



DESIGN, DEVELOPMENT & ANALYSIS OF VIRTUALIZATION USING VIRTUAL MACHINES (VM) IN E-GOVERNANCE

By

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Research Problem : Why this research?

- **Aim** of this research is to **study, use and analyze virtualization** to facilitate the **effective e-Governance** which involves **efficient and optimum use of technical resources** for the **improved service delivery, throughput, efficiency and cost effective solutions**, and to provide **concrete framework** for e-governance in India
- **Technique: Virtualization as Concept and Virtual Machine as Object**



Introduction

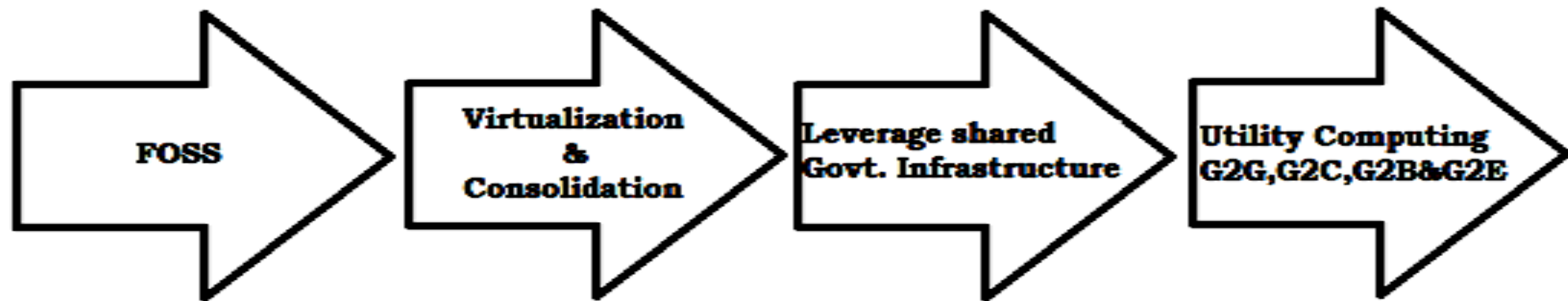
- As e-governance means use of electronic and computing technology for **efficient and optimum** use of Technical Resources for improved service delivery , efficient and cost effective framework for Governance.
- Literature survey shows that following factors are responsible for e-Governance.
 - ICT
 - Efficiency (Strength, Load Handling, Reach, stability, disaster Recovery. Capacity, skill , reliable, ability)
 - Productivity
 - Reachability
 - Sharing of Information
 - Welfare



