

How our network avoids disasters

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Japan is a country often struck by natural disasters. We suffer from earthquakes, tsunami, typhoons, heavy snow fall, thunder storms, and volcanic eruptions. Therefore, as a network operator in Japan, disaster management is important. In general, global warming results in stronger and more devastating natural disasters, and disaster management has become even more crucial for many network operators.

Earthquakes are the most critical because the economical impact is very large. We have made large efforts to make our network robust against and resilient to earthquakes. Examples are the expansion of microwave transit systems and the development of a transportable terrestrial station of a satellite communication system [1]. However, there have been no mathematical models or mathematic frameworks for handling the effects of earthquakes. To address this issue, a series of studies have proposed a method for evaluating metrics such as the probability of network components (such as the main route and its backup) intersecting/encountering a disaster area [2-4]. Through this method, network design, such as geographical physical route configuration and placement of servers or backups for optimizing the metrics, has become possible.

In addition to the network design, a disaster avoidance control against forecastable disasters, such as typhoons, was proposed [5]. This control relocates objects, such as data and software, in the network based on the disaster forecast.

References

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