The Peerian Journal
Open Access | Peer Reviewed
Volume 1, November, 2021.
ISSN (E): 2788-0303
Website: www.peerianjournal.com
Email: editor@peerianjournal.com

Compile a routing table using a static routing algorithm

Lachashvili Tamaz
Telavi State University named after I. Gogebashvili
Zhonzholadze Nino
Telavi State University named after I. Gogebashvili

Summary: The example we offer is interesting in that in the process of performing calculations, the existing routes are repeatedly replaced by shorter ones and each subsequent computation process must be considered to get the correct final result. However, in the real situation it is noteworthy that only the short distance does not determine the factor of fast delivery of information. The example under consideration is a rather interesting visible option for solving the given task (by determining the optimal shortest path) and can be successfully used in the learning process in this direction.

Keywords: 1. router; 2. Package; 3. Router; 4. Optimal; 5. Interface; 6. Network.

In computer networks, information is transmitted through many intermediate routing devices that are divided into small packets. When a packet istransmitted from a local network to remote networks, the destination address is the Default gateway. It is necessary to connect a local network to the Internet. Typically, each network to which a router connects requires a separate interface. This interface is used to connect to both local area networks (LANs) and wide area networks (WANs). In most cases, a LAN is an Ethernet network. WAN networks are used to access networks over large areas. For example, a WAN is typically used to connect a LAN Internet Service Provider (ISP).

In this process, devices called routers are actively used. Their main functions are: determining the optimal way of transmitting packets; Transfer of packets to their destination.

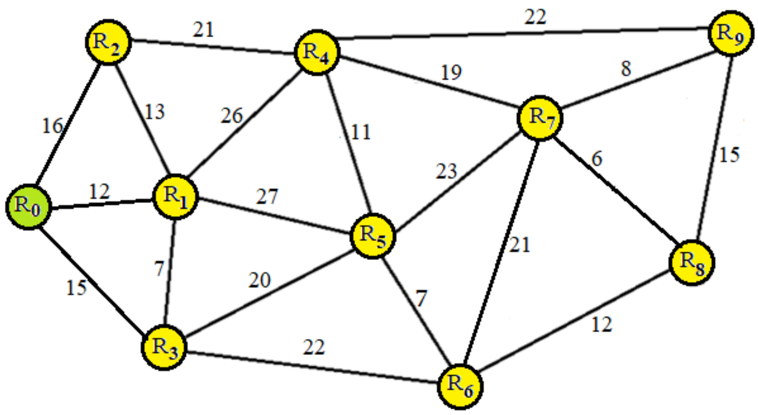
The router uses its own routing table to find the best packet forwarding route. When the router receives a packet, it checks the destination of the packet and uses the routing table to find the optimal path to the desired network. In addition,the routing

The Peerian Journal
Open Access | Peer Reviewed
Volume 1, November, 2021. ISSN (E): 2788-0303
Website: www.peerianjournal.com Email: editor@peerianjournal.com

table defines the interface through which packets should be routed to each known setand. In the case of finding the optimalroute, the router encapsulates the packet and sends it to the destination.

Consider this task for a specific part of the network.

Here is a fragment of the R_0 - R_9 network with the distances between the routers. Let's find the shortest optimal path for router R_0 to the rest of the routers and make the route paths in the form of a table.



Decision

We perform this taskaccording to a certain rule, known as Edwin Dijkstra. We begin to determine the distances with small numerical indicators. During the solution, if at the next stage the path to the router is less than the real version, its replacement obtained short distance.

The nearest router for R_0 is router R_1 with data 12. Andthat indicator does not changeandcan be entered into the table.

Similarly, the distance R_0 - R_3equal to 15 will not change.

Следующее расстояние R_0 - R_2 равно 16.

For R_1, the closest is R_3 at a distance of$_7$, but since this data is morethan the direct distanceof R 1, i.e., 12 + 7 = 20, then for R_3 the situation will not change and the value of the direct path from R_0 15 will remain.

Similarly, the situation will not change for R_2 and will remain 16, because the distance to R2 12 + 13 = 25, which is greater than the straight distance 16.

The Peerian Journal
Open Access | Peer Reviewed
Volume 1, November, 2021. ISSN (E): 2788-0303
Website: www.peerianjournal.com Email: editor@peerianjournal.com

The next closest router from R_1 is R_4, at a distance of 26. For R_0, we get the following value: R_0 - R_1 --R_4 = 12 + 26 = 38. Enter this data intothe table, and in casethe distancee is less, replace it with the shortest one.

The next step is R_0 -- R_1 -- R5 = 12 + 27 = 39. This data will also be added to the table.

At this point, we have determinedor all possible distances from R_1 to all directly connected routers. Witha leading step will be the distance from R_3. The closest isR1, and this does not change the situation for R_0 (since 12 + 7 = 19 and greater than 15).

