

Discovery of Networking Devices in the Network

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Abstract: *It is very challenging to implement an efficient discovery module for the network. Each device in the network should be recorded by the company to trace the status of that device of presence or failure. The device discovery is done through three methods that are through IP range specification called Range Based Discovery, Device Based Discovery and Individual Discovery. In Range Based Discovery we use IP addresses of the devices which are manually recorded in our database. In Device Based Discovery the device manufacturer is specified and accordingly the IP address of the device is matched from the master database. In Individual Discovery a single IP address of the device is used to discover it. The reconciliation module has two discrepancies as per the discovery carried out. Discrepancies here are the differences in between the master database and the discovered database.*

Index Terms: *Network Elements (NE), Master Database, Discovery, Discovered Database, Reconciliation.*

I. Introduction

A computer network is a communication network, where the data between the computers are exchanged. In the computer network every communicating devices passes data to another communicating devices in the network along with some data connections. These data are sent through some media; either it is cable media or wireless media. The device in the network that creates, send and terminate the data is called as network node in the networking. Nodes can be host like servers also can be the networking device. When two devices can communicate with each other by exchanging the data, we can say that they are networked.

As the networking have been developed and become so advance, it became very essential to keep record of each and every devices present in the network. The network is a combination of multiple devices like switches, hubs, routers, etc. the network is a combination of arrangement of link and the devices in the network and the interconnection among all the devices present in the network.

As it is very essential to keep record of each and every device in the network which is done through three methods that are through IP range specification called Range Based Discovery, Device Based Discovery and Individual Discovery. If there is an inexperienced network administrator who have recently joined the organization may faces many problems because of unavailable discovery tool. Some time it becomes a difficult task even for the experienced administrator to keep the devices and the connectivity details of them within the track, when there is absence of proper method of visual representation. A network element is a manageable logical entity and it is used to unit multiple physical devices, allowing the single management system to manage distributed devices in a unified way.

For the company it is always very essential to keep record of each and every device in its network, so that details of the devices in the network can be kept in that network according to the presence status or the failure status of the device. The tracking every device is necessary to track the functioning of the device. It is very important to check whether all devices are alive or not. There are some existing systems, in those existing systems it is easy to run discovery but the reconciliation did not there and for reconciliation it needed the third party. Whenever there is addition of new device in the network the manual entry in the database is done and when next time discovery is performed, that device is get identified. This system doesn't allow the end user to perform the reconciliation of the information that is discovered of the devices in the network.

II. Related Work

SNMP:

Simple Network Management Protocol (SNMP) is a standard internet protocol which is used for managing the devices in the given networks. Devices in the network supporting SNMP are servers, switches, routers, printers, modem racks, workstations, etc. It is used to monitor the networking devices. SNMP a component of the IP Suite defined by the Internet Engineering Task Force (IETF). It contains a set of standards for management of the network; it also includes an application layer protocol that is a set of data objects and a database schema.

NMS:

A Network Management System (NMS) is combination of hardware and software which is used for monitoring and administrating a computer network. Each individual network element (NEs) in the network are get managed by an element management system. This device management includes accounting, configurations, performance, faults and security management. The management here includes discovery of the network inventory, monitoring the health of the devices and their status, providing the alerts to the conditions which impacts the system performance, and problems identification, their sources and the possible solutions. The NMS have been built on the following concepts:

- i. Provisioning
- ii. Troubleshooting
- iii. Fault Management System
- iv. Performance and Usage

EMS:

An Element Management System (EMS) consisting the systems and the applications used to manage NE on the Network Element Management Layer (NEL) of the Telecommunications Management Network (TMN) model. As it is recommended by the International Telecommunication Union - Telecommunication Standardization Sector (ITU-T), the main function of the EMS is divided into the five key areas - fault, configuration, accounting, performance and security. The parts of each of the FCAPS functionality fit into TMN models. An EMS manages multiple specific type of telecommunications NE. Typically, the EMS manages the functionality and capabilities within each NE in the network but doesn't manage the traffic between the different NEs in the given network. For supporting the management of the traffic in between itself and other NEs, the EMS always communicates to higher-level network management systems (NMS) as it is described in the telecommunications management network layered model.

NE:

A Network Element is a manageable logical entity that unit one or more physical devices. This allows distributed devices in the given network to be managed in a unified way under a single management system.

