Common Mistakes and How to Avoid Them

Raj Jain
Washington University in Saint Louis
Saint Louis, MO 63130
Jain@cse.wustl.edu

These slides are available on-line at:

http://www.cse.wustl.edu/~jain/cse567-08/

Overview

- Common Mistakes in Evaluation
- Checklist for Avoiding Common Mistakes
- A Systematic Approach to Performance Evaluation
- Case Study: Remote Pipes vs RPC

Common Mistakes in Evaluation

1. No Goals
   - No general purpose model
   - Goals $\Rightarrow$ Techniques, Metrics, Workload
   - Not trivial
2. Biased Goals
   - ``To show that OUR system is better than THEIRS''
   - Analysts = Jury
3. Unsystematic Approach
4. Analysis Without Understanding the Problem
5. Incorrect Performance Metrics
6. Unrepresentative Workload
7. Wrong Evaluation Technique

Common Mistakes (Cont)

8. Overlook Important Parameters
9. Ignore Significant Factors
10. Inappropriate Experimental Design
11. Inappropriate Level of Detail
12. No Analysis
13. Erroneous Analysis
14. No Sensitivity Analysis
15. Ignoring Errors in Input
16. Improper Treatment of Outliers
17. Assuming No Change in the Future
18. Ignoring Variability
19. Too Complex Analysis

Common Mistakes (Cont)

20. Improper Presentation of Results
21. Ignoring Social Aspects
22. Omitting Assumptions and Limitations

Checklist for Avoiding Common Mistakes

1. Is the system correctly defined and the goals clearly stated?
2. Are the goals stated in an unbiased manner?
3. Have all the steps of the analysis followed systematically?
4. Is the problem clearly understood before analyzing it?
5. Are the performance metrics relevant for this problem?
6. Is the workload correct for this problem?
7. Is the evaluation technique appropriate?
8. Is the list of parameters that affect performance complete?
9. Have all parameters that affect performance been chosen as factors to be varied?

Checklist (Cont)

10. Is the experimental design efficient in terms of time and results?
11. Is the level of detail proper?
12. Is the measured data presented with analysis and interpretation?
13. Is the analysis statistically correct?
14. Has the sensitivity analysis been done?
15. Would errors in the input cause an insignificant change in the results?
16. Have the outliers in the input or output been treated properly?
17. Have the future changes in the system and workload been modeled?
18. Has the variance of input been taken into account?

Checklist (Cont)

19. Has the variance of the results been analyzed?
20. Is the analysis easy to explain?
21. Is the presentation style suitable for its audience?
22. Have the results been presented graphically as much as possible?
23. Are the assumptions and limitations of the analysis clearly documented?

A Systematic Approach to Performance Evaluation

1. State Goals and Define the System
2. List Services and Outcomes
3. Select Metrics
4. List Parameters
5. Select Factors to Study
6. Select Evaluation Technique
7. Select Workload
8. Design Experiments
9. Analyze and Interpret Data
10. Present Results

Repeat