The next step is the distance to R_5, which is equal to20, we get: R_0 -- R_3 -- R5 = 15 +20 = 35. Since this distance is less than the previous route R_0 -- R_1 --R_5 = 12 + 27 = 39, we will have to change this indicator.

At the next step, a new routizator R_6isconnected, we get: R_0 - R_3 - R_6 = 15 + 22 = 37. Enter in the table.

For router R_3 we have considered all the cases. Next will be the distance from R_2.Here the situation with R_1 and R_0 does not change, but for R_4 we get: R_0 -- R_2 -- R_4 = 16 + 21 = 37. Since this route is shorter than the already discussed R_0 – R_1 -- R_4 = 12 +26 = 38, we're also going to have to change it.

For R_1,R_2 and R_3 we have looked at all the routes. The next closest router is R_5,the distance from R_0 is 35. Here for the rest of the routers the situation does not change because the distance from R5 is$_{greater}$ than the previous options. A new router R 7 distance is added: R_0 -- R_1-- R_5 -- R_7 = 12 + 27 + 23 = 62. (Let's add it to the table).

Since routers R_4 and R6 from R_0 are removed by the same distance - 37, to continue the calculations, we choose any router, conditionally R_6,and get: R_0 -- R_3 - R_6 - R_8 = 15 + 22 + 12 = 49. (Let's add it to the table).

Что касается R_7, здесь ситуация изменится, т.к. R_0 - R_3 - R_6 - R_7 = 15 + 22 + 21 = 58, а этот показатель меньше предыдущего расстоя R_0 -- R_1 -- R_5 -- R_7 = 12 + 27 + 23 = 62. (Изменяем на 58).

Для маршрутизатора R_4 добавляем новый маршрутизатор R9 и получаем: R_0 --- R_2 --- R_4 --- R_9 = 16 + 21 + 22 = 59. (Внесём в таблицу).

От R_4 до R_7 мы имеем: R_0 -- R_2 -- R_4 -- R_7 = 16 + 21 + 19 = 56, а это означает, что мы долнны изменить предыдущий маршрут R_0 - R_3 - R_6 - R_7 = 15 + 22 + 21 = 58, т.к. этот путь короч.

With respect to R_9,thesituation does not change (because R_0 --- R_3 --- R_6 ---R_8 - R_9 = 15 + 22 + 12 + 15 = 64 and this figure is more than the previous indicator of 59).

As for the distance from R_8 through R_7,we get: R_0 --- R_3 --- R_6 --- R_8 --- R_7 = 15 + 22 + 12 +6 = 55 and since this route is shorter than route R_0 - R_2 - R_4 - R_7 = 16

The Peerian Journal
Open Access | Peer Reviewed
Volume 1, November, 2021. ISSN (E): 2788-0303
Website: www.peerianjournal.com Email: editor@peerianjournal.com

+ 21 +19 = 56, we will have to again replace it with the latest result. As a result, the table will look like this:

Router routes R_0:

Destination Routers	Route of the shortest path	Distance (km)
R_1	R_0 --- R_1	12
R_2	R_0 --- R_2	16
R_3	R_0 --- R_3	15
R_4	R_0 --- R_2 --- R_4	16+21=37
R_5	R_0 --- R_3 --- R_5	15+20=35
R_6	R_0 --- R_3 --- R_6	15+22=37
R7	R_0 -- R_3 -- R_6 -- R_8 -- R_7	15+22+12+6=55
R8	R_0 --- R_3 --- R_6 --- R_8	15+22+12=49
R9	R_0 --- R_2 --- R_4 --- R_9	16+21+22=59

These calculations are performed by computer programs. Having found the shortest way to all routers, we make a so-called routing table, and router R_0 sends this data to other routers. Thus, from the other routers it receives tables compiled by the same method, and finally, the optimal way to send packets to remote routers becomes known to each router.

The example we offered is interesting because in the process of calculation, the available routes are repeatedly replaced by shorter ones, and each subsequent calculation process is provided to obtain the correct final result. In a real situation, it should be noted thatthe factorof rapiddeliveryof information is not only the brevity of the distance. A number of algorithms are based on many other criteria, such as: determination short time intervals between sending and returning information; the number of routers, i.e. the number of transit nodes through which the group of transmitted packets passes; shipping rate or any combination of the listed criteria, etc.

The example proposed by us is a rather interesting option for solving this problem on the basis of determining the optimally shortest path, and can be successfully used in the learning process in this direction.

