

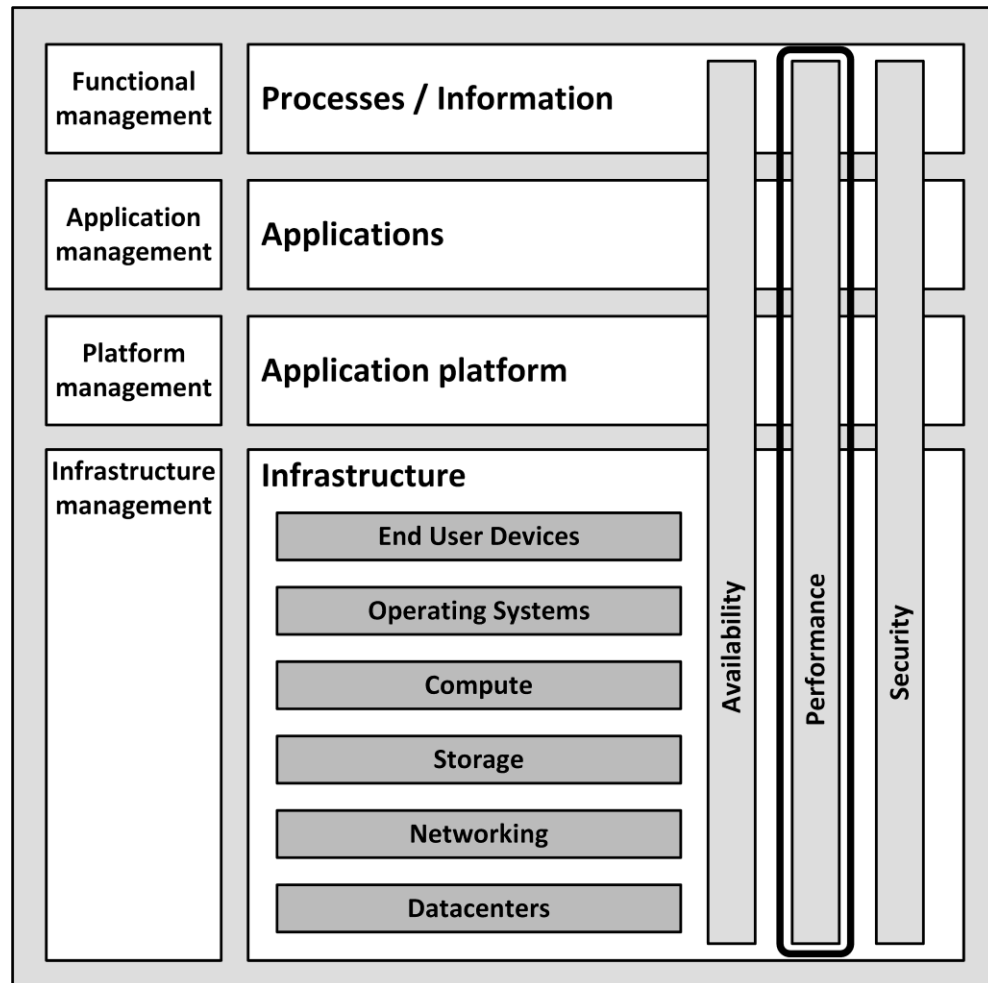
IT Infrastructure Architecture

Infrastructure Building Blocks
and Concepts

Performance Concepts

Introduction

- Performance is a typical hygiene factor
- Nobody notices a highly performing system
- But when a system is not performing well enough, users quickly start complaining

