



# CASE STUDY

HOW A HYPERSCALE DATA CENTER AVOIDED AN UNPLANNED OUTAGE

## THE CUSTOMER

The customer was a 16 megawatt hyperscale data center located in Seattle Washington that provides cloud services globally. Because of the importance of facilities like this, a power outage can be extremely expensive. In certain cases, due to the redundant design of certain infrastructure systems, a fault in equipment does not always result in a complete power outage. However, most data centers are designed to handle any level of power outage or anomaly.

The Uptime Institute has also defined a category framework for operational events at a facility (see below). This customer Data Center experienced a Category 1 event in which Trystar Sequence of Event Recorders (SER) were used to quickly resolve the issue.

### *Outage Impact on Critical Facilities*

Rating	Service Outage	Impact of Outage
Category 1	Negligible	Recordable outage but little or no obvious impact on services.
Category 2	Minimal	Services disrupted. Minimal effect on users/customers/reputation.
Category 3	Significant	Customer/user service disruptions, mostly of limited scope, duration or effect. Minimal or no financial effect. Some reputational or compliance impacts.
Category 4	Serious	Disruptions of service and/or operation. Ramifications include some financial losses, compliance breaches, reputation damages, possibly safety concerns. Customer losses possible.
Category 5	Severe	Major and damaging disruption of services and/or operations with ramifications including large financial losses, possible safety issues, compliance breaches, customer losses, reputational damage.

The Outage Severity Rating was developed by Uptime Institute 2019, All Rights Reserved

## THE CHALLENGE

The facility was designed so that generators could support various loads if there was a need to transfer power from utility to backup. Redundant generators were implemented as a part of this power transfer solution. The additional generators provide backup should a generator fail to engage while switching to backup power. Just such an event did occur, and the redundant design successfully prevented a full outage. However, the event still resulted in immediate diagnostic labor and maintenance to determine the root cause of this close call and to ensure future prevention.

## **THE SOLUTION**

This customer had implemented an Electric Power Monitoring System (EPMS) which also included a Sequence of Events recording system from Trystar. The Sequence of Events Recorder (SER) captures changes in input status from equipment such as circuit breakers, generators, UPS's and ATS's with 1 millisecond time stamp accuracy. The SER also maintains precision time synchronization of all the other devices in the EPMS. Post event analysis was performed to look at the process of closed transition procedure between the generator and utility. With the help of the SERs, the customer was able to reconstruct the incident quickly and effectively. By having a precise picture of the sequence of events which occurred during the incident, it was determined the cause of failure was a medium voltage circuit breaker which caused single phasing of the closed transition process and subsequent failure of one of the generators.

## **THE RESULT**

The precise event data available in the EPMS system quickly directed technicians to the problem area of the transfer scheme. This was estimated to have saved several man-hours of specialty diagnostic labor on the site to determine and rectify the issue for an overall costs savings to the data center. Critical facilities such as data centers, have electrical distribution systems which are highly complex with multiple sources of primary and secondary power along with multiple points of distribution and bypass capability. Any level of power events within the power distribution system, especially those close to critical loads, have the potential to be extremely disruptive and time consuming to resolve. While it is not always practical or economical to install power metering at every power protection point, a lack of monitoring can create blind spots within the EPMS system. The Trystar Sequence of Events Recorder provides a simple, affordable and scalable solution, providing a full picture with precise diagnostic information. In this case, the use of Sequence of Events Recorders essentially eliminated blind spots in the power monitoring system.