

Evaluating and Calculating "Five Nines"



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What does "Five Nines" mean?

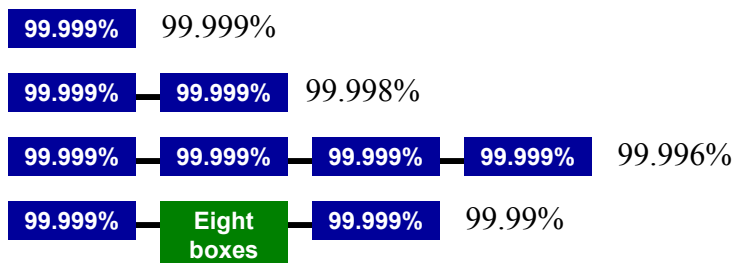


- Up time is at least 99.999%
- How good is 99.999%?
 - Measurement interval is one key
 - If measured yearly, less than 5.5 minutes of downtime in the year
 - If measured monthly, less than half a minute per month
 - 99.99 (four nines) measured monthly is about 4.5 minutes per month
 - Is five nines yearly or four nines monthly "better"?
 - Are there any excluded outages?
 - Usually refers to equipment failure
 - What about "busy signals"
 - Check out the Frame Relay Forum's FRF.13 Implementation Agreement

How do you calculate the availability / reliability



- Components or network elements in series reduce reliability
 - Any single failure causes a system failure
 - Calculated by multiplying the reliability of each element

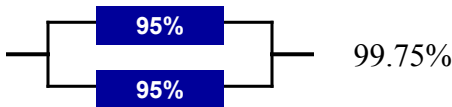


How do you calculate the availability / reliability



- Components or network elements in parallel increase reliability
 - Any single failure is protected
 - Calculated by multiplying the probability of failure for each element

95% 95%

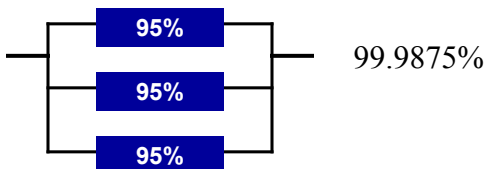


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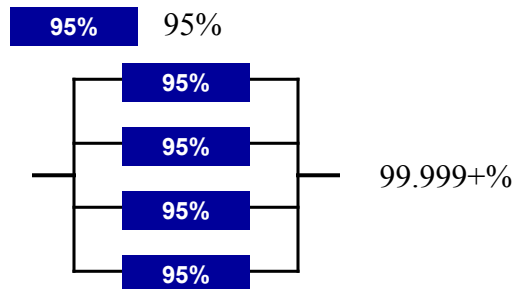




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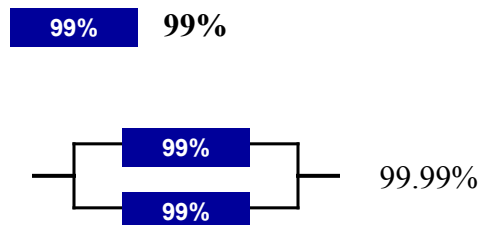
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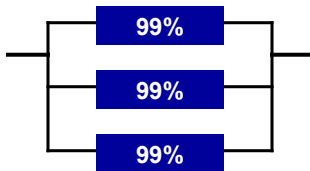


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99% 99%



99.9999% - "Six nines"

The bottom line on five nines



- Make sure you do the arithmetic
- Look for parallel elements in
 - The LAN?
 - Station equipment?
 - Local switching equipment
 - Network access
 - The WAN network
- Traditional telephony tends to be based on circuit switching
 - A failure means you redial
- Most packet switching architectures do automatic rerouting in the event of failure