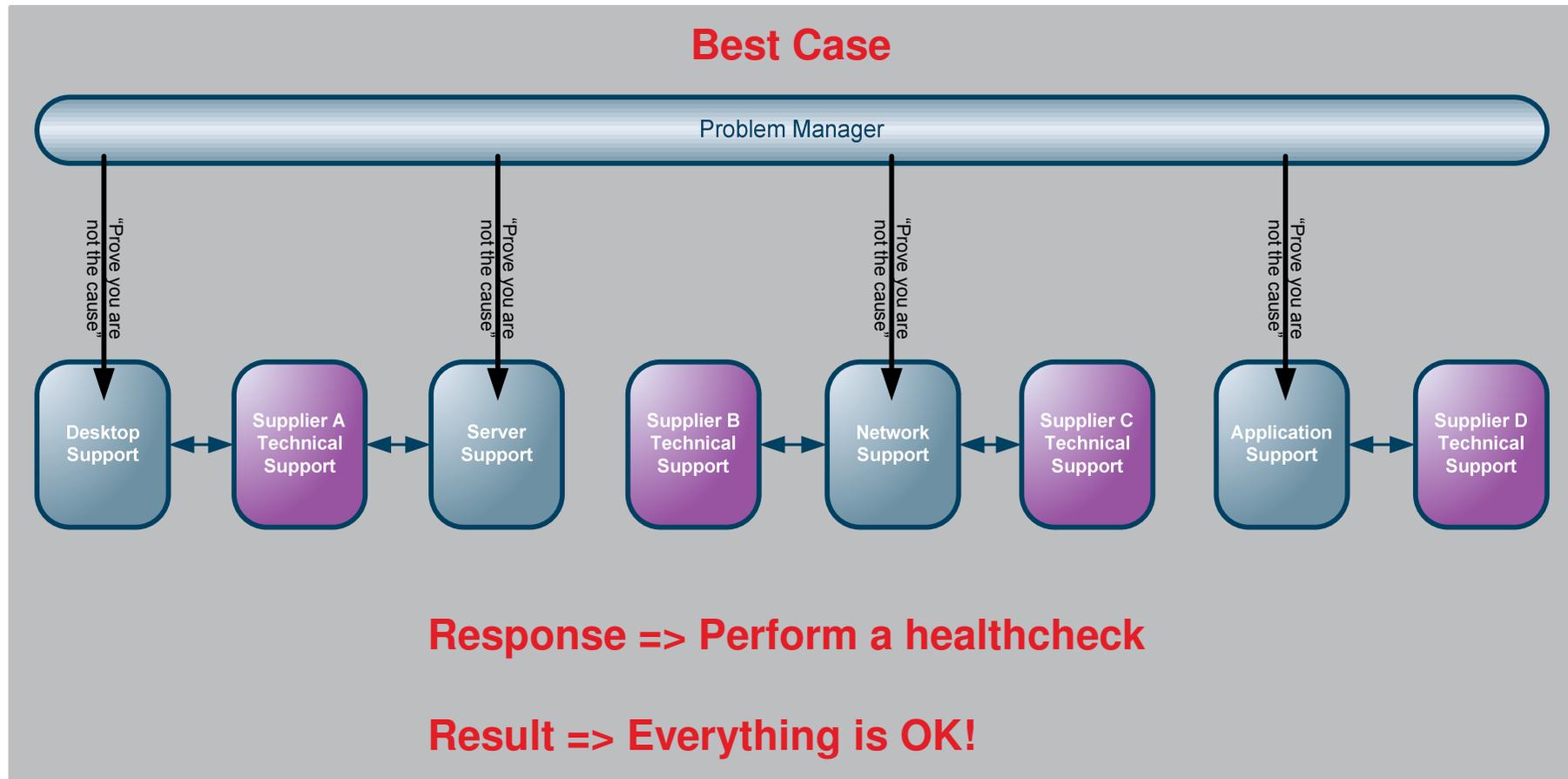- Put on the "too difficult to deal with" pile

# ITIL Solution to Recurring Problems



Problem Manager

Problem Solving Group

| Desktop Support | Supplier A Technical Support | Server Support | Supplier B Technical Support | Network Support | Supplier C Technical Support | Application Support | Supplier D Technical Support |

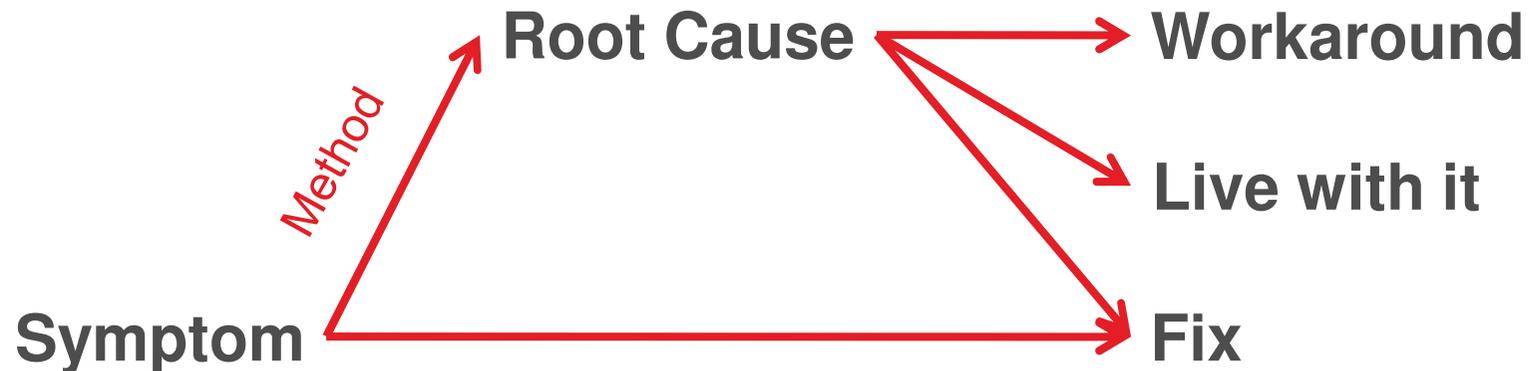*"The actual solving of problems is likely to be undertaken by one or more technical support groups and/or suppliers or support contractors under the coordination of the Problem Manager."*

# "ITIL" Reality

**Worst Case => No coordination, left to bounce between teams**

**Best Case**

Problem Manager

"Prove you are not the cause"

"Prove you are not the cause"

"Prove you are not the cause"

"Prove you are not the cause"

| Desktop Support | ↔ | Supplier A Technical Support | ↔ | Server Support |  | Supplier B Technical Support | ↔ | Network Support | ↔ | Supplier C Technical Support |  | Application Support | ↔ | Supplier D Technical Support |