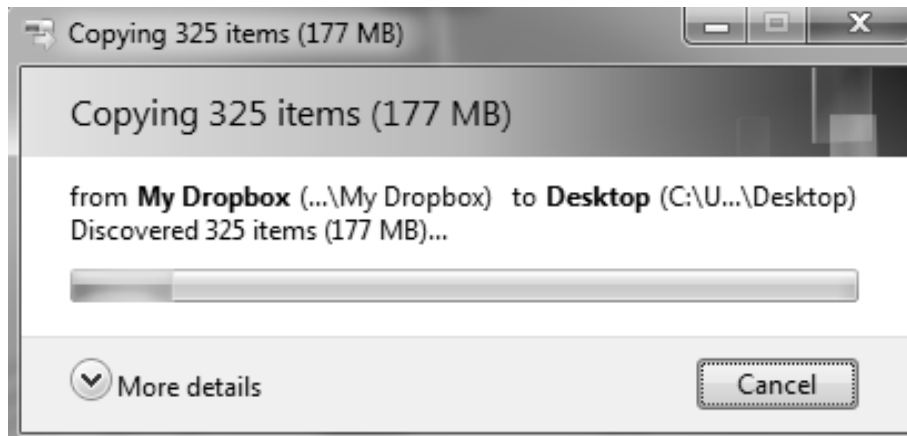


Perceived performance

- Perceived performance refers to how quickly a system appears to perform its task
- In general, people tend to overestimate their own patience
- People tend to value predictability in performance
 - When the performance of a system is fluctuating, users remember a bad experience
 - Even if the fluctuation is relatively rare

Perceived performance

- Inform the user about how long a task will take
 - Progress bars
 - Splash screens



Performance during
infrastructure design

Performance during infrastructure design

- A solution must be designed, implemented, and supported to meet the performance requirements
 - Even under increasing load
- Calculating performance of a system in the design phase is:
 - Extremely difficult
 - Very unreliable

Performance during infrastructure design

- Performance must be considered:
 - When the system works as expected
 - When the system is in a special state, like:
 - Failing parts
 - Maintenance state
 - Performing backup
 - Running batch jobs
- Some ways to do this are:
 - Benchmarking
 - Using vendor experience
 - Prototyping
 - User Profiling

Benchmarking

- A benchmark uses a specific test program to assess the relative performance of an infrastructure component
- Benchmarks compare:
 - Performance of various subsystems
 - Across different system architectures

Benchmarking

- Benchmarks comparing the raw speed of parts of an infrastructure
 - Like the speed difference between processors or between disk drives
 - Not taking into account the typical usage of such components
 - Examples:
 - Floating Point Operations Per Second – FLOPS
 - Million Instructions Per Second – MIPS

Vendor experience

- The best way to determine the performance of a system in the design phase: use the experience of vendors
- They have a lot of experience running their products in various infrastructure configurations
- Vendors can provide:
 - Tools
 - Figures
 - Best practices

Prototyping

- Also known as proof of concept (PoC)
- Prototypes measure the performance of a system at an early stage
- Building prototypes:
 - Hiring equipment from suppliers
 - Using datacenter capacity at a vendor's premise
 - Using cloud computing resources
- Focus on those parts of the system that pose the highest risk, as early as possible in the design process

User profiling

- Predict the load a new software system will pose on the infrastructure before the software is actually built
- Get a good indication of the expected usage of the system
- Steps:
 - Define a number of typical user groups (personas)
 - Create a list of tasks personas will perform on the new system
 - Decompose tasks to infrastructure actions
 - Estimate the load per infrastructure action
 - Calculate the total load

User profiling personas/tasks

Persona	Number of users per persona	System task	Infrastructure load as a result of the system task	Frequency
Data entry officer	100	Start application	Read 100 MB data from SAN	Once a day
Data entry officer	100	Start application	Transport 100 MB data to workstation	Once a day
Data entry officer	100	Enter new data	Transport 50 KB data from workstation to server	40 per hour
Data entry officer	100	Enter new data	Store 50 KB data to SAN	40 per hour
Data entry officer	100	Change existing data	Read 50 KB data from SAN	10 per hour

User profiling Infrastructure load

Infrastructure load	Per day	Per second
Data transport from server to workstation (KB)	10,400,000	361.1
Data transport from workstation to server (KB)	2,050,000	71.2
Data read from SAN (KB)	10,400,000	361.1
Data written to SAN (KB)	2,050,000	71.2