III. Need of the Project

In the existing system a tool known as IBM Tivoli Netcool Configuration manager is being used by the organization and it is used with the BulkLoader utility which is used to discover the bulk of the network elements and the result obtained aren't that much efficient for organizational standards. Each device when get added into the network, it manually enters its data and after that whenever the discovery process will be run the device will be identified. The existing systems doesn't allows end user to perform reconciliation of discovered information in the network.

Limitations of Existing System:

- i. Manual discovery
- ii. Static approach for discovery
- iii. Excessive time required
- iv. Difficulty to identify the end of discovery
- v. Database of NEs is maintained by third party

IV. System Architecture

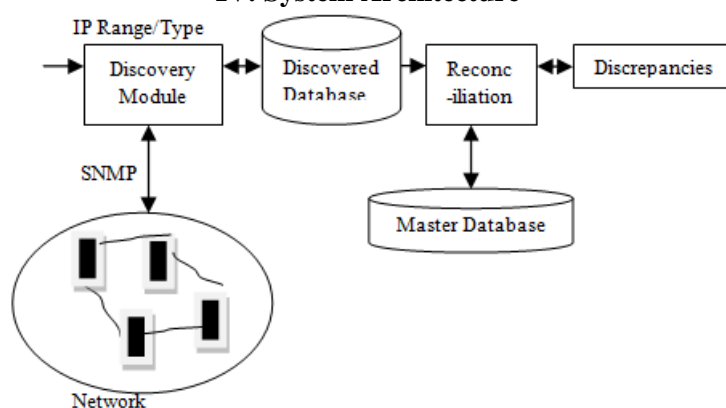


Fig – System Architecture

Architecture defines for the overall system. Discovery modules help us to find out for searching out new modules. As it is finished it is being stored in Discovery database. We can call this as a secondary database which is compared with actual database for finding the discrepancies. Reconciliation module then takes those discrepancies & ask user to reconcile. If user performs the reconciliation then changes are updated in main database.

In this system we are providing here the Ranges for this discovery, the Individual discovery and the Device based discovery of network elements from which Discovery by the help of device based was not available in existing system. By this new devices can be added and also new devices will deploy to the market at the time of Range Based Discovery and will also get added to main discovery. This will be saving a lot of time and also will be improving the efficiency of the system by reducing the efforts of the manual entry. Our system also having the options by which the user can perform the selection for updation of the database which can be either through the automatic updation functions or it can be done manually by user.

Discovery Module

Advanced system that will be providing the Range based discovery, the Individual discovery & the Device based discovery of network elements from this the devised based discovery will be absent in the existing system. This will be free from manual work. in our system also we have options that they can provide individual device discovery by this any user can search data by his own IP.

Discover through range of IPs or by using the device manufacturer, so here we come to know so when we finished with this discovery it will call to the end discovery.

1) Range based discovery:

This will be helpful if added any device will be get discovered at the time of the Range Based Discovery and which will get added to the main discovery. Users have ability to perform the selection for the updation of

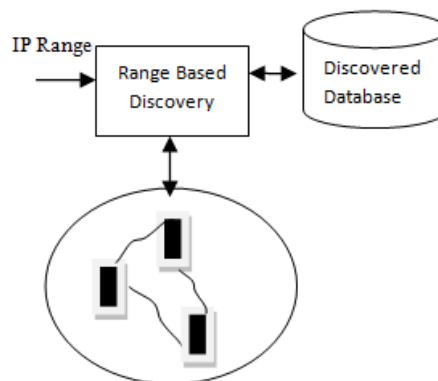


Fig- Range based Discovery Architecture

2) Individual discovery:

The Individual Device Discovery through which the user can perform search any one specific device by its IP

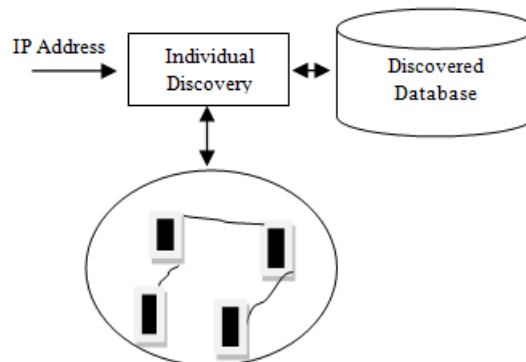


Fig-Individual Discovery Architecture

3) Device based discovery:

In the Device Based Discovery, specific manufacturer each and every network element is specified and the IP addresses depending on manufacturer we can fetch data from database also.

