

# KT Structured Problem Solving

A Rational Approach for Improving Performance

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# Agenda

- Session Overview
- The Structure of a Problem
- Six-Step Problem Solving Process

# Session Overview

By the end of this session , you will be able to:

- Define a problem
- Use a structured approach to:
  - Specify an expected level of performance not being achieved (variation)
  - Identify causes of unacceptable performance

# Cause and Effect Thinking

- Something has gone wrong without explanation
- Relating effect (Symptom) to underlying cause
- Asking key questions to get to the 'why'
- Tools
  - Problem Analysis
  - 5 whys
  - FMEA (Potential Problems)

# What is Problem Analysis?

- A set of skills and tools used to explain any situation in which
  - an expected level of performance is not being achieved (variation)
  - the cause of the unacceptable performance is unknown.
- The way in which information is used to address deviations in performance

# Critical Thinking Skills

- Cause and Effect Thinking
  - The “Solved Problem” that isn’t
- The Criteria That Define A Problem
  - The importance of specifications

# The Structure of a Problem

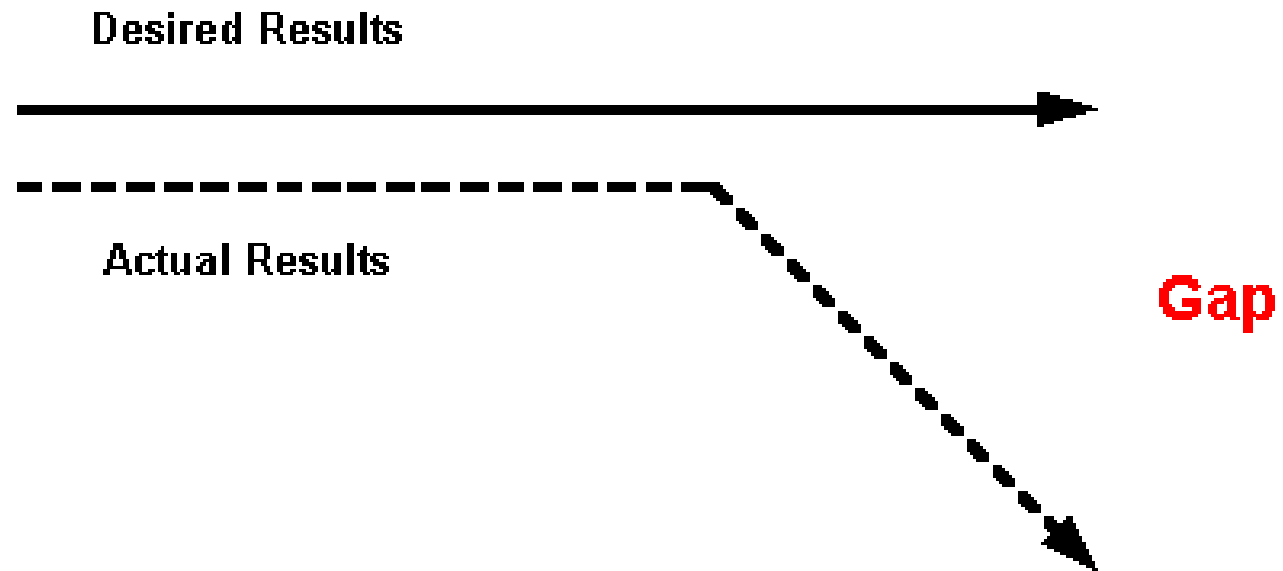
## Gap Theory

Kepner, C. H. and Tregoe, B.B. 1997. *The New Rational Manager* Princeton: Princeton Research Press

Theo Black, Certified Master Black Belt, Optum (A Division of UnitedHealth Group)