**Response => Perform a healthcheck**

**Result => Everything is OK!**

# Changing Tack

Root Cause → Workaround

Method

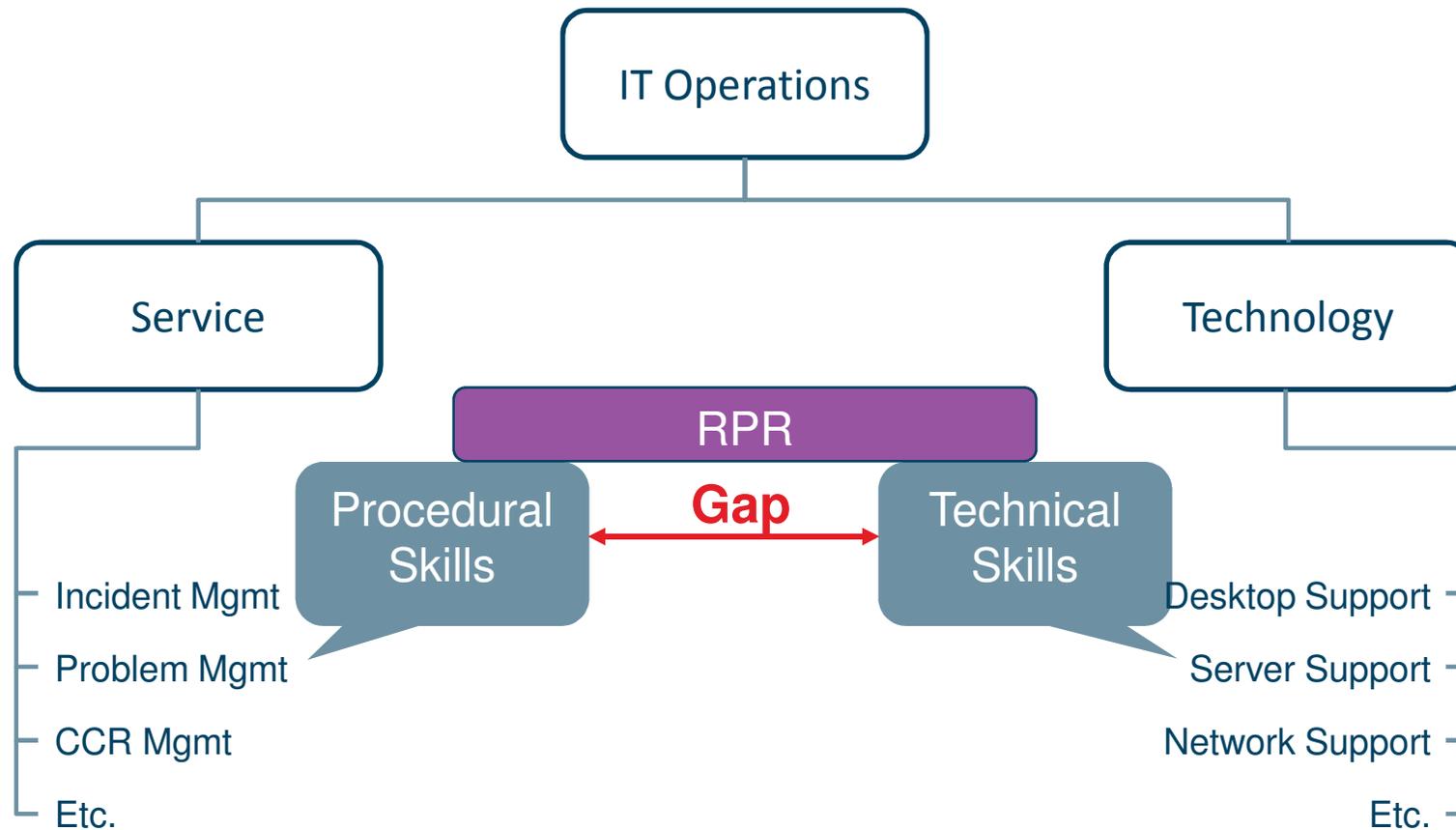Root Cause → Live with it

Symptom → Fix

Root Cause → Fix

**When to switch:**

**"We're just going to try one more thing"**
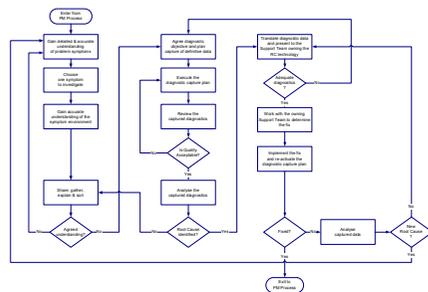
**"We made a change and it's improved a bit"**

# Bridging The Gap

# RPR – What to Do & How to Do It
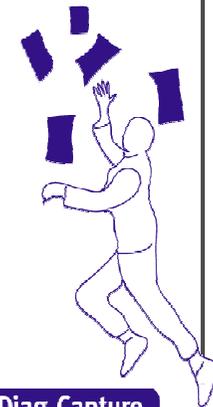


**Core Process**

- Discover
  - Gather & review existing information
  - Reach an agreed understanding

- Investigate
  - Create & execute a diagnostic plan
  - Analyse & iterate if necessary
  - Identify Root Cause

- Fix
  - Translate diagnostic data
  - Determine & implement fix
  - Confirm Root Cause addressed