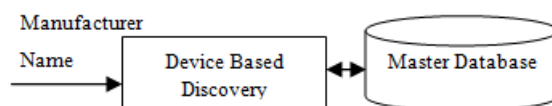


Fig - Device based discovery Architecture

Reconciliation Module

The Reconciliation module contains the two different types of differences depending upon the Discovery carried out as the Range based and the Device Based. Differences found out by matching the master database and the discovered database.

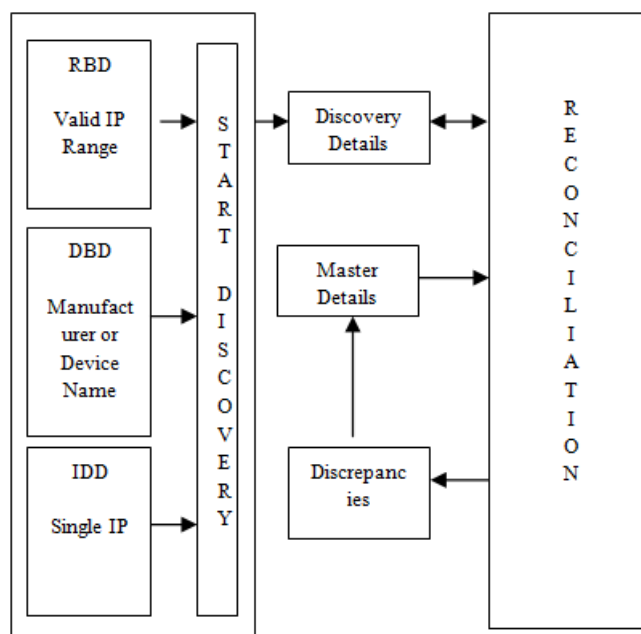


Fig – Reconciliation Architecture

V. Conclusion

In this paper, a Discovery module is proposed which overcomes all the issues and limitations of the existing system. It will improve the efficiency of the network. Discovery module helps to keep record of all the devices in the network.

References

- [1]. "Network Management – Principles and Practices" by *Mani Subramanian* Brief description for how to manage the network traffic and its issues. Use of SNMP in network for management of the network devices.
- [2]. Kishori M. Konwara, Dariusz Kowalski , Alexander A. Shvartsman for "Node discovery in networks" *Springer-Verlag Berlin Heidelberg 2006*
- [3]. Yigal Bejerano, Yuri Breitbart, Minos Garofalakis, Rajeev Rastogi at Bell Labs, Lucent Technologies , "Physical Topology Discovery for Large Multi-Subnet Networks", *IEEE Conference on network management,2003*
- [4]. Suman Pandey, Mi-Jung Choi, Sung-Joo Lee, James W. Hong for "IP Network Topology Discovery Using SNMP". *ICOIN'09 Proceedings of the 23rd international conference on Information Networking,2009*
- [5]. M. Shoaib Yousaf ,Ahmed Mattin ,Ahsan Raza Sattar, "Real Time Network Monitoring System in LAN Environment", *IJRIME, Volume1,Issue5, 2012*
- [6]. http://www.dpstele.com/layers/12_snmp_tutorials.php
- [7]. <http://www.manageengine.com/network-monitoring/what-is-snmp.html>
- [8]. http://publib.boulder.ibm.com/infocenter/tivihelp/v8r1/index.jsp?topic=/com.ibm.netcool_configurationmgr.doc_6.3.0/ncm/wip/discovery/concept/ncm_discovery_discoveringncm.html
- [9]. http://pic.dhe.ibm.com/infocenter/tivihelp/v45r1/index.jsp?topic=%2Fcom.ibm.tivoli.tpm.scenario.doc%2Fdiscovery%2Frdsc_advdiscovery.html
- [10]. <http://computernetworkingnotes.com/comptia-n-plus-study-guide/network-devices-hub-switch-router.html>
- [11]. <http://apple.stackexchange.com/questions/19783/how-do-i-know-the-ip-addresses-of-other-computers-in-my-Network>
- [12]. <http://verticalhorizons.in/snmp-message-format-snmp-pdu-format>