Steps towards effective e-Gov

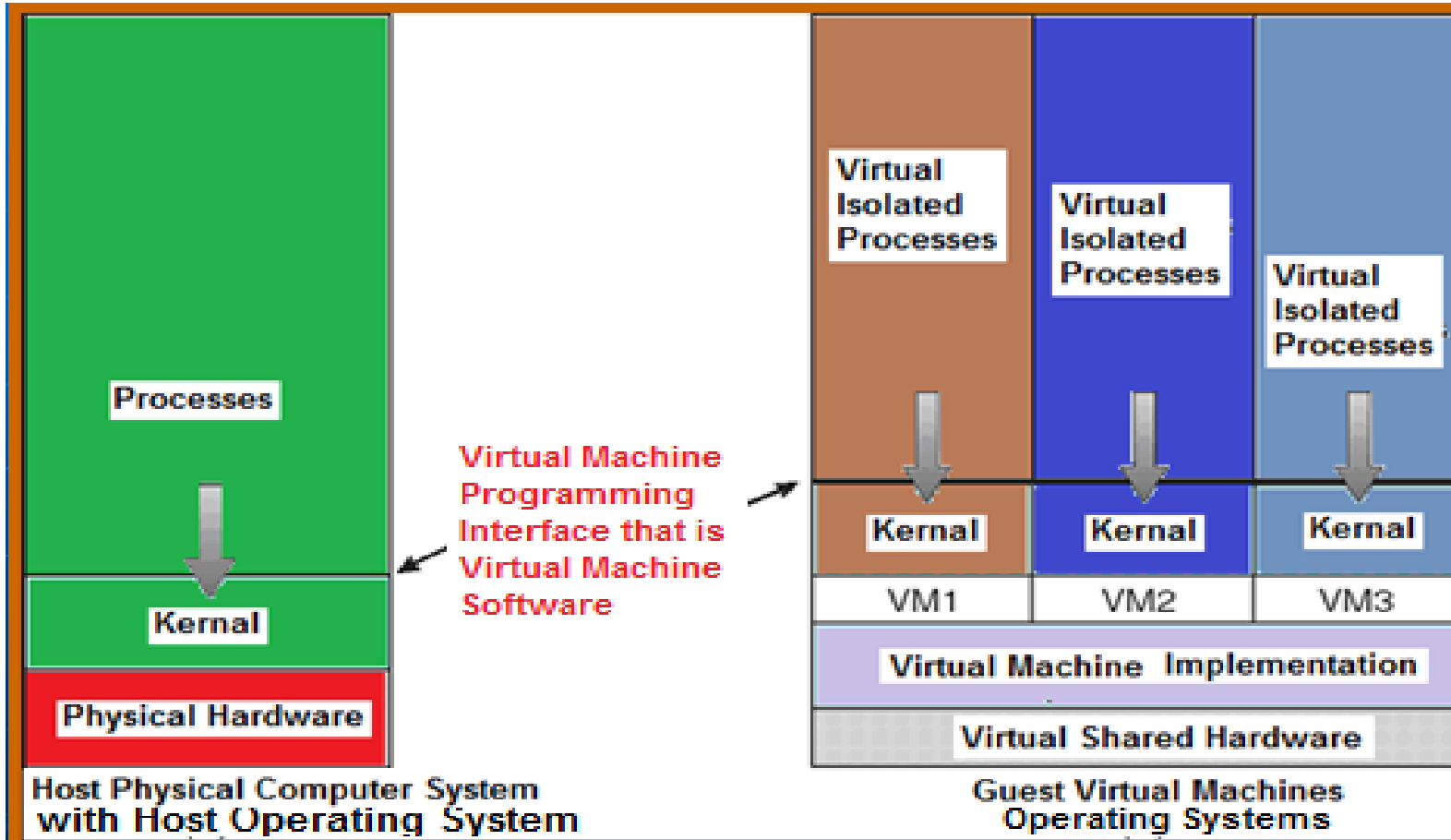
Effective e-Gov is based on

- **Free and open source software (FOSS)**
- **Virtualization**
- **Server Consolidation (to Save Server Hardware per location)**
- **Cloud computing (Live Virtual Machines Virtually accessed by users remotely)**
- **Leveraging shared Government infrastructures**



Proposed Framework for effective e-Governance

Virtualization : Virtual Running Virtual Computer on Physical

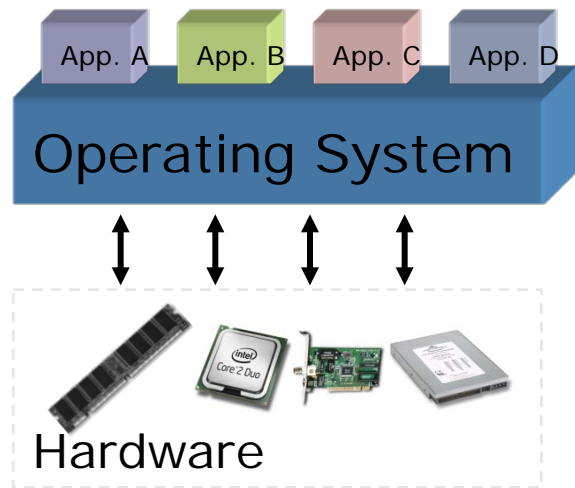


Logical Structure of Virtual Machine

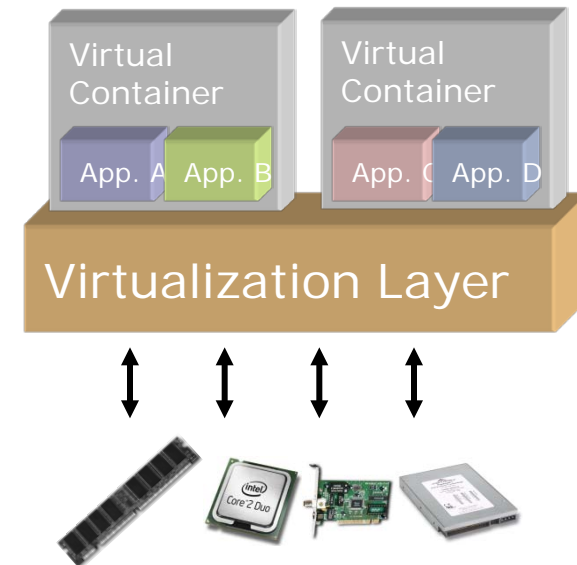
- Virtualization means
 - Virtual **isolated** execution of Virtually Developed Machine(s) on the Physical Machine **simultaneously**.
 - virtual **isolated** execution of the **multiple software platforms** (layers) on the same physical hardware **simultaneously**
 - allows one computer to do the job of multiple computers, by sharing the resources of a single hardware across multiple environments

Virtual Machine Logically divide single Computer System and resources into several isolated different sizes same like slices of the bread, each of which works and feels as a separate computer System / Server of different client / server Operating System and simultaneously run different isolated processes.

