



## External Border Gateway Protocol (EBGP) Routing Design In Router Core

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### ABSTRACT

An autonomous system (AS) is the collection of networks having the same set of routing policies. Each AS has administrative control to its own inter-domain routing policy. Computer networks consisting of a bunch of AS's with different routing will not be able to interconnection one another. This is causes communication in the network to be inhibited. For that we need a protocol that can connect each different AS. External Border Gateway Protocol (EBGP) is an inter-domain routing protocol ie between different AS that is used to exchange routing information between them. In a typical inter-network (and in the Internet) each autonomous system designs one or more routers that run EBGP software. EBGP routers in each AS are linked to those in one or more other AS. The ability to exchange table routing information between Autonomous System (AS) is one of the advantages of EBGP. EBGP implements routing policies based on a set of attributes accompanying each route used to pick the "shortest" path across multiple AS, along with one or more routing policies. EBGP uses an algorithm which cannot be classified as a pure "Distance Vector", or pure "Link State". It is a path vector routing protocol as it defines a route as a collection of a number of AS that is passes through from source AS to destination AS. This paper discusses the implementation of the EBGP routing protocol in the network that have different AS in order to interconnect. Its application using Graphic Network Simulator (GNS3) software for prototyping and simulating network. So that later can be applied to the actual network.

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## 1. Introduction

In the current era, the rapid development of technology has made human needs for internet access increase. The internet can connect everyone through a communication device that supports an internet connection and is connected to an internet service provider[1]. An internet service provider is a company or an organization that provides internet access connection services for individuals, offices, campuses, schools, and others.[2].

PT. Arsen Kusuma Indonesia is one of the internet service providers in Indonesia. PT. Arsen Kusuma Indonesia itself has branches in three locations, namely Cyber, Duren Tiga and Kokas. Currently, the implementation of routing at the backbone router or distribution of PT. Arsen Kusuma Indonesia still uses static routing and relies on the vendor for dynamic routing protocols to the internet[3].

Along with technological developments in the world, Service Providers using static routing protocols on backbone routers or distribution routers are no longer efficient considering there are too many IP addresses being routed. Routing protocol is useful for managing data communication lines in a computer network[4].

Static routing is a type of routing performed by network managers to manually configure information about the destination network[5]. The use of static routing can only be used on small scale networks, therefore on large scale networks such as internet service providers it is not recommended to use static routing because it will make it difficult for network administrators to manage and make repairs if there are problems with the



network.[6]. Therefore, dynamic routing is needed on large slaka networks because it will make it easier for network admins to manage data traffic and also make it easier to make repairs on the network.[7].

PT. Arsen Kusuma Indonesia has a large network of internet service providers. This requires dynamic routing using an external border gateway protocol (EBGP) to regulate data traffic towards the local and international internet[8]. Based on the research results, EBGP can connect two autonomous systems, so that communication can run smoothly. This makes BGP an alternative routing between domains (autonomous system).[9]. To use the routing external border gateway protocol (EBGP), an autonomous system (AS) is also needed to connect the dynamic external border gateway protocol routing to each router. BGP has been quite successful in providing routing between autonomous systems that is relatively stable[10].

## 2. Research Method

The research method carried out is described as illustrated below:

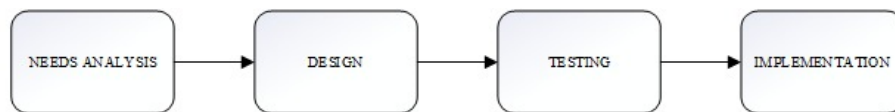


Fig 2. Research method

## 3. Result

### 3.1. Analysis

Two routers where one router for routing ebgp with upstream PT MEGA AKSES PERSADA (FIBERSTAR) then one router for the purposes of managing office networks and switch manage to be distributed to each room.

