

## Extensive Reviews of OSPF and EIGRP Routing Protocols based on Route Summarization and Route Redistribution.

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### Abstract

The increasing demand of computer networks is growing rapidly day by day. The growing need to distribute applications across multiple networks with high capacity and high-performance intermediate switching nodes and networks. This research primarily focuses on route redistribution and route summarization of different intra-domain routing protocols such as EIGRP and OSPF. Routing Protocols that use facilitate to exchange routing information between routers. Reasons such as multiple departments managed by multiple network Administrators, company mergers. In any case, having a multiple routing protocol and different autonomous system in networks then without route redistribution we cannot advertise route from source to destination. Of course Network complexity will increase with the size of routing table of routers then route summarization is necessity, to reduce traffic and complexity of network.

**Keywords** – EIGRP, OSPF, Route summarization, Route redistribution.

### I. INTRODUCTION

Dynamic routing protocols and Hybrid protocols that scale better than distance vector routing protocols. It virtually has no practical Hop count limit. Providing Load balancing and introduction the concept of Area's to ease management and control traffic. It provides Authentication. Its convergence is faster than in Distance vector Routing protocols. The reason for that is it floods the changes to all neighboring routers simultaneously rather than in a chain. Both support Variable length subnet masking (VLSM), FLSM and Super netting. Provides bit-based Route summarization. There are no periodic updates. Updates are only sent when there are changes. OSPF use a Cost Value, instead of hop count. Cost is based on the speed of the link.  $Cost = (10^8 / \text{Bandwidth})$ . It relies on IP to deliver the Packets. Use port 89.

EIGRP uses DUAL to achieve rapid convergence. It Store a backup route if one is available, so it can quickly re-converge. In case route goes down. If no backup route exists, EIGRP send query to its neighbor until an alternate route is found. EIGRP and OSPF can support broadcast multi-access topology such as Token-Ring, and Ethernet. Point to Point topology such as HDLC. NBMA topology such as ATM.

EIGRP use multicasting address of 224.0.0.10 instead of broadcast. It Support unequal and equal cost path load-balancing. This feature will enable the administrators to distribute traffic flow in the network. By default EIGRP will use to 4 paths and we can increased up to 6.

### II. ROUTE SUMMARIZATION

When network is massive and complex. Then traffic of the network is going to be increase and conjointly increase size of the routing table, CPU utilization and memory. Thus reduce bandwidth and Speed of Links. Route summarization, additionally referred to as route aggregation, may be a technique of minimizing the amount of size of routing tables in network. It works by selected multiple routes into single route advert.

Summarizing is that the consolidation of multiple routes into one single promotional material. This can be done at the boundaries of Area Border Routers (ABRs). It cloud be configured between any two areas, it's higher to summarize within the direction of the backbone. This manner the backbone receives all the combination addresses and successively can inject them, already summarized, into alternative areas. Route summarizations are divided in two types

- Inter-area route summarization
- External route summarization

**Inter-area Route Summarization** is completed on ABRs and it applies to routes from inside the AS. It doesn't apply to external routes injected into OSPF via distribution. In order to take advantage of summarization, areas should be assigned in a contiguous the number of networks be able to lump these addresses into one range on one range

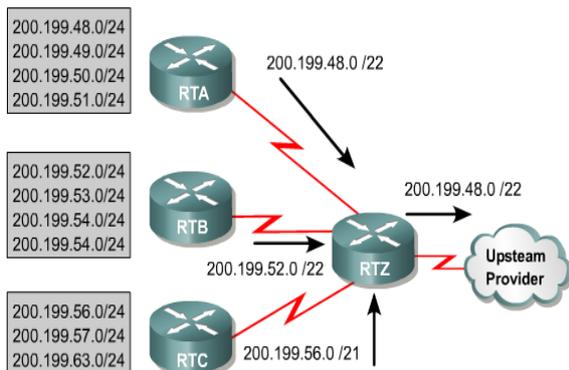
**Router (config-if) # area (area-id) range (address) (mask)**

**External route summarization** is to identify external routes that are injected into OSPF with redistribution. Therefore external ranges that are

being summarized are contiguous During Summarization overlapping from two different routers in these cause packets to be sent to the incorrect destination. Summarization is done using the following sub command:

**Router (config-if) # summary-address (ip-address) (mask)**

This command is effective one on only ASBRs doing redistribution with OSPF. Running different routing protocols is commonly a part of a network implementation. In any case, having a multiple protocol then distribution a necessity. Variations in routing protocol characteristics, like metrics, administrative distance, classful and classless capabilities will impact redistribution. Thought should lean to those variations for distribution to achieve giant internetworks, hundreds, or perhaps thousands, of network addresses will exist. It's typically problematic for routers to take care of this volume of routes in their routing tables. Router report (also known as route aggregation or super netting) will reduce number of routes that a router should maintain



Route summarization reduces routing table size by aggregating routes to multiple networks into one supernet.

Figure 1: Example of Route Summarization

### III. ROUTE REDISTRIBUTION

Route redistribution involves placing the routes learned from one routing domain, such as OSPF into another routing domain or protocols such as

EIGRP. When this occurs, you have several problems to address, one of which is metrics. Each routing protocol has its own way of determining the best path to a network. RIP uses hop counts, and IGRP and EIGRP both use a composite metric of bandwidth, reliability, load, delay, and MTU size, OSPF and IS-IS uses cost. Because of the differences in metric calculations when redistributing routes then you lose all metrics and must manually specify the cost metric for each routing domain. This is because OSPF has no way of translating bandwidth,

reliability, delay, load, and MTU size into cost, and vice versa. Another issue to address with route redistribution is that some routing protocols are classful meaning that the routing protocol doesn't send subnet mask information in the routing updates (for example, in IGRP and RIP). In addition, some protocols are classless, meaning that the routing protocol does send subnet mask information in the routing updates (for example as EIGRP Protocol). This poses a problem when classless interdomain routing (CIDR) and variable-length subnet masking (VLSM) routes need to be redistributed from a classless routing protocol into a classful routing protocol.

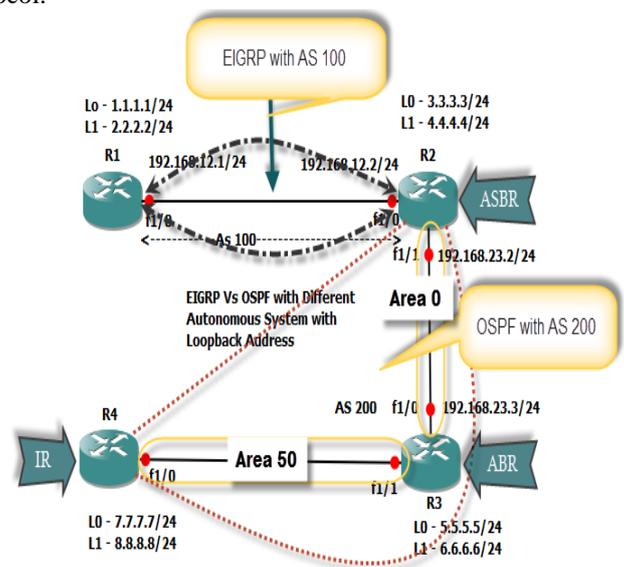


Figure 2: Route Redistribution between OSPF and EIGRP with Different Autonomous Systems.

### IV. LITERATURE REVIEW

Y. Navaneeth Krishnan, Dr Shobha [6] In this paper explored two eminent protocols namely Open Shortest Path First (OSPF) and Enhanced Interior Gateway Routing Protocol (EIGRP). Performed based on the Quantitative metrics such as Convergence Time, End-to-End delays, Throughput and Packet Loss through the simulated network models. The evaluation results indicate that EIGRP routing protocol provides a better performance than OSPF routing protocol for real time. Conclude that EIGRP uses less system resources when compared to OSPF. A use of less system resources of EIGRP Routing protocol that produces lesser heat and therefore the cooling Cost is also saved.

Mr. Rajneesh Narula, Mr. Kaushal [7] This research focuses on the design and performance of Hybrid Network incorporating different intra-domain routing algorithms and performed the transmission of video-

and voice-data streams over Hybrid network. Discussed classification of Routing Protocols such as Distance vector routing protocol and Link state routing then compared IS-IS & RIP and IS-IS & OSPF on various performance parameters for video & voice data transmission.