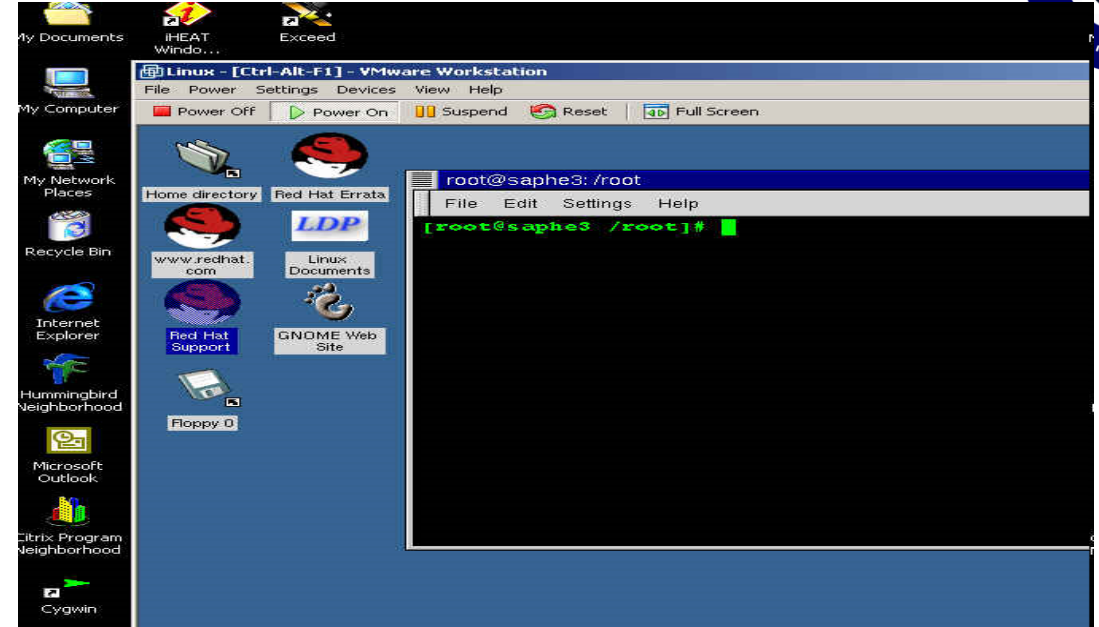
- Virtualization is way to run **multiple operating systems** and **user applications** on the same hardware
 - E.g., run both Windows and Linux on the same laptop
 - Hosting of Website using VPN