The Peerian Journal

Open Access | Peer Reviewed

Volume 1, November, 2021. **ISSN (E): 2788-0303**

Website: www.peerianjournal.com **Email:** editor@peerianjournal.com

Literature:

1. J Beridze, T. Burkadze, A. Burkadze. *Control and routing in computer networks,* Tbilisi 2009
2. Olifer V. G., Olifer N. A. Computer networks. Saint Petersburg. "Peter". 2006-762c

The Peerian Journal
Open Access | Peer Reviewed
Volume 1, November, 2021.
ISSN (E): 2788-0303
Website: www.peerianjournal.com
Email: editor@peerianjournal.com

Drawing up a minibus using a satable algorithm for routine

Lachashvili Tamaz
I. Gogebashvili Telavi State University
Jozhzholadze Nino
I. Gogebashvili Telavi State University

Keywords: 1. Router; 2. Package; 3. router; 4. optimal; 5. interface; 6. Network.

Information is transmitted through many intermediate minibus devices in computer networks, partitioning of which occurs in the form of small packages. When transferring packages to networks empty from the local network, the destination address is the Default gateway. It is necessary to use it to connect the local network to the Internet. As a rule, each network connected by the router requires a separate interface. This interface is used to connect both local networks (LAN) and global networks (WAN). In most cases, LAN is an Ethernet network. WANS are used to connect to large areas of networks. For example, connections to WAN are usually used to enable LAN's internet provider (ISP) network.

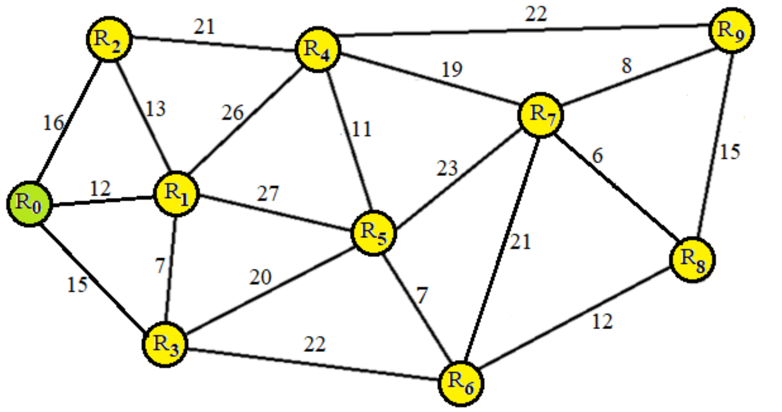
In this process, devices called routers are actively used. Their main functions are: determining the optimal path to package transfer; Forward packages to the destination.

The router uses its own routing table to find the best route for sending the package. When the router receives a package, it checks the destination of the package and uses the route table to find the optimal path to the desired network. In addition, the routing table provides for which interface to override packages on each famous network. If the optimal route is detected, the router incaptures the package and sends the package to its destination.

Consider the above task of the network of specific fragments.

There is a fragment of the network between R_0 – R_9 routers with direct distances.

The Peerian Journal
Open Access | Peer Reviewed
Volume 1, November, 2021.
ISSN (E): 2788-0303
Website: www.peerianjournal.com
Email: editor@peerianjournal.com



Unralm:

The solution of this task must be fulfilled according to a certain rule known asEdwin Dejkstra (Edwin Dijkstra) as follows: we begin to determine distances from the smallest numerical data.

The R_0 router is closest to the R_1 router data 12. This data will no longer change and we can enter the table.

Similarly, the distance R_0 - R3 will notchange, which is equal to 15.

The next distance R_0 - R_2 is equal to 16.

We start calming the calculations from these routers from R_1, as it is closestto R_0. R_1 is closestto R_3 at a distance of 7, but since this data is greater at a direct distance, that is, 12+7=20, therefore,for R_3 the situation will not change and the meaning of the direct road from R_0 to 15 will remain.

Similarly, the situation will not change for $R_2$and will remain 16, since the distanceR to R_2 is 12+13=25 and it is more directly at a distance of 16.

The next closest router from$R_1$is R_4 at a distance of 26. For R_0 - we will have: R_0 -- R_1 --R_4 = 12+26 = 38. Enter this data into the table, and when fixing the next step, we will replace it with the shortest possible distance.

The next step is R_0 -- R_1 -- R_5 = 12+27=39. Enter this data in the table as well.

At this stage, remove the distance from $R_1$to all directly connected routers, the next step will bethe distance from R_3.is the closest to R_1, and this will not change the situationfor R_0,(since 12+7=19 and more than 15).

The next step, - the distance to R_5,equal to 20, we will have: R_0 -- R_3 -- R_5 = 15 +20 = 35. because, this distance is smaller than the present route R_0 -- R_1 --R_5 =12+27=39, we will have to replace this data.

At the next stage, a new router R_6 is attached, we will have: R_0 – R_3 – R_6 = 15+22=37.

