

1 Problem

What	Problem(s)	Lightning strikes on grid that powers Google data center, some data compromised
When	Date	August 13, 2015
	Time	09:19 PDT
	Different, unusual, unique	?
Where	Facility, site	Saint-Ghislain, near Mons in Belgium
	Unit, area, equipment	Data center in europe-west1-b zone
	Task being performed	Google Compute Engine data storage

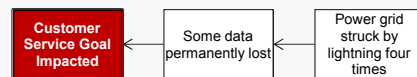
Impact to the Goals

Customer Service	Some data permanently lost
Production/ Schedule	Some data temporarily inaccessible
Property/ Equipment	Datacenter equipment failed
Labor/ Time	Work required to recover data

When building the Case Map, the impacted goals are listed in red boxes and the impacts to those goals are used to create the first cause boxes. So if there are four impacted goals, there will be four red boxes on the Cause Map.

2 Analysis

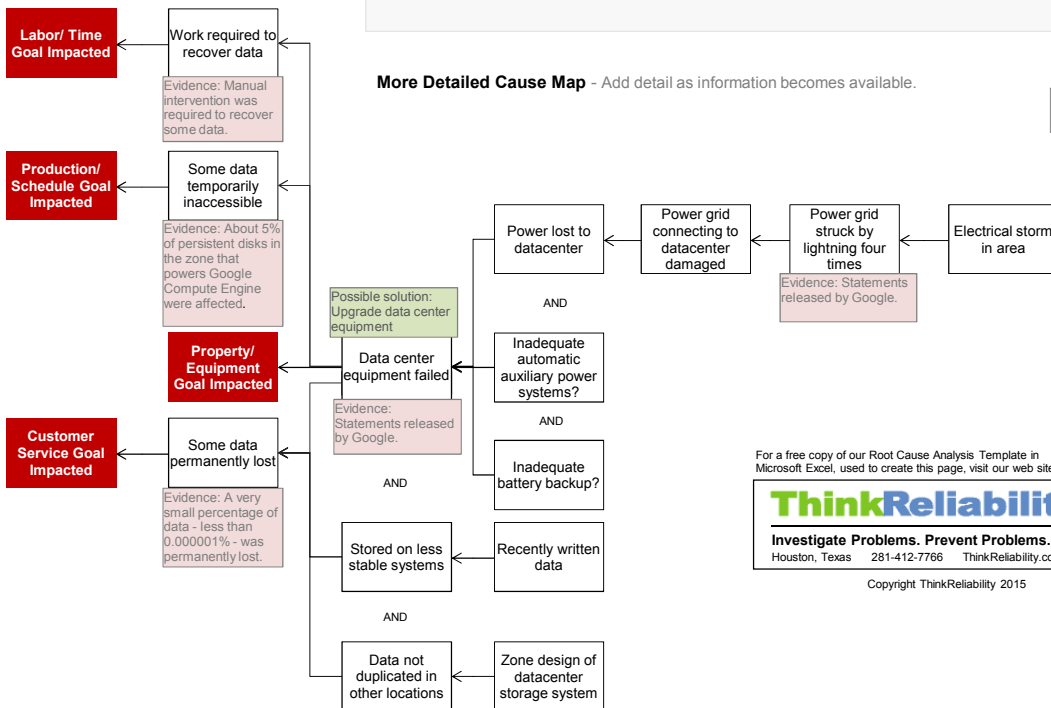
Basic Level Cause Map - Start with simple Why questions.



Basic Cause-and-Effect

Some data was lost because datacenter equipment failed after the nearby power grid was struck with lightning four times and was damaged. This particular data was stored on a less stable system and wasn't duplicated in another location.

More Detailed Cause Map - Add detail as information becomes available.



For a free copy of our Root Cause Analysis Template in Microsoft Excel, used to create this page, visit our web site.

ThinkReliability
 Investigate Problems. Prevent Problems.
 Houston, Texas 281-412-7766 ThinkReliability.com

Copyright ThinkReliability 2015

LOST DATA

Cause Map

Power grid near Google datacenter struck by lightning four times

A small amount of data was permanently lost at a Google datacenter after lightning struck the nearby power grid four times on August 13, 2015. About five percent of the disks in Google's Europe-west1-b cloud zone datacenter were impacted by the lightning strikes, but nearly all of the data was eventually recovered with less than 0.000001% of the stored data not able to be recovered.

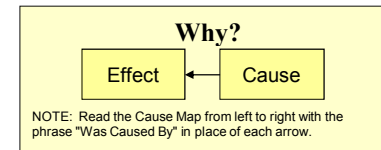
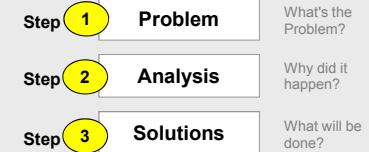
"This outage is wholly Google's responsibility. However, we would like to take this opportunity to highlight an important reminder for our customers: GCE instances and Persistent Disks within a zone exist in a single Google datacenter and are therefore unavoidably vulnerable to datacenter-scale disasters."

-statement by Google on August 18, 2015

Cause Mapping is a Root Cause Analysis method that captures basic cause-and-effect relationships supported with evidence.

CAUSE MAPPING

Problem Solving • Incident Investigation • Root Cause Analysis



3 Solutions

The final step in the Cause Mapping process is to develop solutions to reduce the risk of a problem recurring in the future. For this example, Google has stated that they are upgrading the datacenter equipment so that it is more robust in the event of a similar event in the future. Google also stated that customers should backup essential data so that it is stored in another physical location to improve reliability.

Few of us probably design datacenter storage systems, but this incident is a good reminder of the importance of having a backup. If data is essential to you or your business, make sure there is a backup that is stored in a physically separate location from the original. Similar to the "unsinkable" Titanic, it is always a good idea to include enough life boats in a design just in case something you didn't expect goes wrong. Sometimes lightning strikes four times so it's best to be prepared just in case.