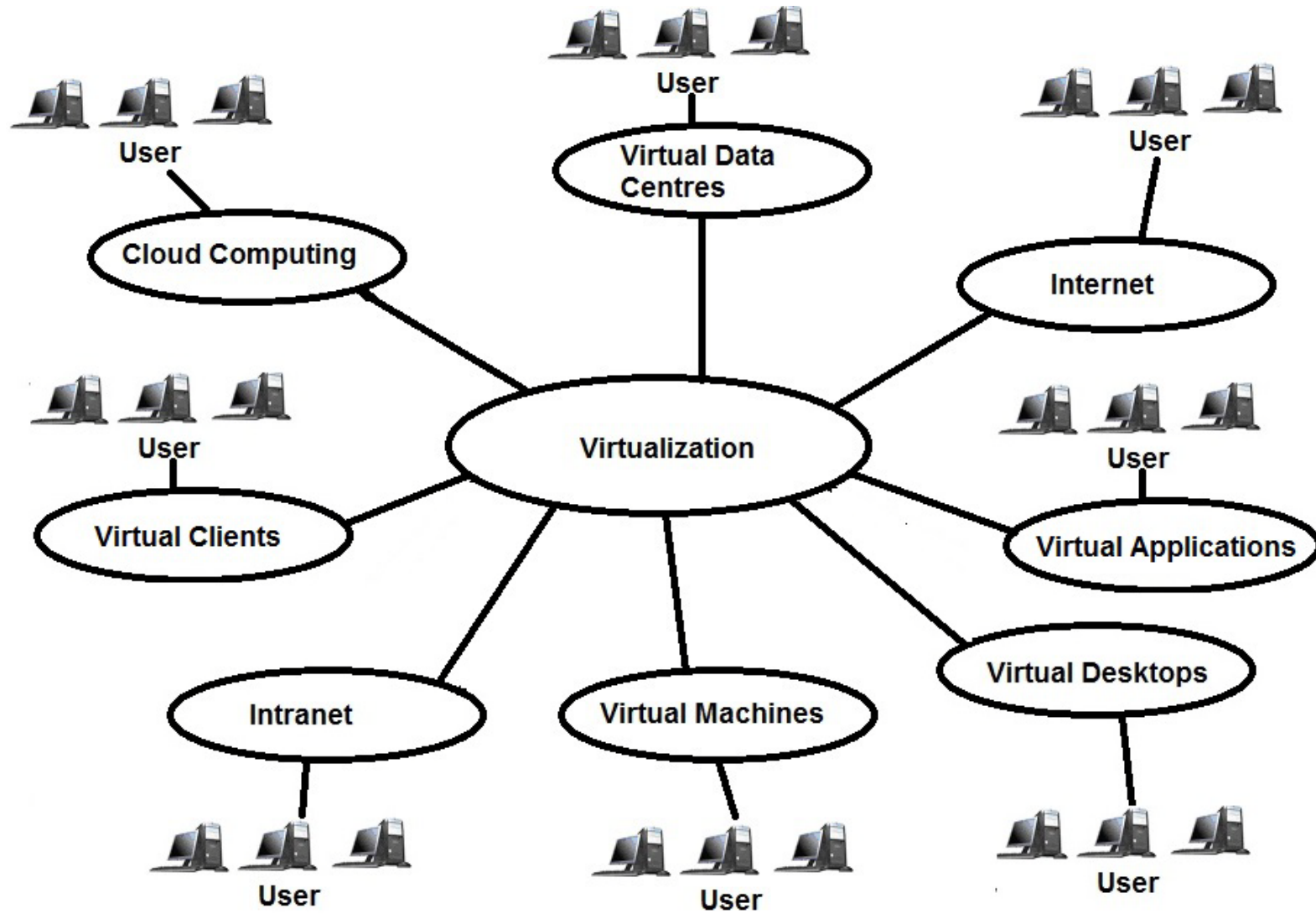
Traditional Nonvirtualized' system
A single OS controls all hardware platform resources



Virtualized system
It makes it possible to run multiple Virtual Containers on a single physical platform



- Distinct OS run **simultaneously**
- The OS's are completely **isolated** from each other



