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Nota di contenuto	Cover; Title Page; Copyright; Contents; List of Abbreviations; Introduction; PART 1: Management of Distributed Infrastructures; Chapter 1: Distributed Infrastructures Before the Rise of Virtualization; 1.1. Overview of distributed infrastructures; 1.1.1. Cluster; 1.1.2. Data center; 1.1.3. Grid; 1.1.4. Volunteer computing platforms; 1.2. Distributed infrastructure management from the software point of view; 1.2.1. Secured connection to the infrastructure and identification of users; 1.2.2. Submission of tasks; 1.2.3. Scheduling of tasks; 1.2.4. Deployment of tasks 1.2.5. Monitoring the infrastructure 1.2.6. Termination of tasks; 1.3. Frameworks traditionally used to manage distributed infrastructures; 1.3.1. User-space frameworks; 1.3.2. Distributed operating systems; 1.4. Conclusion; Chapter 2: Contributions of Virtualization; 2.1. Introduction to virtualization; 2.1.1. System and application virtualization; 2.1.1.1. System virtualization; 2.1.1.2. Application virtualization; 2.1.2. Abstractions created by hypervisors; 2.1.2.1. Translation; 2.1.2.2. Aggregation of resources; 2.1.2.3. Partition of resources 2.1.3. Virtualization techniques used by hypervisors 2.1.3.1. Emulation;

2.1.3.2. Paravirtualization; 2.1.3.3. Hardware virtualization; 2.1.4. Main functionalities provided by hypervisors; 2.1.4.1. Resource throttling; 2.1.4.2. Optimizing memory usage; 2.1.4.3. Suspending and resuming virtual machines; 2.1.4.4. Snapshotting; 2.1.4.5. Migrating virtual machines; 2.2. Virtualization and management of distributed infrastructures; 2.2.1. Contributions of virtualization to the management of distributed infrastructures; 2.2.1.1. Advantages for owners; 2.2.1.1.1. Improving resource sharing; 2.2.1.1.2. Facilitating maintenance operations; 2.2.1.2. Advantages for users; 2.2.1.2.1. Deploying a customized runtime; 2.2.1.2.2. Outsourcing infrastructure buy and management; 2.2.1.2.3. Fault-tolerance and high availability; 2.2.2. Virtualization and cloud computing; 2.3. Conclusion; Chapter 3: Virtual Infrastructure Managers Used in Production; 3.1. Overview of virtual infrastructure managers; 3.1.1. Generalities; 3.1.2. Classification; 3.2. Resource organization; 3.2.1. Computing resources; 3.2.1.1. Computing nodes and supported hypervisors; 3.2.1.2. Grouping unit; 3.2.1.3. Sets of grouping units; 3.2.2. Storage resources; 3.2.2.1. Local storage on worker nodes; 3.2.2.2. Shared storage; 3.2.2.3. Secondary storage; 3.3. Scheduling; 3.3.1. Scheduler architecture; 3.3.1.1. Centralized architecture; 3.3.1.2. Hierarchical architecture; 3.3.2. Factors triggering scheduling; 3.3.2.1. Creation of a new virtual machine; 3.3.2.2. Periodic or on-demand optimization of resource utilization; 3.3.2.3. Node maintenance; 3.3.2.4. Virtual machine crash; 3.3.3. Scheduling policies; 3.3.3.1. First fit; 3.3.3.2. Random; 3.3.3.3. Load balancing; 3.3.3.4. Consolidation; 3.3.3.5. Affinities and antagonisms

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## Sommario/riassunto

System virtualization has become increasingly common in distributed systems because of its functionality and convenience for the owners and users of these infrastructures. In *Scheduling of Large-scale Virtualized Infrastructures*, author Flavien Quesnel examines the management of large-scale virtual infrastructures with an emphasis on scheduling up to 80,000 virtual machines on 8,000 nodes. The text fills a need for updated software managing to meet the increasing size of virtual infrastructures. Virtual machine managers and virtual operators will appreciate this guide to improvement in cooperation.

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