TCSS 558 Homework 2

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Question 1: [20 points]

Give an Example (different than what are given in the lecture) for each of the following:

a) How a closure mechanism for a URL would work.

- As the definition of closure mechanism informing us, the process has to know how and where to start name resolution for this URL. The URL name resolver on the process often automatically handles this. The process will first extract the scheme identifier from the URL, such as string “ftp:” or “http:” and find the corresponding protocol. Then, it extracts the host name from the URL, such as www.tacoma.uw.edu, and sends to the local DNS server. After these, it passes the rest parts, which represents the desired file, to the host. The host will use its closure mechanism to do the name resolution of the file name.

b) RPC using Pass-by-Reference.

- According to the definition of call-by-reference, it would be difficult in RPC. Since a pointer or a reference is meaningful only within the address space of the process in which it is being used. Therefore, one of the example of passing by reference in RPC is that the client pass a pointer, and it points to a simple array, then, a copy of that array would be contain in the message that passed to the server. Another example of passing by reference would be passing a data structure that containing pointers, for instance, graphs. In this case, the pointer will be passed to the server, then, every time when the pointer is encountered, the server stub will have to send a request for the referenced data to the client stub. Moreover, according to [Silva 1996], there have been several experimental programming languages passes objects by reference in their RPC mechanism. For instance DPS-algol and Emerald. If computation needs to access the value of an object, it has to migrate to the store where the object resides. If the object is a built-in immutable type, then it is copied to the computation.

c) Virtual Machine Monitor.

- A Virtual Machine Monitor (VMM) is a software program that enables the creation, management and governance of virtual machines (VM) and manages the operation of a virtualized environment on top of a physical host machine.
- When the VMM are directly installed on the hardware. They are known as stand alone VMM.Examples-IBM 370, VMware ESX server, Xen.
- When they are installed on the host operating system. The operating system running on physical machine is called host OS and one running on virtual machine is called Guest OS. Examples- UML (User Mode Linux).

- When the VMM is a cross combination of above two types. They mostly operate on physical hardware but use services of host OS to perform I/O activities.Examples- Microsoft Virtual PC, VMware workstation.

d) Identifier.

- An identifier refers to at most one entity. Each entity is referred to by at most one identifier. An identifier always refers to the same entity.For example, the social security number or the MAC address.

Question 2: [10 points]

Explain how you would implement a DNS-like naming scheme in using Chord-DHT based system.

- we can compute the hash of a DNS name, and subsequently take that hash as a key value to be looked up in a distributed-hash table or a hierarchical location service with a fully partitioned root node. The obvious drawback of this approach is that we lose the structure of the original name. This loss may prevent efficient implementations of, for example, finding all children in a specific domain.

Reference

[Silva 1996] M. Mira da Silva, M.P. Atkinson, A.P. Black, “Semantics for Parameter Passing in a Type-Complete Persistent RPC,” 96 Proceedings of the 16th International Conference on Distributed Computing Systems, 1996