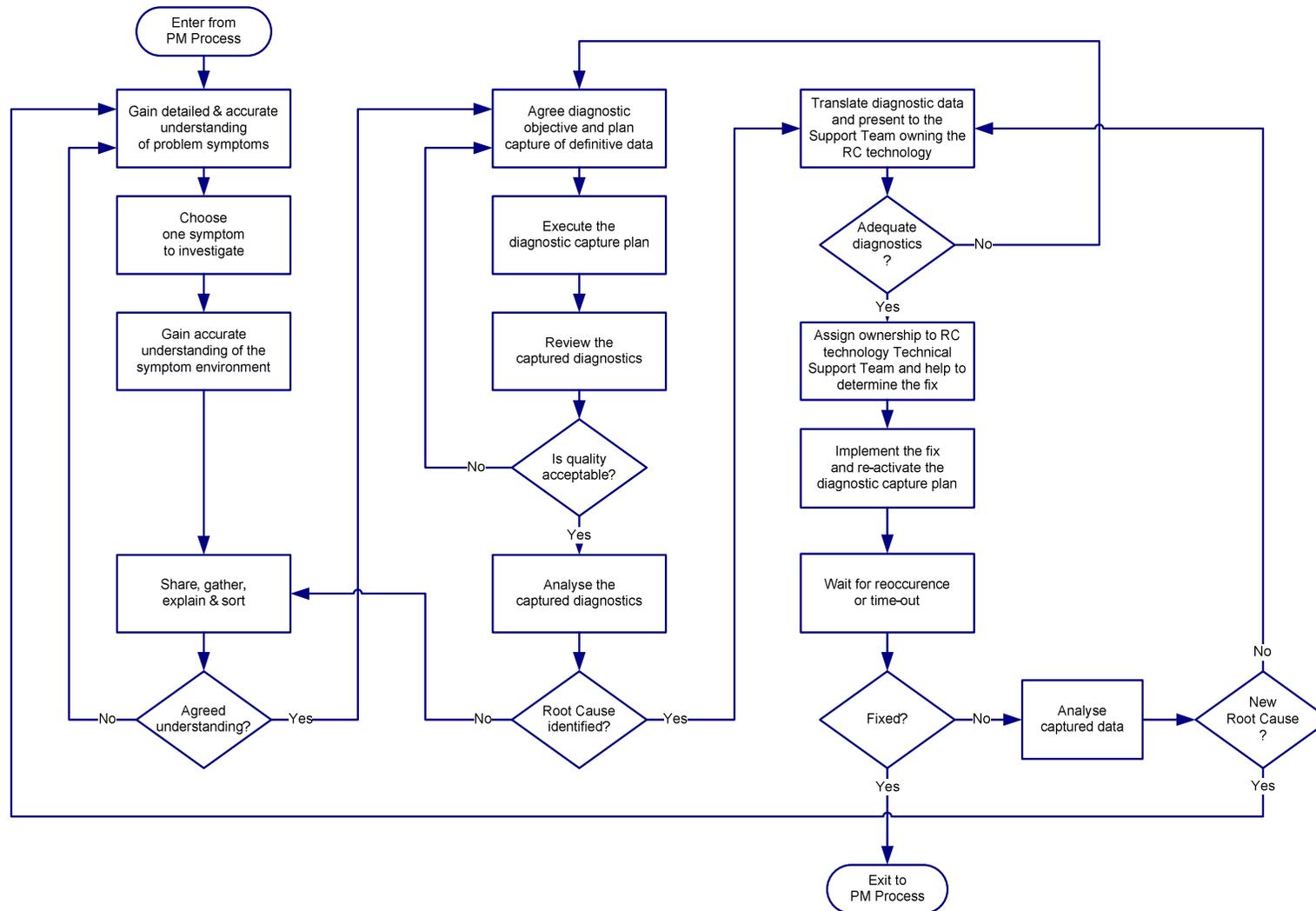**Supporting Techniques**

Initiation & Planning

Diag Capture

Analysis

Tools

# RPR Core Process

```
                    Enter from
                    PM Process

Gain detailed & accurate          Agree diagnostic              Translate diagnostic data
understanding                     objective and plan            and present to the
of problem symptoms               capture of definitive data    Support Team owning the
                                                                RC technology

Choose                            Execute the                   Adequate
one symptom                       diagnostic capture plan       diagnostics ?  ──No──
to investigate

Gain accurate                     Review the                    Yes
understanding of the              captured diagnostics          Assign ownership to RC
symptom environment                                            technology Technical
                                  Is quality                    Support Team and help to
                                  acceptable?  ──No             determine the fix

                                  Yes                           Implement the fix
Share, gather,                                                  and re-activate the
explain & sort                    Analyse the                   diagnostic capture plan
                                  captured diagnostics

                                                               Wait for reoccurence
                                                               or time-out

Agreed              ──Yes         Root Cause      ──Yes
understanding?                    identified?                   Fixed?  ──No──  Analyse      ──  New
──No                              ──No                          Yes            captured data     Root Cause ?
                                                                                                 No
                                                                                                 Yes

                                        Exit to
                                        PM Process
```