The Peerian Journal
Open Access | Peer Reviewed
Volume 1, November, 2021. ISSN (E): 2788-0303
Website: www.peerianjournal.com Email: editor@peerianjournal.com

For R_3 router, remove all the cases, the next will bethe distance from R 2 to R_1. the situation herewith $R_1$and R_0 will not change, andfor R_4 we will have: R_0 -- R_2 -- R_4 = 16 + 21=37, because this route is shorter thanthe present defined R_0 -- R_1 -- R_4 = 12+26 = 38, here we will have to replace.

For $R_{1,}R_2$ and $R_{3,}$remove all routes, the next nearest router with R_5 distanceR_0 to 35. The situation for the rest of the routers here will not change, sincethe distance from $R_5$is greater than the present options, adding a new router R_7 at a distance: R_0 -- R_1-- R_5 -- R 7 -- R_7 =12+27+23 = 62 (enter into the table).

Since R_4 and R_6 routersR_0 at an equal distance, at an equal distance of 37, choose any, conditionally R 6, conditionally R 6, we will have R_0 --- R_3 --- R_6 --- R_8 = 15+22+12=49, (enter in the table).

As for R7, the situation will change because, R_0 -- R_3 -- R_6 -- R_7 = 15+22+21=58, and this data is less than the present distance R_0 -- R_1-- R_5 -- R_7 =12+27+23 = 62. (Replace with 58).

R_4 მარშრუტიზატორისათვის გვემატება ახალი მარშრუტიზატორი R_9 , გვექნება: R_0 --- R_2 --- R_4 --- R_9 = 16+21+22=59 , (შევიტანოთ ცხრილში).

We will have R_4 to Rfor$_{7:}$ R_0 -- R_2 -- R_4 -- R_7 = 16 + 21+19 = 56, which means that we need to replace the present route R_0 -- R_3 -- R_6 -- R_7 = 15+22+21=58, because this path is shorter.

Waste distance from the R_8 router. The condition will not change in relation toR_9 (since R_0 --- R_3 --- R_6 --- R_8 -- R_9 = 15+22+12+15= 64, and this data is greater than the previous route data on 59).

As for the distance through R_8 up to $R_{7,}$we will have:

R_0 --- R_3 --- R_6 --- R_8 --- R_7 = 15+22+12 +6 = 55, and since this route is shorter than route R_0 -- R_2 -- R_4 -- R_7 = 16 + 21+19 = 56, we will still have to replace the last result.

Router $R_{0's}$utilization roads:

Destination Router	Shortest road route	Distance (km)
R_1	R_0 --- R_1	12
R_2	R_0 --- R_2	16
R_3	R_0 --- R_3	15
R_4	R_0 --- R_2 --- R_4	16+21=37
R_5	R_0 --- R_3 --- R_5	15+20=35
R_6	R_0 --- R_3 --- R_6	15+22=37
R7	R_0 -- R_3 -- R_6 -- R_8 -- R_7	15+22+12+6=55

The Peerian Journal
Open Access | Peer Reviewed
Volume 1, November, 2021. ISSN (E): 2788-0303
Website: www.peerianjournal.com Email: editor@peerianjournal.com

Destination Router	Shortest road route	Distance (km)
R8	R_0 --- R_3 --- R_6 --- R_8	15+22+12=49
R9	R_0 --- R_2 --- R_4 --- R_9	16+21+22=59

Clearly, these calculations are carried out through computer programs. What the shortest way to all routers is found, the so-called minibus, which the R_0 router sends to the rest of the routers, thus, the tables drawn by the same method are taken from the rest of the routers, and finally, the optimal way to forward packages to remote routers becomes known to each router.

The example we offer is interesting in the fact that in the process of performing calculations, the existing route is replaced in a shorter way, and each subsequent calculation process should be taken into account to get the correct final result. In real situation, it is noteworthy that only the lack of distances does not determine the factor of quick delivery of information. A number of algorithms are based on many other criteria, such as: considering short intervals of time for forwarding information and returning; The number of routers, that is, the number of transit nodes that the group of packages will have to pass; forwarding tariffs, or any combination of the listed criteria, etc.

The example we offer is a rather interesting visible option for solving the task according to the optimally shortest path determination and can be successfully used in this direction in the learning process.

References:

3. J. Beridze, T. Burkadze, A. Burkadze. *Management and routing of computer networks in* Tbilisi 2009.
4. Olifer V. G., Olifer N. A. Computer networks. Saint Petersburg. "Peter". 2006-762c

Resume

The example we offer is interesting in the fact that in the process of performing calculations, the existing route is replaced in a shorter way, and each subsequent calculation process should be taken into account to get the correct final result, however, in real situation it is noteworthy that only the lack of distances does not determine the factor of fast delivery of information. The example discussed is a rather interesting visible option for solving the task (optimally the shortest way to determine) and can be successfully used in this direction in the learning process.