# Structure of a Problem

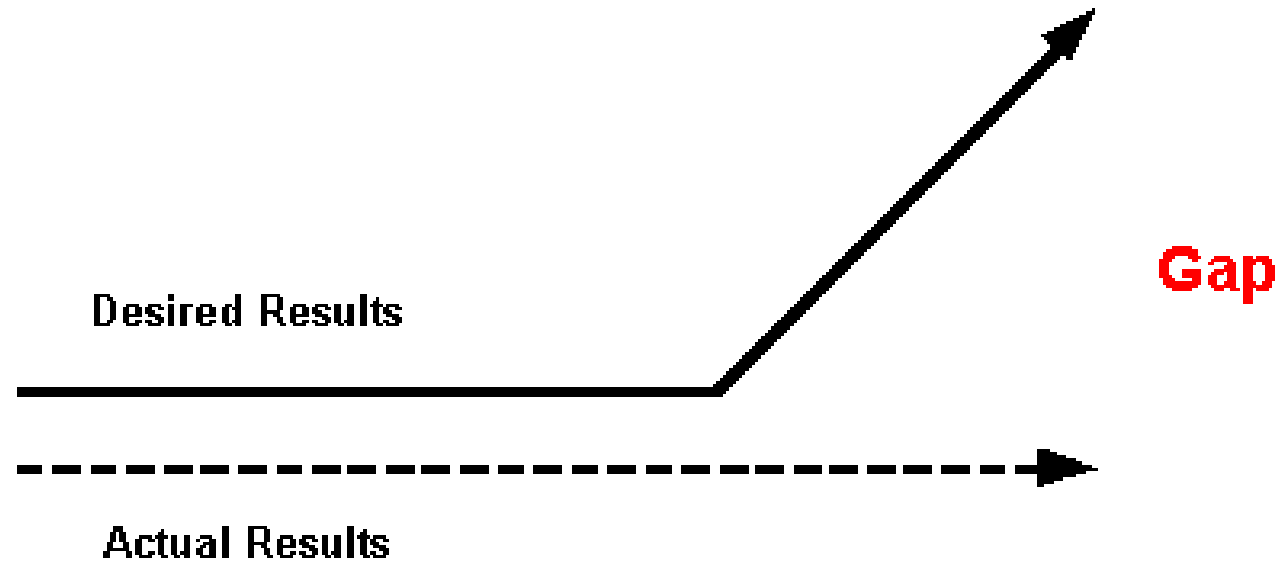
## Gap 1 - Something Has Gone Wrong





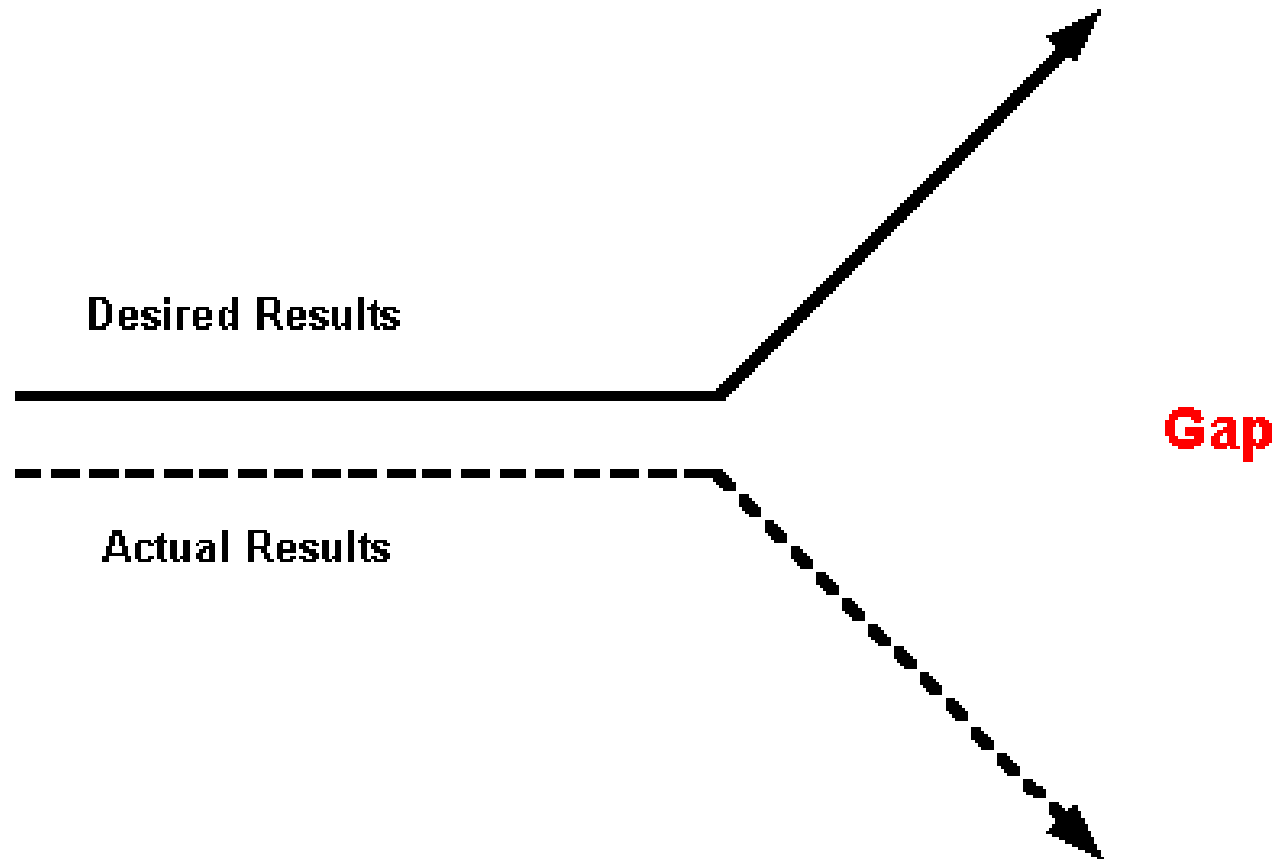
# Structure of a Problem

## Gap 2 – Raised Expectations



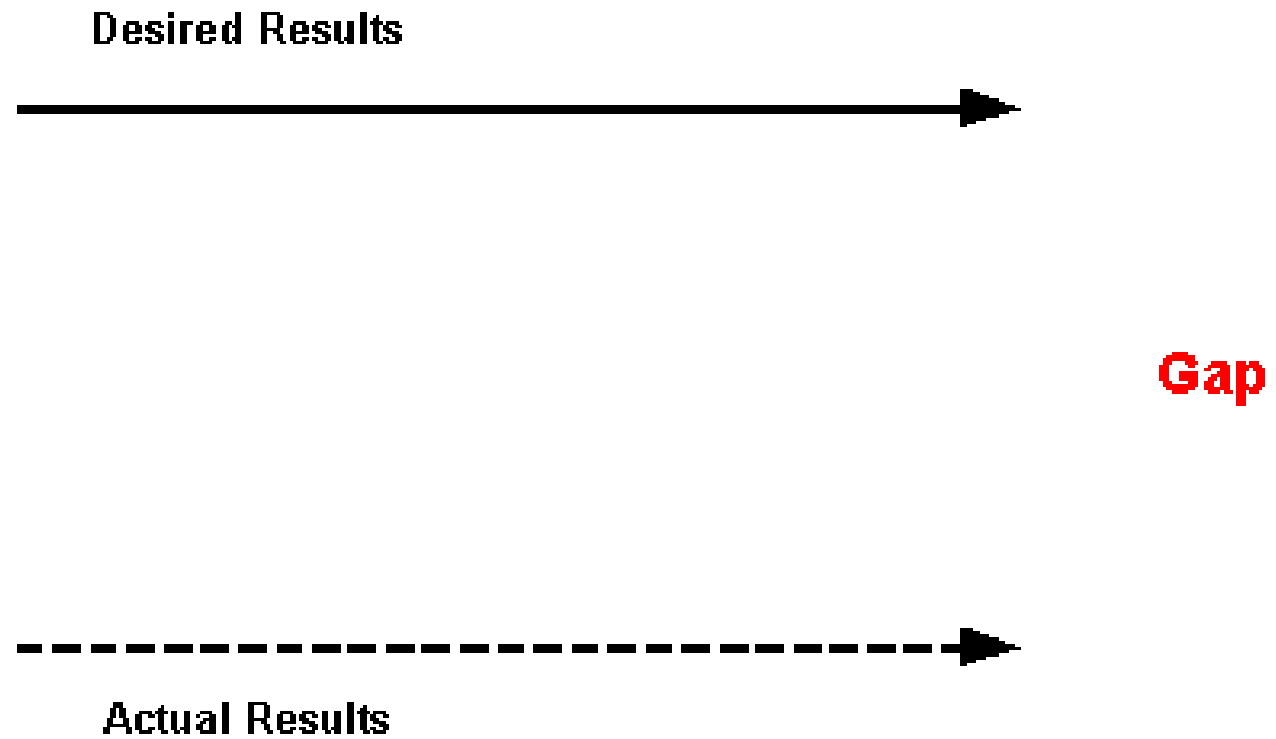
# Structure of a Problem

## Gap 3 – Double Whammy



# Structure of a Problem

## Gap 4 - It Never Did Work Right (A "Day One" Problem)



# Structure of a Problem

## Gap 5 – Basic Engineering Problem

**Desired Results**



**Gap**



**Actual Results**

# The Problem Analysis Process

1. State the Problem
2. Specify the Problem (What, When, Where, Extent, 'Is' vs 'Is Not')
3. Develop possible causes from knowledge and experience or distinctions and changes
4. Test possible causes against the specification
5. Determine the most probable cause
6. Verify assumptions, observe, experiment, or try a fix and monitor

# State the Problem

## Establish Operational Definitions

### Avoid

- Vague/General Wording - “Low productivity on...”, “Sub-standard performance by...”, “This widget doesn’t work properly.”
- Combining multiple deviations into a single problem statement.