# ITIL Problem Mgmt Process Alignment
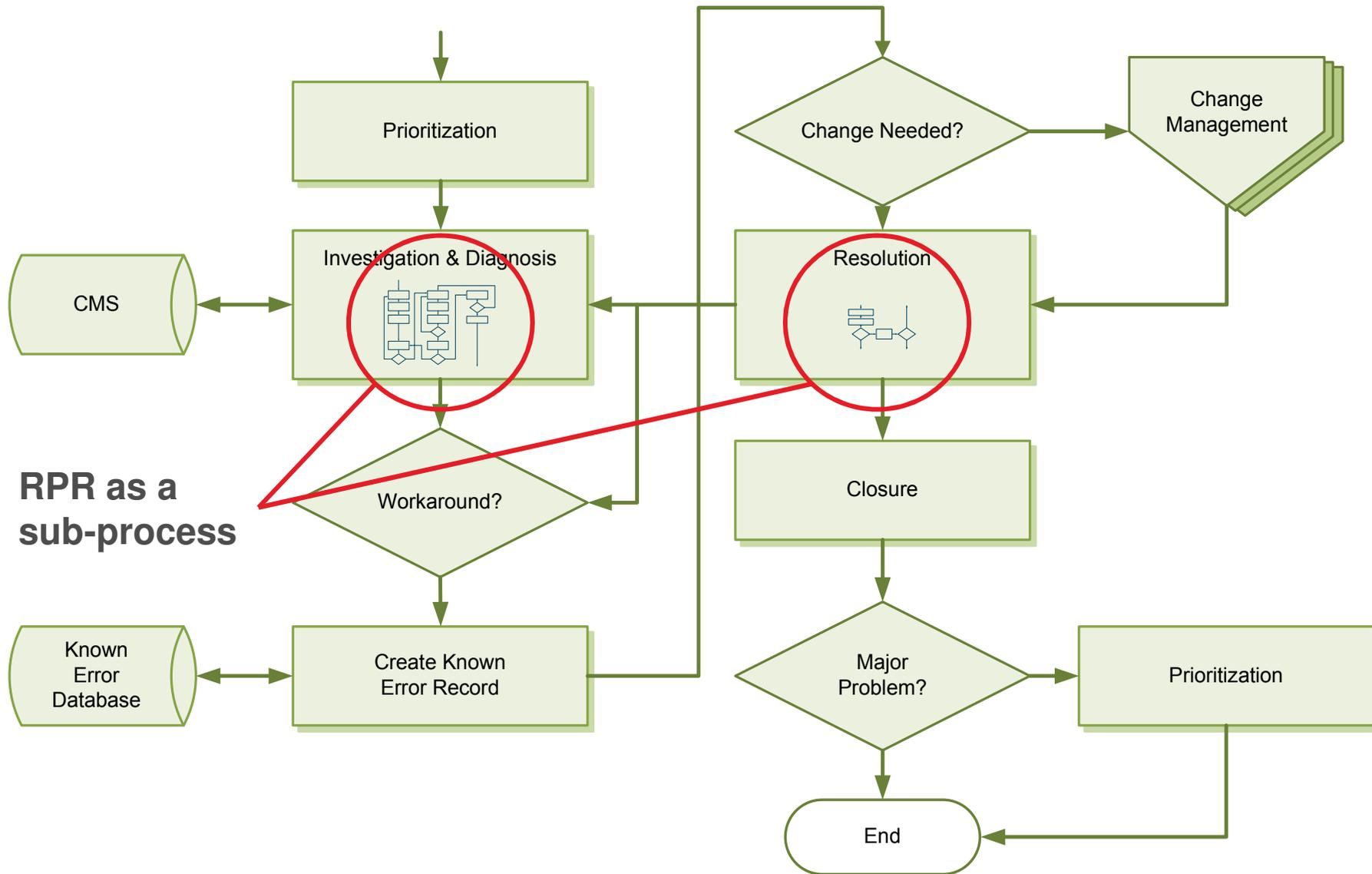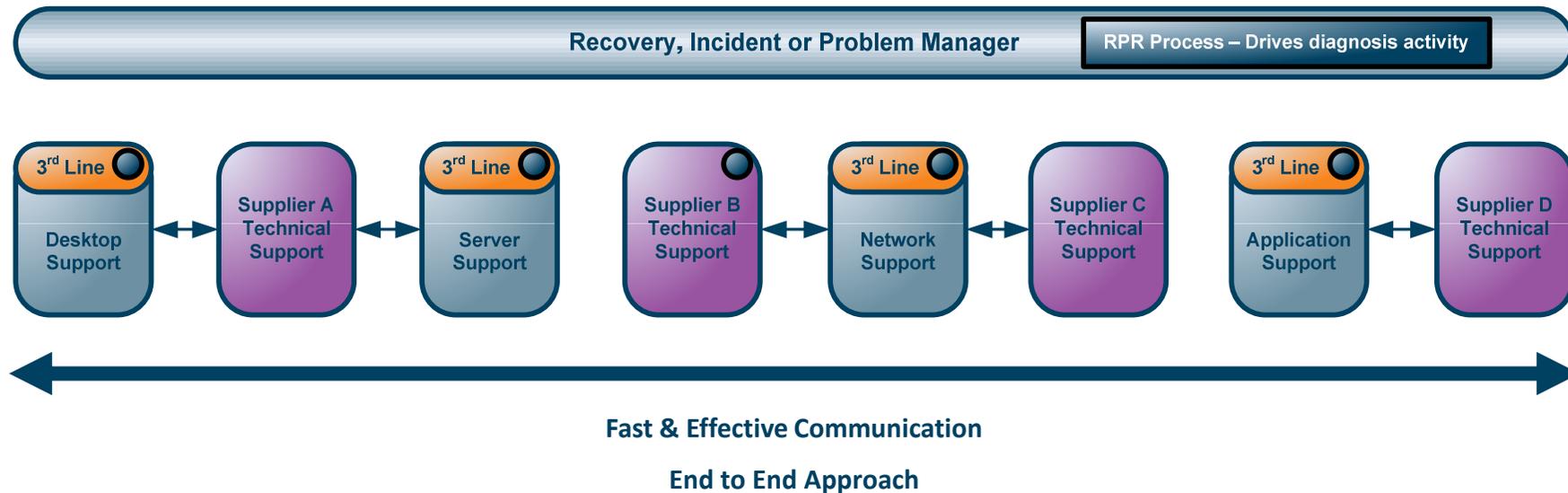


RPR as a
sub-process

# RPR Features & Benefits

- Process-based method
  - Controllable, repeatable & scalable

- Very reliable (99.6%)
  - Reduced IT support costs

- Fast – cuts fix time by up to 97%
  - Reduced downtime cost

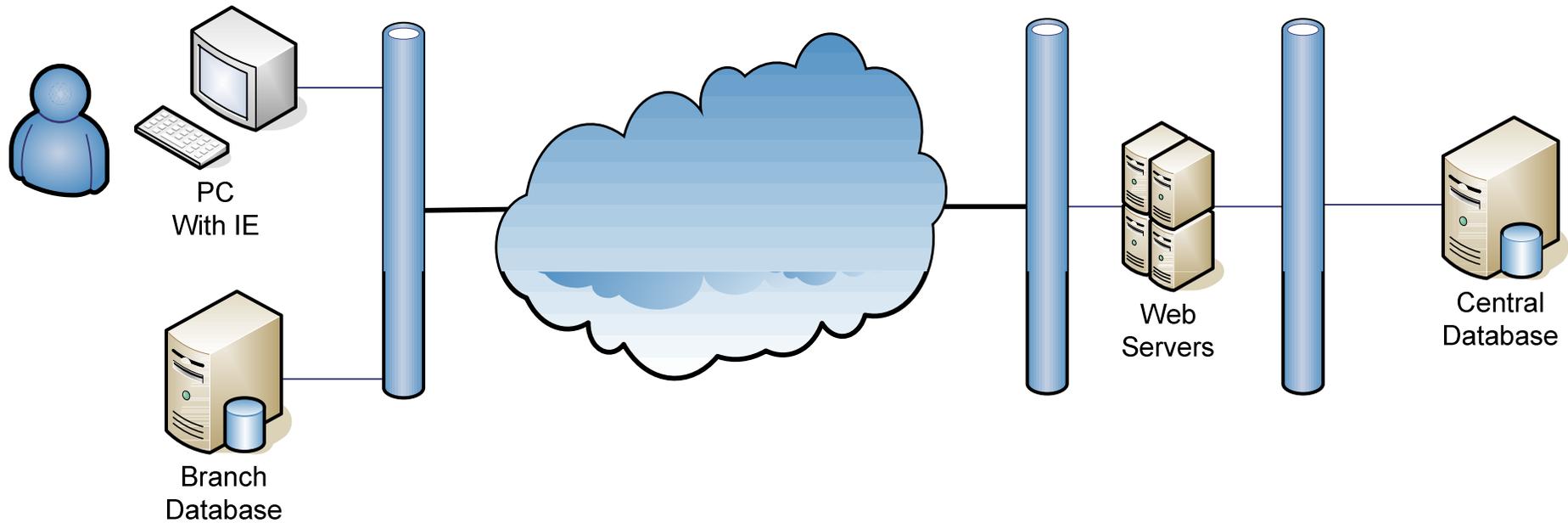- Evidence-based
  - Reduces wasted cap-ex

Reduces Support Staff Frazzle

# RPR Deployment



Recovery, Incident or Problem Manager | RPR Process – Drives diagnosis activity

| 3rd Line Desktop Support | Supplier A Technical Support | 3rd Line Server Support | Supplier B Technical Support | 3rd Line Network Support | Supplier C Technical Support | 3rd Line Application Support | Supplier D Technical Support |