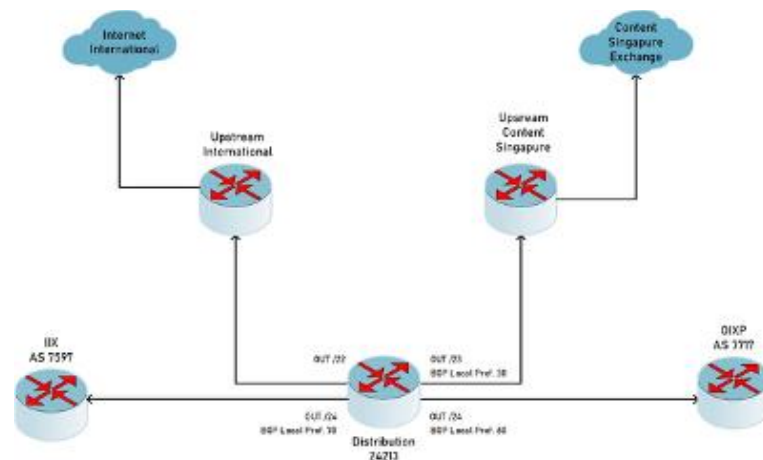


Fig 2. Analysis of the needs under study

### 3.2. Design

In the picture below, the network topology that will be used as a proposed network design that will change is the design on the international upstream side which previously only used a single upstream with a static routing method where the IP address is advertised from the upstream side, currently designed to use dual upstream and use the ebgp multihoming routing method so that if one upstream has a problem it can go through the upstream backup so that the internet network can run normally without any downtime.

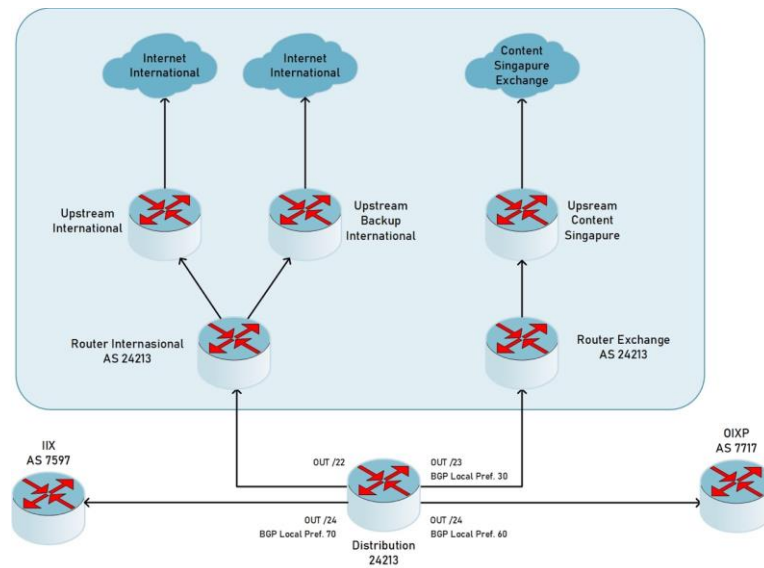


Fig 3. Proposed network design

### 3.3. Testing

In the initial test, using a proxy router device that is in the GNS3 server simulation software of PT Arsen Kusuma Indonesia and will use point-to-point private ip which is used as a connecting line between arsen router and upstream router for implementing external bgp (EBGP) routing

