slides

Extensible Operating System

Presentaiton

Amit Gangrade 00d05004

Nishant Kumar 00d05012

Guided by Prof. R.K Joshi

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Overview

- What is Extensible OSes
- Motivation of OS extensibility
- Advantages & Disadvantages
- Performance of Extensible Operating Systems
- Implementation of Extensible OS

What is Extensible OSes

- *Extensible operating system* allow applications to modify kernel behavior by providing mechanisms for application code to run in the kernel address space. Extensibility enables a system to efficiently support a broader class of applications than is currently supported. An *extensible operating system* is one that is capable of dynamically adding new services or adapting existing ones based on individual application demand without compromising the fault isolation properties of the system.

Advantages and Disadvantages

Advantages

- Improved application flexebility
- Improved Performance.

Disadvantages

- buggy or malicious code can jeopardize the integrity of the kernel
- great deal of work is left to the application or application designer

Motivation

- The motivation for OS extensibility comes from the fact that one person or group can recognize the needs of all users, understand everything about operating systems. The second reason is the extensible operating system could improve performance. And since it is not possible to recognized the needs of all users, we need a mechnism to provide special perpose functionality. That is, the emergency of extensibility in OS is primary due to the need for better performance and more functionality

Performance of Extensible Operating Systems

- Sinking application code into the OS can reduce the number of context switches, therefore imroving performance. Besides, extension could be used to create new data paths in the kernel that otherwise would no exist.
- For example, in a traditional system an application that moves data from the network to a local disk copies the data from the network into application and back into the OS to the file system. This causes moving potentilly massive amount of data across the user/kernel boundary several times for no good reason. A kernel extension that creates a path directly from the network to the disk removes the need for these copies.

Implementation of Extensible OsEs

The various steps in creating an Extensible Os are as follows .Continuous monitoring of the system to construct a database of performance statistics. Correlation of the database by process, process type, and process group. Collection of traces and logs of process activity. Deriving heuristics and algorithms to improve performance for the observed patterns. Simulation of new algorithms using logs and traces. Adapting the system according to results of simulation.