**Fast & Effective Communication**

**End to End Approach**

RPR Supporting Techniques

# Case Study 1 - Leisure System



**"It's slow"**

# Finger Pointing

- Must be a network problem because other branch applications are slow

- Must be a database problem because we've had other similar problems

- It can't be a database problem because we've profiled all Stored Procedures

# Step 1 – Understand the problem

Click on Appointments in the menu bar it intermittently takes 10+ seconds to respond
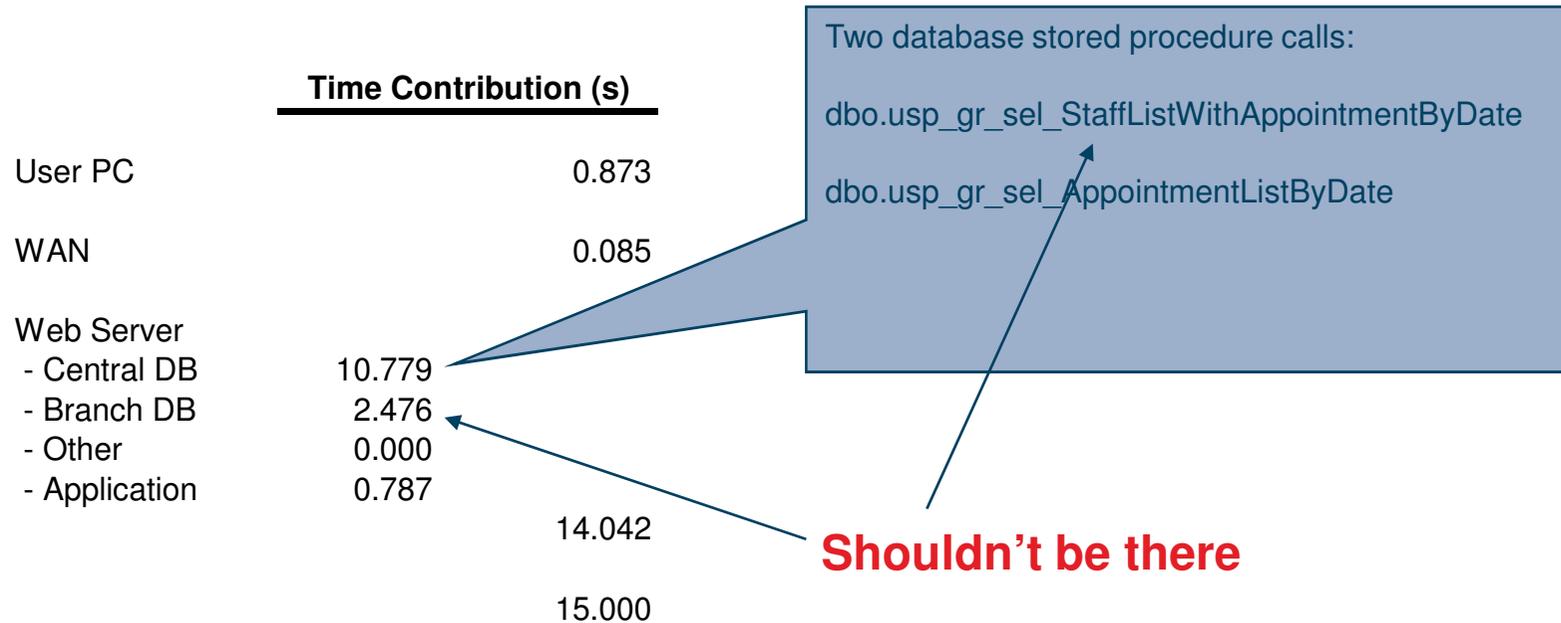
It should take less than 5 seconds

# Step 3 – Understand Environment



PC
With IE

Branch
Database

ADSL
WAN

Web
Servers

Central
Database

**Not used by Appointments transaction**
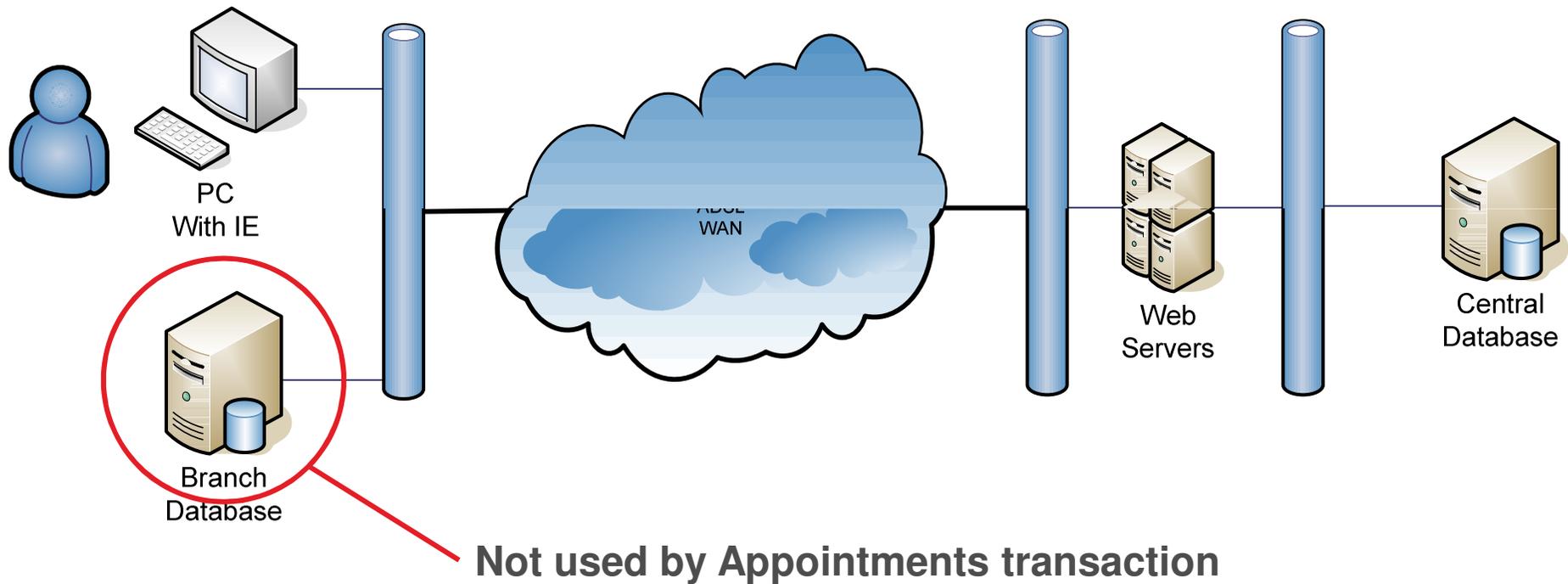
# Step 6 – Diag. Objective & Capture Plan
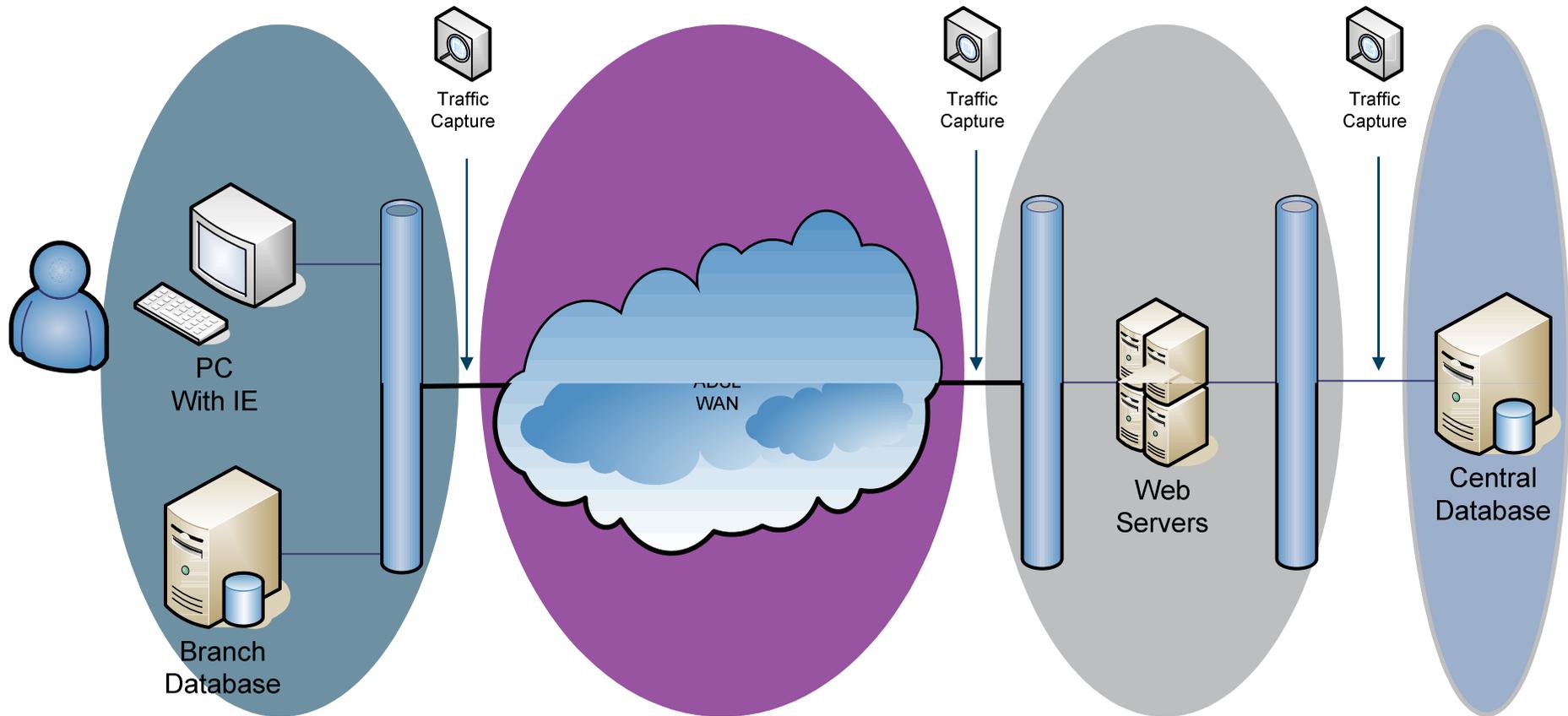