Application Areas of Virtualization for Utility Computing between G2G,G2B,G2C,GE



Motivation

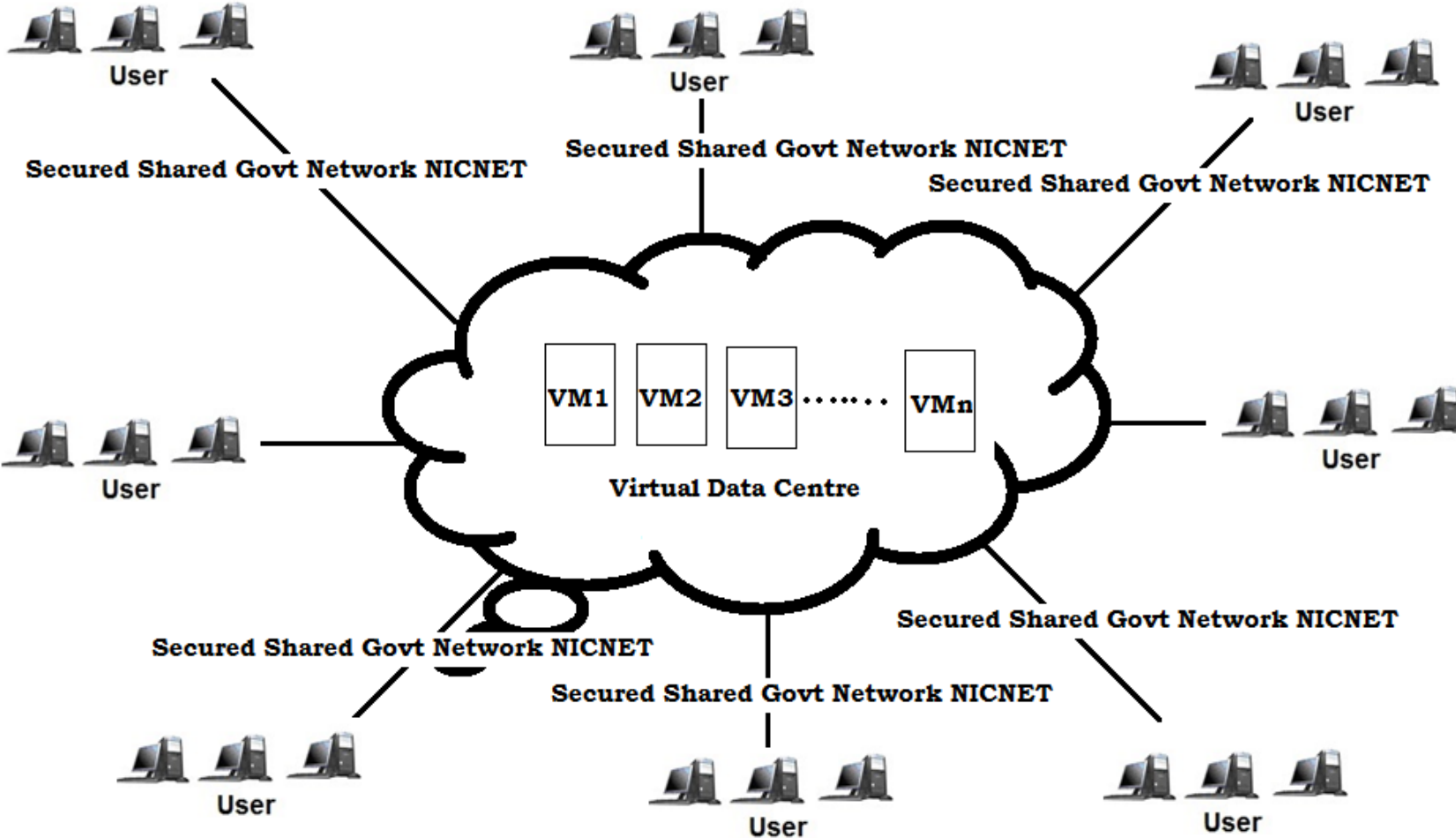
- **Need of efficient and optimized use of technical resources** (Hardware, software, Network and human resources) due to limited availability **for increased throughput**, Improved Service Delivery and Cost Effective Framework for e-Governance in India.
- **Use Single Computer system as a multiple Computer Systems : Running Multiple OS Simultaneously** : Instead of using traditional approach of running one operating system at a time on single computer system, the initiative is the Innovative use of Technology to run the multiple Distinct OS at time on single computer system for resource optimization
- **Server Consolidation**: Setting Up distinct isolated Client and/or Server Operating System on the Single Computer System to save the server hardware per location
- **All type of Operations which Physical computer system performs on File/Folders as object using operating system, that Virtual Machine Software performs on complete virtual computer along with Operating system as object including creation, updating, removing, renaming, customizing, move, copy, backup and restore, sharing, Auto start, import/export etc.**
- **Software Hardware Portability**:
 - Sharing the same hardware among many software platforms
 - Allowing software to be "portable" between various operating systems, as well as running older software and OS on a newer computer. All of these uses of virtual machines are very important to the way that we compute today



Objective

- Investigate VM functionality
- Identification of emergent functionality of VM
- Utility Analysis
- SWOT (Strengths, **W**eaknesses, **O**pportunities and **T**hreats)
analysis of Virtual Machines