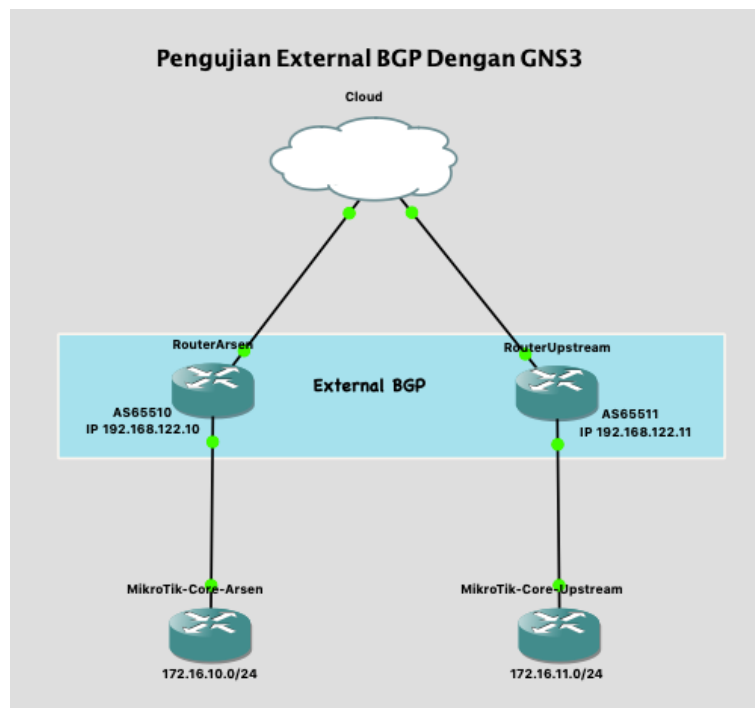
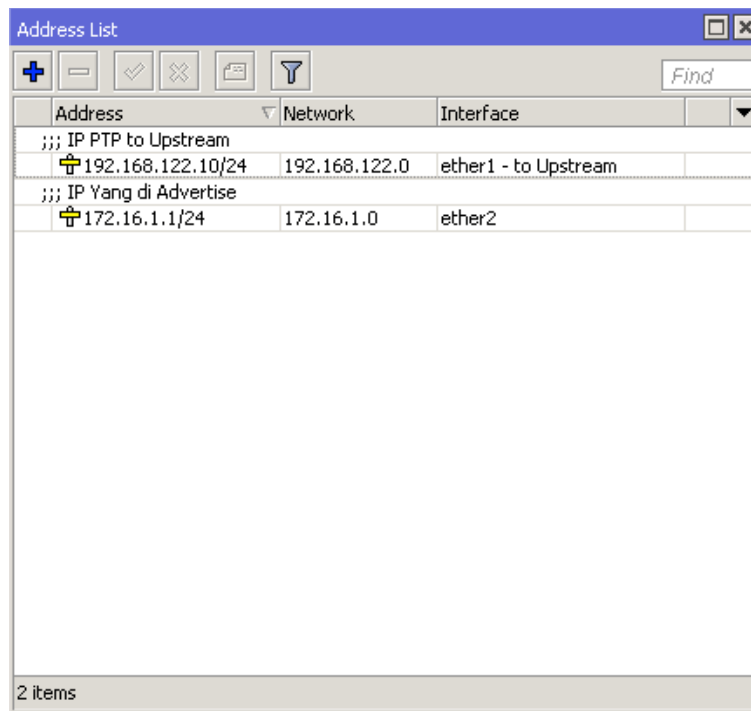


Fig 4. External BGP Testing

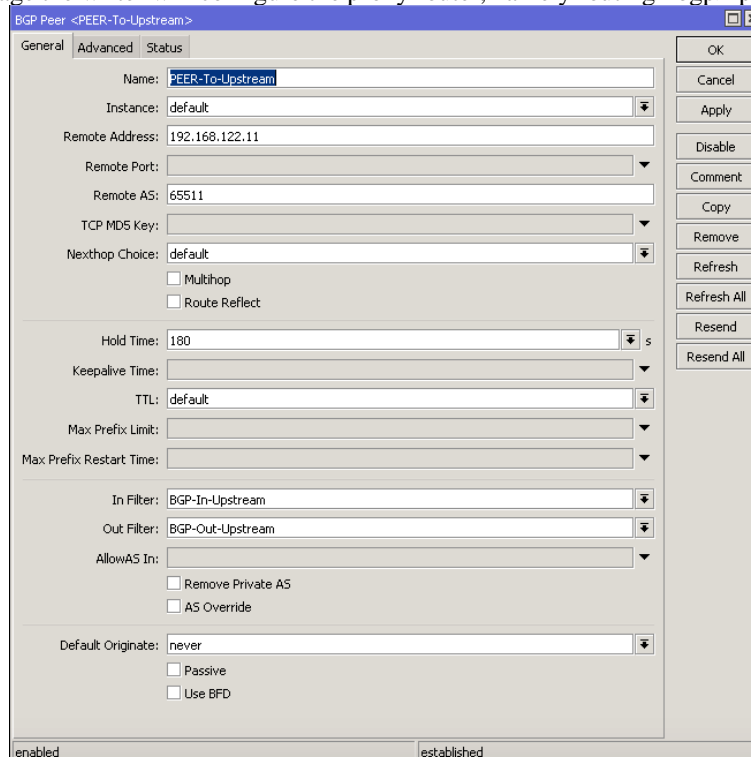
### 3.4. Implementation

In designing the external border gateway protocol routing, the writer designed 2 routers simulated by PT Arsen Kusuma Indonesia, where each router will be connected to each other peer to the ISP transit provider, namely PT. Media Akses Persada, the following configuration on the router:



**Fig 5.** Implementation of External BGP

In the next stage the writer will configure the proxy router, namely routing> bgp> peer as follows:



**Fig 6.** BGP peer configuration

In the next step, we can see the peer status that we have advertised as follows:

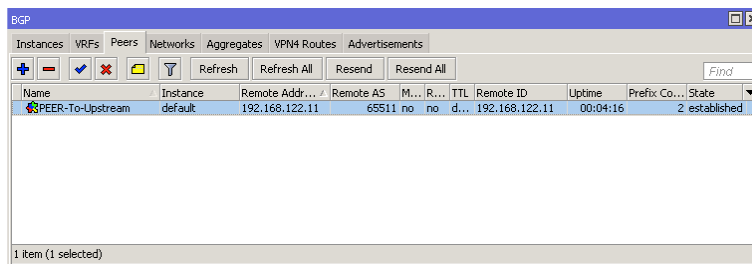


Fig 7. BGP peer established status

Furthermore, the author will conduct a traceroute from the PT Arsen Kusuma Indonesia network to the international site facebook.com as follows:

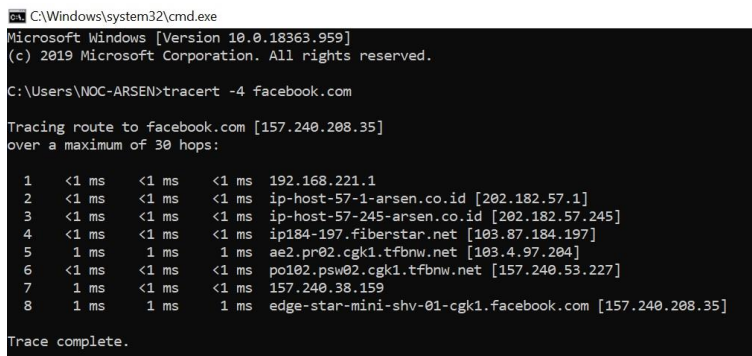


Fig 8. Traceroute results

Furthermore, the author can also monitor the PT Arsen Kusuma Indonesia network using monitoring.arsen.co.id where on the website we see bandwidth traffic running both download and upload as follows:

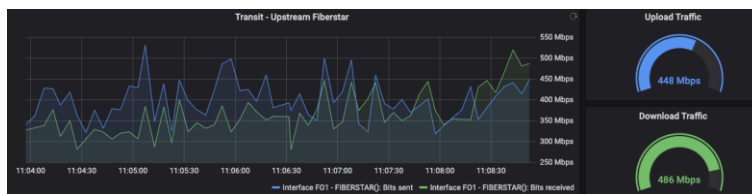


Fig 9. Traffic monitoring

Based on the author explains how in designing the External Border Gateway Protocol routing in the PT Arsen Kusuma Indonesia router that for setting the IP address and AS number given from the transit service provider we can monitor our peer router if the peer status is not established we can complain to the service provider. transit.

#### 4. Conclusion

From the results of the description discussed above, it can be concluded that the basic configuration in routing the External Border Gateway Protocol can work well if the upstream or arsenic can provide public ip or private ip as point to point to be embedded in each router. which will do the peer, the External Border Gateway Protocol (EBGP) routing. Each provider or client must have an Autonomous System (AS) Number to perform peer routing of the External Border Gateway Protocol (EBGP).

In configuring the External Border Gateway Protocol on each router, it must be connected with a cable, either an Unshield Twisted Pair (UTP) cable or using Fiber Optic (FO), must be connected to one another, either using additional devices such as switches or directly from the router to the router. . In conducting EBGp Routing PT Arsen Kusuma Indonesia must filter on routers, which IPs can be advertised and which IPs cannot be used to prevent routing leaks that will affect the global network.



In routing ebgp to make sure that the configuration is running or not, we can look inside a router at Routing> BGP> Peer where we can see the status of bgp is running or not. If the ebgp routing is running, we will see the established status and get the ip prefix from the upstream side.

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