**Prove that the cause is or is not one of these**

# Step 10 – Analyse the diagnostics

advance7

**Time Contribution (s)**

| | |
|---|---|
| User PC | 0.873 |
| WAN | 0.085 |
| Web Server | |
| - Central DB | 10.779 |
| - Branch DB | 2.476 |
| - Other | 0.000 |
| - Application | 0.787 |
| | 14.042 |
| | 15.000 |

Two database stored procedure calls:

dbo.usp_gr_sel_StaffListWithAppointmentByDate

dbo.usp_gr_sel_AppointmentListByDate

**Shouldn't be there**

# Case Study 2 – Banking System

| Lost productivity cost | |
|---|---|
| Number of users impacted per incident | 20 |
| Number of incidents per day | 20 |
| Time lost | 10 mins (0.17 hours) |
| Total hours lost per day | 66.67 hours per day |
| Estimated loaded cost of admin staff | £10.23 per hour |
| Total cost per day | £682.03 |
| | |
| IT support recovery cost | |
| Number of resets per day | 20 resets per day |
| Time to reset | 5 mins |
| Total workload per day | 100 mins (1.67 hours) |
| Estimated loaded cost of IT support staff | £39 per hour |
| Total cost per day | £65.13 |
| | |
| Grand total per day | £747.16 |

