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A business imperative for companies of all sizes, cloud computing allows organizations to consume IT services based on a subscription-based subscription model. The promise of cloud computing depends on two viral metrics, reliability of service and availability to assess the reliability of the system. Suppliers offer service level agreements (SLAs) to meet specific reliability and affordability standards. The SLA breach not only overshadows the cost penalty for the vendor, but also jeopardizes the work of applications and solutions running in the cloud network. While reliability and accessibility are often used interchangeably, they are different concepts in the engineering field. Let's look at the difference between reliability and availability, and then move on to how both are calculated. What is reliability? Reliability is the probability that the system is working correctly over a period of time. During this correct work, repairs are not required or performed, and the system adequately follows certain performance specifications. Reliability follows an exponential failure law, which means that it decreases as time passes for reliability calculations. In other words, the reliability of the system will be high in its original state of operation and will gradually decrease to the lowest value over time. What is accessibility? Availability refers to the probability that the system works correctly in a specific instance of time (not duration). Disruptions can occur before or after the time for which the system is calculated. The service must function and adequately meet certain specifications at the time of use. Availability is measured in a stable state, which means potential downtime incidents that can (and will) render the service unavailable during its projected usage times. For example, availability of 99.999% (five-9) means 5 minutes and 15 seconds of downtime per year. Incident and maintenance metrics Require an understanding of incident service metrics used in these calculations before discussing how reliability and availability are calculated. These figures are calculated on the basis of extensive experiments, experience or industry standards; they are not observed directly. Thus, the calculations obtained provide only a relatively accurate understanding of the reliability and availability of the system. The below and below are the following sections that set out the most up-to-date incident and service metrics: the failure rate of the original data to the failure rate of the component failure per unit of time. It is usually denoted by the Greek letter λ (Lambda) and is used to calculate the metrics listed later in the post. In engineering reliability calculations, the failure rate is seen as a projected failure rate, given that the component functions in its original state. The formula is given to repair repairs unrepaired systems respectively: Repair speed Frequency of successful repairs performed on a failed component per unit of time. It is usually denoted by the Greek letter μ (Mu) and is used to calculate the metrics listed later in the post. The repair speed is mathematically defined as follows: Average failure time (MTTF) Average time before an unrepaired system component fails. The following formula calculates MTTF: Average time between failure (MTBF) The average length of time between the inherent failures of the repaired component of the system. To calculate MTBF: The average recovery time (MTTR) the average length of time for fixing a failed component and returning to operational state uses the following formulas. This metric includes the time spent on the alert and diagnostic process prior to the start of repairs. (The

average time spent solely on the repair process is called average repair time.) The average detection time (MTTD) is the average time between a component failure and its detection. The reliability and accessibility calculations below are calculated for the reliability attributes and availability of an individual component. The bounce level can be used interchangeably with MTTF and MTBF in accordance with the calculations described earlier. Reliability is calculated as an exponentially collapsing probability function that depends on the speed of failure. Because the failure rate cannot remain the same throughout the lifecycle of the component, average time-based quantities such as MTTF or MTBF can also be used to calculate reliability. The mathematical function is defined as: Accessibility determines the instant performance of a component at any given time based on the length of time between failure and recovery. Availability is calculated by the following formula: Calculating multi-component IT systems contains several components related as complex architectural. The efficient reliability and availability of the system depends on the specifications of individual components, network configurations and redundancy models. The configuration can be in-series, parallel or hybrid in a series and parallel connections between system components. Redundancy models can explain the failures of internal components of the system and therefore change the effective reliability of the system and the performance of availability. The Reliability Block Chart (RBD) can be used to demonstrate the relationship between individual components. In addition, analytical methods can be used for large-scale and complex networks to perform these calculations. RBD demonstrates a hybrid combination of series and parallel connections between system components: the basics of the RBD methodology are highlighted below. Using Bounce Rates Effective bounces are used to calculate reliability and availability System using these formulas: For components connected to a series, the effective failure rate is defined as the sum of each component's failure rates. For components connected to the N series: For parallel related components, MTTF is defined as the reciprocal failure amount of each component of the system. For components associated with the N parallel: For hybrid systems, connections can be reduced to in-series or parallel configurations in the first place. Using availability and reliability specifications, calculate the reliability and availability of each component individually. For components connected to the series, calculate the product of all component values. For components connected to the N Series, use a formula for parallel related components: For components associated with the N parallel, first reduce the calculations to in-series or parallel configurations. You may find that the reliability and availability of a network of components connected to the series is lower than the specifications of individual components. For example, two components with 99% availability are connected to a series to give 98.01% availability. The opposite is true for a parallel combined model. If one component has a 99% availability specification, two components combine in parallel with 99.99% availability; and the four parallel connection components provide 99.9999% availability. Adding redundant components to the network further improves reliability and availability performance. It is important to note a few caveats regarding these incident indicators and related reliability and affordability calculations. These indicators may be perceived in relative terms. Failure can be determined differently for the same component in different applications, usage, and organizations. Metrics such as MTTF, MTTR, MTBF and MTTD are averages observed in experiments in controlled or specific environments. These measurements may not be carried out sequentially in real-world applications. Therefore, organizations should map the reliability of the system and the availability calculations for business value and end-user experience. Decisions may require strategic cost, performance, and security trade-offs, and decision makers may need to ask questions that go beyond system reliability and specifications, followed by IT departments. Additional Resources Next Literature relates to the reliability of the system and the availability of calculations described in this article: These messages are my own and do not necessarily represent BMC's position, strategy or opinion. Do you see a mistake or do you have an offer? Please let us know by email blogs@bmc.com. High quality Reliability Engineering Reliability Posted by John Spacey, January 26, 2016 Updated Feb 06 Reliability is the ability of things to perform over time in a variety of expected expected Here are illustrative examples: Bike tires with usually long lifespan, even when used at high speed on bumpy roads. A mobile device that can play media files that contain data errors. An e-commerce site that is 99.99% of the time. Working procedures and systems on a high-speed train that reduce a serious human error to zero, The page-loading stock trading system is faster than 1 second for 99.99% of requests. A telecommunications company that makes less than one billing error per million accounts. Credit rating agency, which monthly excludes data from questionable sources with accuracy audit programs on all accounts. A storage device with a margin of error of less than 0.0001%. A bank that backs up data in real time so that a storage device failure can be recovered without losing transactions. Media that check the facts and do not publish news from dubious sources. An aircraft with redundant systems such that it can continue to operate safely when the system or component fails. An elevator that requires power to hold the brakes. When the power fails, the brakes come. An electric car that tells you that it requires maintenance based on diagnostic tests before it breaks down. The building is designed to absorb the energy of large enough earthquakes without collapse. Solar panels that are designed to tolerate extreme weather conditions such as strong winds. Delivery service, which is on time for 99.9% of deliveries. A mobile device manufacturer that fully tests each device in such a way that less than 0.005% of customers experience a box failure. This is a complete list of articles that we have written about the reliability of engineering. 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