Jagdeep Singh, Dr. Rajiv Mahajan [8] Here in this paper OPNET simulation tool is used to analyzed the performance of different routing protocols RIP, EIGRP and OSPF .Simulated Email Download Response Time, Email Upload Response Time, Using Throughput parameter determined that EIGRP has higher throughput and less packet loss than other protocols. Also Found that EIGRP performs poor for Email download and upload response time and DB query response time. While RIP performs well.

Vishal Sharma, Rajneesh Narula ,Sumeer Khullar [9]This paper compared the performance of intra-domain routing protocols such as Enhanced Interior Gateway Protocols of IEEE 802.3 LAN by evaluating

various parameters including Network convergence time, Delay Variation, End to End Delay, Utilization, Throughput, Queuing Delay and IP Processing Delay and Also compared the performance of video- and voice-data on the entire networks results found that IGRP routing protocol enabled networks performs better than that of EIGRP.

Chandra Wijaya[10] OSPF and EIGRP will distribute routing information between routers in the same autonomous system. In This research found that how routing protocol works and compare those dynamic routing protocols in IPv4 and IPv6 environments. Simulated Network based on GNS3 and Packet Tracer software. The conclusions according to simulation and analysis performed that Packet sends in an IPv4 networks is smaller than the packet sends in an IPv6 networks. packet loss is smaller when using EIGRP as compared with OSPF. Whether it is using an IPv4 addressing or IPv6 addressing. EIGRP packets sent has a smaller size compared to the packets sent by OSPF

**Table 1: Summary of Literature Review**

<i>Year</i>	<i>Author</i>	<i>Title</i>	<i>Approach</i>	<i>Result</i>
2013	Y.Navaneeth Krishnan , Dr Shobha G	Performance Analysis of OSPF and EIGRP Routing Protocols for Greener Internetworking	Operation and Comparison of EIGRP and OSPF Routing Protocol.	EIGRP uses less system resources when compared to OSPF.
2013	Mr. Rajneesh Narula, Mr. Kaushal	Performance Analysis and Evaluation of Hybrid Network using different Integrated Routing Protocols	The design and performance of Hybrid Network incorporating different intra-domain routing protocols using OPNET simulator.	Analysis has been done in the same network with IS-IS RIP against IS-IS OSPF routing protocols for real time applications.
2013	Jagdeep Singh, Dr. Rajiv Mahajan	Simulation Based Comparative Study of RIP, OSPF and EIGRP	Calculate Response time, Throughput, Point to Point utilization	EIGRP behaves well and its performance is better than RIP
2012	Vishal Sharm,Rajneesh Narula, Sumeer Khullar	Performance Analysis of IEEE 802.3 using IGRP and EIGRP Routing Protocols	IGRP and EIGRP Of IEEE 802.3 LAN by evaluating Network convergence time.	IGRP routing protocol enabled networks performs better than that of EIGRP. The EIGRP protocol behaves well in terms of point-to-point throughput.

2011	Chandra Wijaya	Performance Analysis of Dynamic Routing Protocol EIGRP and OSPF in IPv4 and IPv6 Network.	OSPF and EIGRP will distribute routing information between routers in the same autonomous system based On IPv4 and IPv6.	The number of packet loss is smaller when using EIGRP as compared with OSPF.
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## V. CONCLUSION

From the results obtained in our experiments that when multiple routing protocols and Autonomous systems are communicate in the Hybrid networks (OSPF vs. EIGRP protocols with Different AS) then route redistribution is necessary to advertise route from source network to destination. OSPF support unlimited hop count values means that it is able to communicate unlimited routers network. Due to large network. Size of routing table, CPU and Memory utilization of the routers and also traffic of networks will increase that can be successfully reduced by route summarization.

## VI. ACKNOWLEDGMENT

I am deeply indebted my respected dissertation guide and HOD. Whose stimulating, motivation and valuable ideas helped me to complete this work. I would wish to impart all the who contributed in how to the work represented.

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