**Without RPR:**

- Problem Duration => 12 months

- Total Cost => £272,219

**With RPR:**

- RC determined in 9.2 days

- Approx IT support cost => £800

- Potential savings => £263,939*

* Based on switching to RPR after 10 days of investigation

# Case Study 3 – Banking System

- RPR Proof of Concept project

- Corporate client system

- Slow production of reports

- Very high profile => 10,000 users impacted

- Problem duration => 3 months

- 24 man hours / day on conference calls alone

- 360 man days effort
  - Our client says this is conservative

- Server upgrade proposed

# Case Study 3 – Banking System

- Used RPR to determine RC in 17.5 man days

- Server upgrade would not solve it

- Direct evidence provided of IIS issue

- Being pursued with Microsoft

# Recurring Problem Types
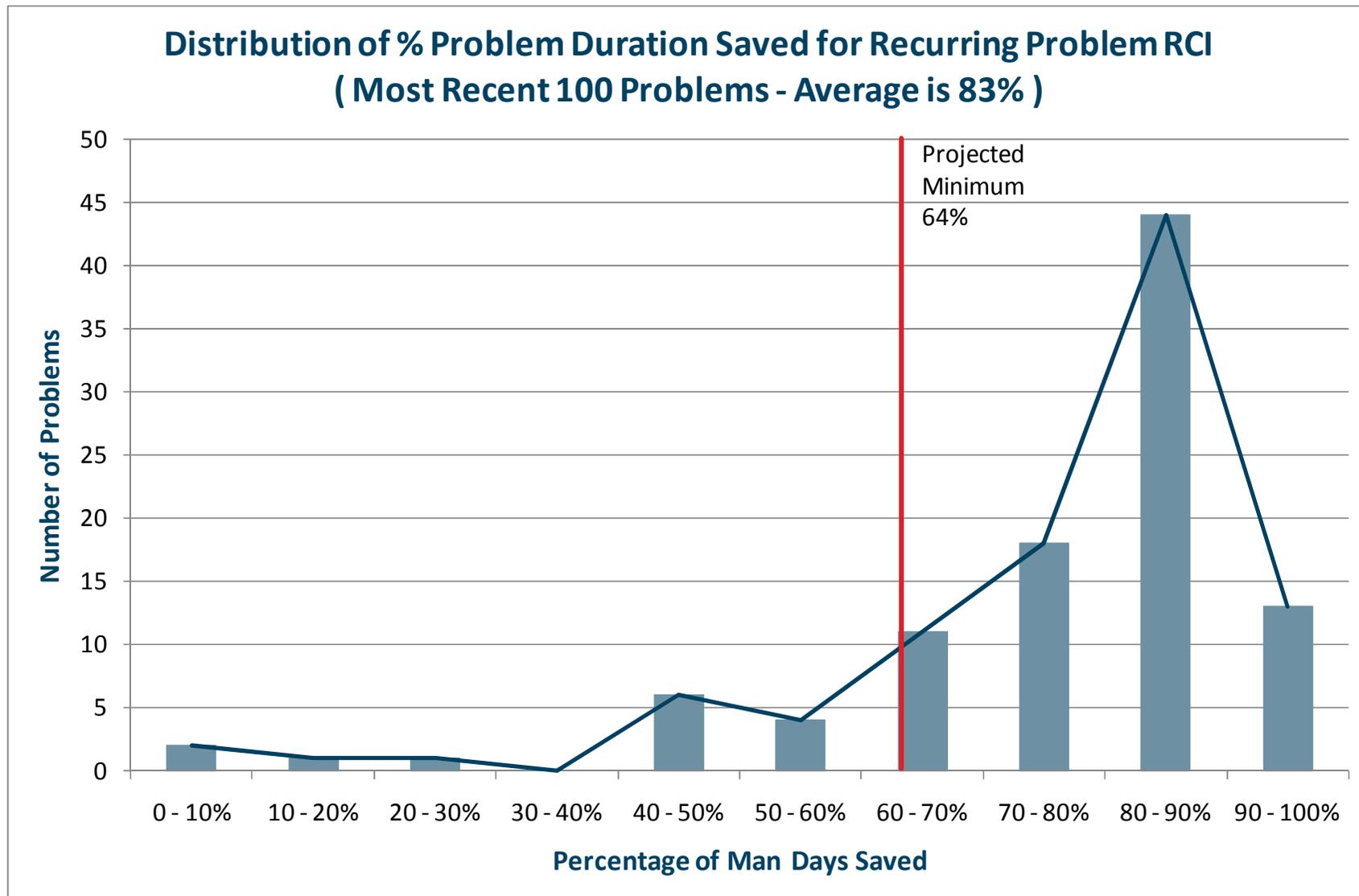## ( Most Recent 100 Problems )



Error
26%

Incorrect Output
2%

Other
1%

Performance
71%
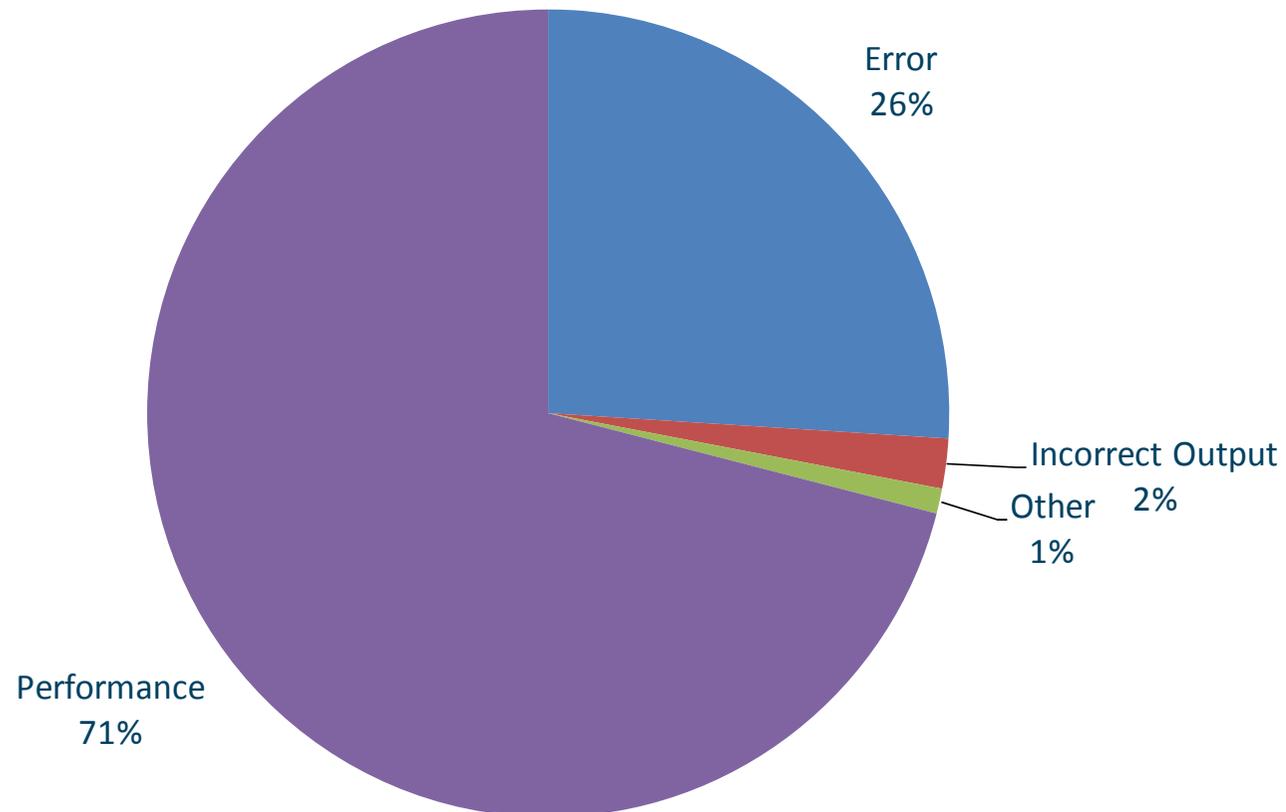
Recurring Problem Resolution
( Most Recent 100 Problems - All Problem Type )
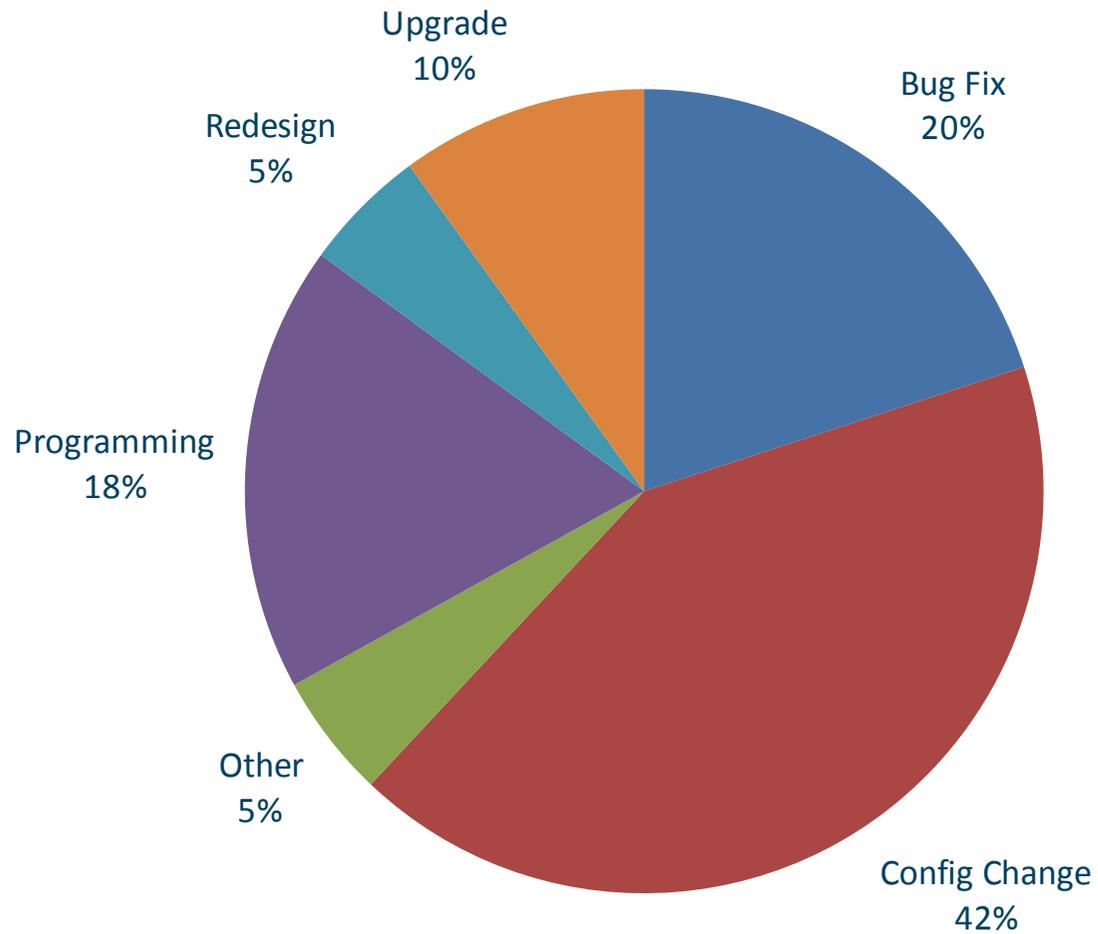
Distribution of % IT Workload Saved for Recurring Problem RCI
( Most Recent 100 Problems - Average is 69% )

