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Design Criteria of SOA for Cloud Based Infrastructure Resource Management as a Service.

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Abstract:

Service Oriented Architecture and Cloud Computing are two popular design paradigms in order to fulfill the user's requirement that includes for high cost and heavy infrastructure applications. SOA is demanding for the different in built approach and cloud is includes for security and infrastructure measures . In this paper, we try to compare the previous existing solution for resource management as a service.. Again we aim to propose a architecture by aggregate these two approaches for low cost and efficient access of infrastructures.

Key Words: SOA, Cloud Computing

I. INTRODUCTION

Cloud is gaining popularity as means for saving cost of IT ownership and accelerating time to market due to ready-to-use, dynamically scalable computing infrastructure and software services offered on Cloud on pay-per-use basis. Design of software solution for delivery as a shared service over Cloud requires specific considerations. In this paper we describe an approach for design of infrastructure resource management as a service for use by group of institution based on Service Oriented Architecture, Software-as-a-Service, and Cloud Computing paradigms[20].

II. RELATED WORK

Service Oriented Architecture is a paradigm for organizing and utilizing distributed capabilities that may be under the control of different ownership domains. Service is a mechanism to enable access to one or more capabilities, where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description [1]. In SOA approach to modeling software, software is organized in terms of services each capturing reusable functionality that can be discovered at run time and accessed in location transparent manner through well-defined, open standards technology based interfaces SOA is not a new concept, although it again has been receiving considerable attention in recent years Examples of some of the first network-based service-oriented architectures are remote procedure calls

(RPC), DCOM and Object Request Brokers (ORBs) based on the CORBA specifications [e.g., Omb08a, Omb08b]. A more recent example are so called "Grid Computing" architectures and solutions [e.g., Fos04, Glo08 Had08]. In an SOA environment end-users request an IT service (or an integrated collection of such services) at the desired functional, quality and capacity level, and receive it either at the time requested or at a specified later time. Service discovery, brokering, and reliability are important, and services are usually designed to interoperate, as are the composites made of services. It is expected that in the next 10 years, service-based solutions will be a major vehicle for delivery of information and other IT assisted functions at both individual and organizational levels, e.g., software applications, web-based services, personal and business "desktop" computing.

A corporate travel reservation system is required to fulfill requests for reservations with multiple airlines and hotels for corporate employees traveling on business trips. an approach for design of travel reservations solution for use by corporate business travelers based on Service Oriented Architecture, Software-as-a-Service, and Cloud Computing paradigms. This can be taken as an example of cloud. Here the A single copy of software can be made available to consumers on demand as a shared service accessible over remote network location and charged on subscription or pay-per-use basis. The term SaaS denotes application software provided in such a mode.[4] Our proposed cloud based infrastructure resource management (CBIRM) may face some challenges during finding efficient alternative solutions. In the following we try to explain the existing solution that aim to solve cloud base infrastructure resource management.

A. SOLUTION: 1. ENTERPRISE WAN OR GLOBAL INTERNET:

An enterprise WAN is a corporate network that connects geographically dispersed users areas that could be anywhere in the world. As is the case with most WANs, an enterprise WAN (wide area network) links LANs in multiple locations. The enterprise in

question often owns and manages the networking equipment within the LANs. However, the LANs are generally connected by a service provider. An enterprise WAN often also has additional remote users connecting through a virtual private network (VPN).

Advantage:

- Data transmission between different organization in order to easy maintainability.
- Software bought for a single institution can be used by multiple institution at a time .
- Resource utilization
- Effective service utilization

Disadvantage:

- For connecting institution a dedicated leased line is required. That line can either be copper wire or fiber optics cable or radio frequency generating device in order to provide connection through DTH i.e. data transmission equipment .
- Effective capacity planning and determining how much bandwidth your WAN needs to run well is critical to network performance. This section includes methods -- including measuring and planning for bandwidth utilization and tools for WAN modeling, simulation and emulation -- that will help you maximize WAN throughput and eliminate bottlenecks.

Bandwidth requirements vary from one network to another. Determining how many bits per second travel across the network and the amount of bandwidth each application uses is vital to building and maintaining a fast, functional network.

As most network administrators can attest, network bandwidth is one of the more important factors in the design and maintenance of a functional LAN or WAN. Unlike a server, which can be configured and reconfigured throughout the life of the network, bandwidth is one of those elements of network design that is usually optimized best by configuring the network correctly from the outset. How can you determine the bandwidth you are going to need when designing the network? What specific considerations apply? These are some of the questions that we'll answer in this tip.

Bandwidth refers to the data rate that is supported by the network connection or the interfaces that connect to the network. It is usually expressed in terms of bits per second (bps), or sometimes in bytes per second (Bps). Network bandwidth represents the capacity of the network connection

Problem with copper wire or fiber optics cable:

This mechanism will be very costly because due to.

- Due to the heavy transmission of information , the cable must be capable of transmitting that much amount of information which is a very costly affair.
- The cost of such kind of communication will exceed than the cost of the individual bought of software and technique for each individual institution.
- This will work on a limited range in order to reduce the cost associated.