### Do

- Be specific
- Name one object or kind of object, and one malfunction of kind of malfunction
- Describe what is seen, felt, heard, smelled, tasted, that indicates there is a deviation

## State the Problem

'A customer called into say they cannot get to our sites'

Versus

'Josh at Tyrol called at 11:30 PM to report that several users at Tyrol Support get a "website not found" error when attempting to access the following sites

<http://abc.com>

<http://def.com> '

# Specify the Problem

<b>What</b>	Identify	What specific object has the deviation?	What specific object(s) does not have the deviation?	What is the distinction between the has and the has not? (Changes?)	What is the possible cause?
		What is the problem (deviation)?	What is not the problem (deviation)?	What is the distinction between the is and the is not? (Changes?)	What is the possible cause?
<b>Where</b>	Locate	Where is the problem found?	Where is the problem not found?	What is distinctive about the difference in locations? (Changes?)	What is the possible cause?
<b>When</b>	Timing	When does (did) the problem occur?	When does (did) the problem not occur?	What is distinctive about the difference in timing? (Changes?)	What is the possible cause?
		When was the problem first observed?	When was the problem last observed?	What is the distinction between these observations? (Changes?)	What is the possible cause?
<b>Extent</b>	Magnitude	How far does the problem extend?	How localized is the problem?	What is the distinction? (Changes?)	What is the possible cause?
		How many units are affected?	How many units are not affected?	What is the distinction? (Changes?)	What is the possible cause?
		How much of any one unit is affected?	How much of any one unit is not affected?	What is the distinction? (Changes?)	What is the possible cause?



# Problem Solving Worksheet

1. Problem Description (What is wrong with what?)		Problem Solving Worksheet				
2. Description of problem	Is	Could Be But Is-Not	3. Deductions About Facts and Other Information			4. Possible Causes
			3a Distinctions	3b Changes	Date	List Change-How Theories
What specific object has the deviation?						
What is the deviation?						
Where is the object when the deviation is observed (geographically)?						
Where is the deviation on the object?						
When was the deviation first observed?						
When since that time has the deviation been observed? Are there any patterns?						
When in the object's history or life cycle, was the deviation observed?						
Extent - How many objects have the deviation?						
Extent - How many deviations are there on each object (unit)?						
Extent - What is the trend (in the object, in the number of occurrences of the deviation, in the size of the deviation, etc.)?						

**5. Test causes for probability:** Challenge each with "How does it explain (each) Is Is-Not fact?"

Note assumptions needed to explain the inclusion or exclusion of root causes

Note facts which exclude potential causes

**6. Steps to verify (Root cause):**

# Problem Specification

	<u>Is</u>	<u>Is Not</u>
• What	ABC.com DEF.com	google.com non-my company sites
• Where	Tyrol Support	My Company Help Desk
• When	Noticed at 11:30 PM	2:35PM
• Extent	Error Message Site appears to be completely down	Slow page loading Partial functionality

# Possible Causes

- Utilize Knowledge and Experience
  - Brainstorm to quickly gather a list of ideas
- Focus on Distinctions
  - What is distinctive about...compared with...?
  - Apply to all four dimensions (what, where, when, extent)
- Focus on Changes
  - What changed in, on, around, or about this distinction?

## Some Additional Information

2/4/05 11:30 PM

- Brian Hands checked our end and could get to the ABC.com and other MyCompany sites.

2/5/05 1:15 AM

- Southwestern Trucking called to report that they were unable to connect to ABC.com through their AS400
- Kathy called Mike O. - everything was running on the Tandem

## Possible Causes

- Tyrol Firewall or router issue
- Problem with the ISP at Tyrol
- Issue due to the DRC equipment move this evening
- Others?

# Test Possible Causes Against the Specification

- Use the IS/IS NOT data for each dimension
- Eliminate (for now) those issues that do not pass
- Prioritize the rest of the issues to identify the Most Probable Cause

## Test Possible Causes Against the Specification

- Tyson Firewall issue
- Tyson Router issue
- Problem with the ISP at Tyson
- Issue due to the DRC equipment move
- Others

# Determine Most Probable Cause

- Look for a cause that explains the deviation better than any other possible cause
- Consider the assumptions
  - Fewest
  - Simplest
  - Most reasonable



# Verify Assumptions, Observe, Experiment, or Try A Fix and Monitor

- Direct Confirmation
  - Substitute
  - Duplicate
  - Reverse
  - Safe, sure, cheap, easy, quick
- Indirect Confirmation
  - Apollo 13 oxygen tank leak

# Causes of Failure In the Rational Problem Analysis Process

- Inaccurate or vague information
- Insufficient rigor identifying key distinctions, changes, and/or knowledge
- Allowing assumptions to distort judgment

This is a process, not a panacea!

# Review

- ✓ What is a Problem Specification?
- ✓ How many steps does the Problem Analysis Process contain?
- ✓ Can you name them?

# Bibliography

1. Kepner, C. H. and Tregoe, B.B. 1997. *The New Rational Manager* Princeton: Princeton Research Press
2. Nichols, F. 2000. *Solution Engineering: Forget about Causes, Focus on Solutions!*  
[http://www.nickols.us/forget\\_about\\_causes.htm](http://www.nickols.us/forget_about_causes.htm)
3. Fogler, H. S. and LeBlanc, S. E. 2009. *Strategies for Creative Problem Solving* Upper Saddle River: Prentice Hall