Distribution of % Problem Duration Saved for Recurring Problem RCI
( Most Recent 100 Problems - Average is 83% )
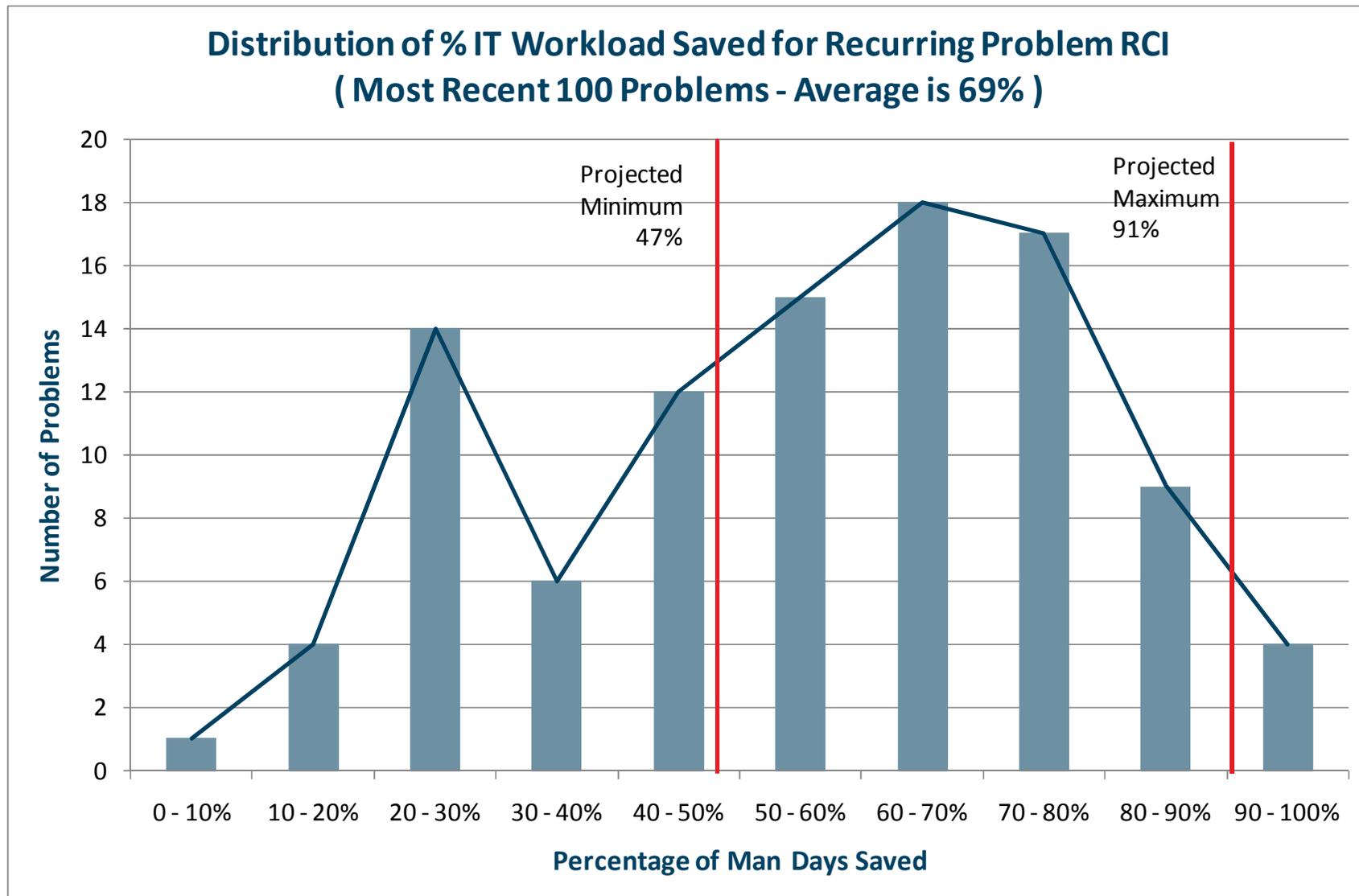
# Other Methods

**RCA & Pattern-based Methods**

- Structured analysis of past problems
  +Good use of historic data

- Includes non-technical RCs
  + Environmental
  + Organisational
  + Commercial / contractual
  + Other

**RPR**

- Completely evidence based
  + Very reliable

- Includes what to do & how
  + Fast

- Uses IT standard techniques
  + Easily integrated into support

- Process-driven
  + Better management and control

**Better suited to:
historic / forensic analysis,
non-technical issues and
prevention of similar problems**

**Better suited to
determining the Root Cause of
ongoing & recurring problems**

# Thank You

# Questions?