Problem with RF equipment are:

- The RF can be used as an replacement for Cu/OFC in order to reduce the cost. Where the institutions are required to communicate and share workload needs to enabled with a RF equipment which will act as data transfer media with generating frequency and exchanging, they can communicate with each other in order to provide the same service of data exchange in between. But the data transmission here also suffers from the following problem or disadvantage like.
 - The RF device frequency must be with in 2.4MHz to 5.4MHz
 - Need to take the permission and register the government department for a particular and unique frequency range.
 - Though this takes place wirelessly, there may chance of data or transmission theft.
 - There also chance of data and transmission noise or interference of some other radio frequency with in the range.
 - This will also work for certain range as for bigger distance needs to enhance the capacity, take legal permission as well as it is a costly affair.
 - Security providing here is a crucial job. This type of transmission needs much care and maintenance.

B. SOLUTION: 2. USE OF TERMINAL SERVER:

In case of terminal server scenario, in our project an institution won some hybrids high-power and

configured computers will be taken as server where they named accordingly as terminal server. Where under each system represent the department requirement and issues. Where if a institution is part of the terminal server system they will be directly deal with the server system. Where all the software and required files are with one system and the other institution's system user will logged onto their system but get an appearance or desktop of the terminal server. They will then work like working on the server machine and then exit.

Here other system's OS are only present in order to provide an interface and perform a limited amount of job.

Advantage:

- Simple and no need of using high power of system on the client systems. Here the client systems can either be thin client or low processing system.
- Centralized computing.
- This can be used in such kind of scenario where in a limited area number of systems is available but all are not equipped with high processing power and need not support to install all the application.
- There we can take a high power on processing capacity equipped system install all the application in that system itself and get the server system appearance on their system.
- Work on that particular and exit, each thinking working on the server machine itself.
- Controlled and managed by the single system. that is terminal server.

Disadvantage:

- Only applicable to such kind of scenario where the client machine's hardware does not support to install some of the application program.
- This will work on a limited geographical area because the D-link or data transmission link capable of transferring 2mbps amount of data which will cost 3to 4 lakhs of money annually.
- If we are going to implement this one on a large geographical area just like WAN will

required D-Link of Gbps capacity which will cost more than to implement this terminal server in each individual college or institution.

- Processing power of the terminal server will be slower because number of users are accessing to it simultaneously.
- Maximum support up to 30 computers.

III.THE PROPOSED CBIRM ARCHITECHTURE

Here the required software design should be virtually implemented, parallel, and reliable. They must be capable of distributing workload.This project must be designed for customizing and reducing effort and cost in order to mark up with business flow.It also requires certain rules, processing logic, user interface , security, reliability and back up or fault tolerance.

This project must be handling within a specific range.

A. LOGICAL VIEW:

Figure 1 shows the logical components in the architecture.

Interfaces: CBIRM interacts with multiple tenants and multiple suppliers. It provides a Website which allows the tenant side administrators to upload their organizational master data and specify customizations needed. CBIRM provides Metadata Services for provisioning the customizations per tenant. After the meta-data is configured, the tenant side end-users can place the requirement by choosing the appropriate server. CBIRM uses asynchronous email notification to inform status of the requirement made to the user.

Databases: CBIRM segregates the supplier data and consumer tenant data into different databases. Additional data stores are provided for CBIRM internal processing data, and for metadata that also serves as service registry. Data Services are used for uniform access, manipulation of data across multiple data sources.

Security: Users of the system are subjected to Login-Password based Authentication and Role Based Access Control mechanisms. Communication links between CBIRM and all on-premise applications are secured using Secured Sockets Layer (SSL).

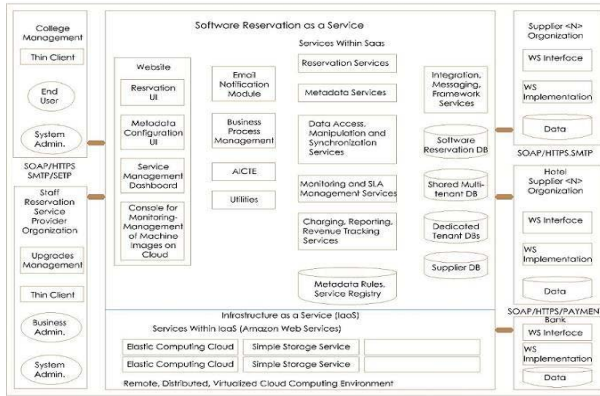


Figure 1: Logical view of CBIRM Architecture

Service Oriented Architecture. CBIRM provides Metadata Services that for provisioning tenant specific variations, Data Access-Manipulation Services, Data Synchronization Services for synchronizing data of external parties, Monitoring and Service Level Agreement (SLA) Management Services, Charging and Reporting Services for monthly subscription plus pay-per-use basis billing, and Revenue Tracking Services. CBIRM uses Enterprise Service Bus (ESB) middleware for hosting, integration, and lifecycle management of these services, For infrastructure level services, CBIRM relies on Amazon Web Services, viz., Elastic Computing Cloud (EC2) service for creating Machine Images and instances of the deployment environment needed, Simple Storage Service (S3) for storing dynamic data pertaining to Amazon Machine Images, Cloud Watch and Auto Scaling services for resource utilization monitoring and scaling, Elastic Load Balancing (ELB) service for workload distribution, as well as Amazon Cloud provided facilities for Security & monitoring.

III. CONCLUSION

SOA paradigm and middleware helped rapid identification, modeling, implementation and monitoring of services within CBIRM. Multi-tenancy could be effectively achieved through metadata based configuration facility. We successfully integrated on premise and Cloud-deployed SaaS software using Web Services. The Cloud vendor provided infrastructure services were used to address scalability, performance, security, availability,

disaster recovery, monitoring requirements of the system. The system delivered via Cloud based SaaS mode helped to meet the requirements of travel reservation system stakeholders.

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