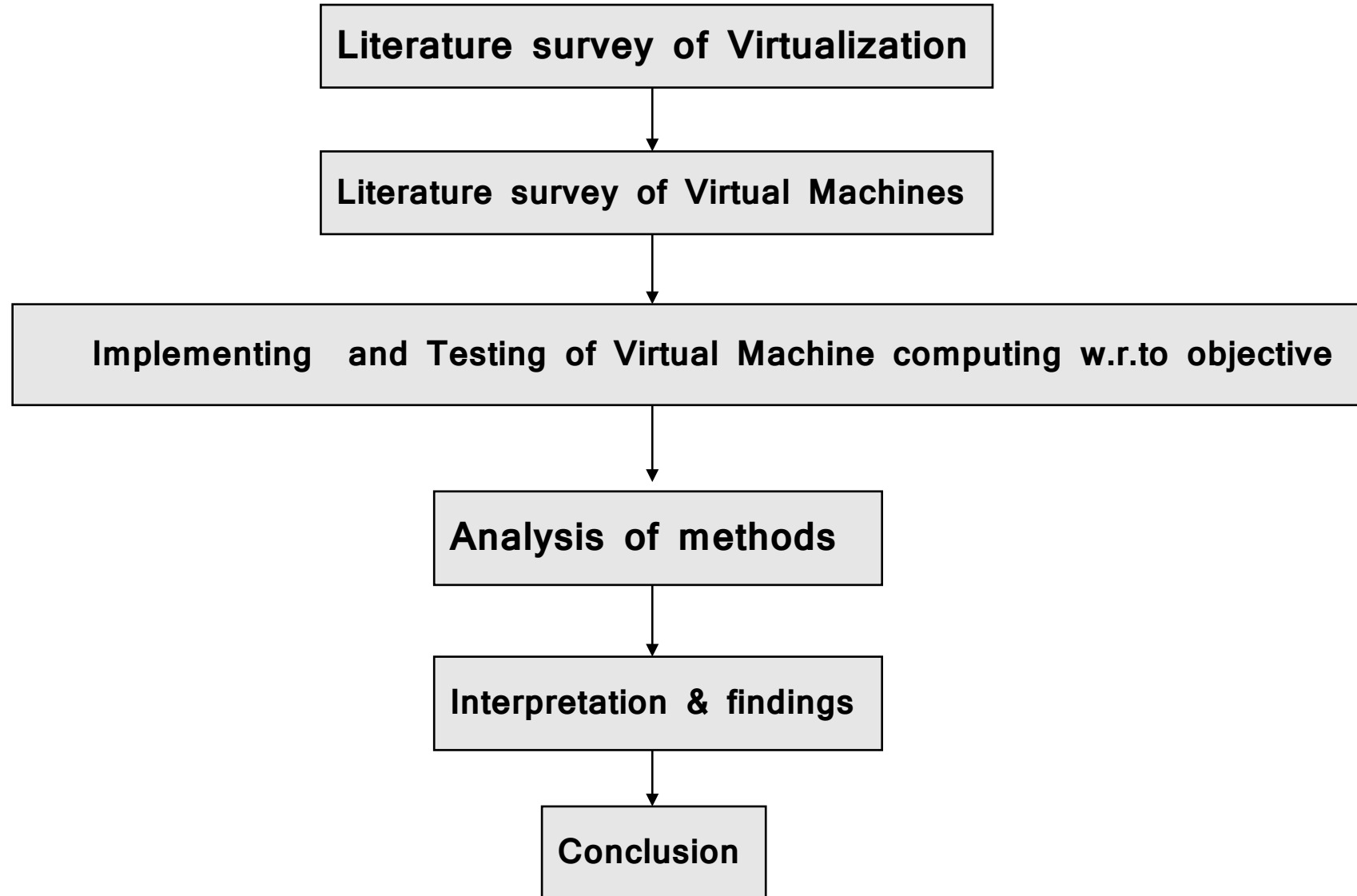
Technical Strategy/ Methodology: Research line of action



- Developed Cloud of Virtual Machines of variety of OS Windows , Linux etc of variety of version, Distinct Server and Client Operating System and Physical Machines, in order to use single physical Computer virtually as multiple computer systems along with server consolidation.
- Investigated, implemented and analyzed functionality and utility of the VM's with Various Operations for our objective resource optimization with saving server hardware per location, increased throughput, Improved Service Delivery, effortless deployments backup & disaster recovery and Cost Effective Framework.
- Developed a Data Centre and hosted Cloud of VM's on it.
- Distributed readily distributable VM's Widely through Data Centre leveraging shared Govt. Network NICNET to the NIC District Units who has downloaded and implemented the same at their respective locations.



ROADMAP





Nitin V. Choudhari, DIO, NIC, Akola receiving Certificate of eGovChampion for Year 2013-14 on the Occasion of UN Public Service Day, June 23rd 2013 in the presence of (from Left) Shri Oscar Fernandes (Union Cabinet Minister for Transport, Road and Highways, Government Of India), Ms. Lise Grande, UN Resident Coordinator, Prof M Moni, former DG, NIC



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This is to recognize

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as an **@gov** champion for the year 2013-2014

on the recommendation of

Moiz Husain Ali, SIO, Maharashtra

on the occasion of UN Public Service Day, June 23rd, 2013
in the presence of Ms. Lise Grande, UN Resident Coordinator, India


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- Thank you