

Data Center & Edge Use Case 5

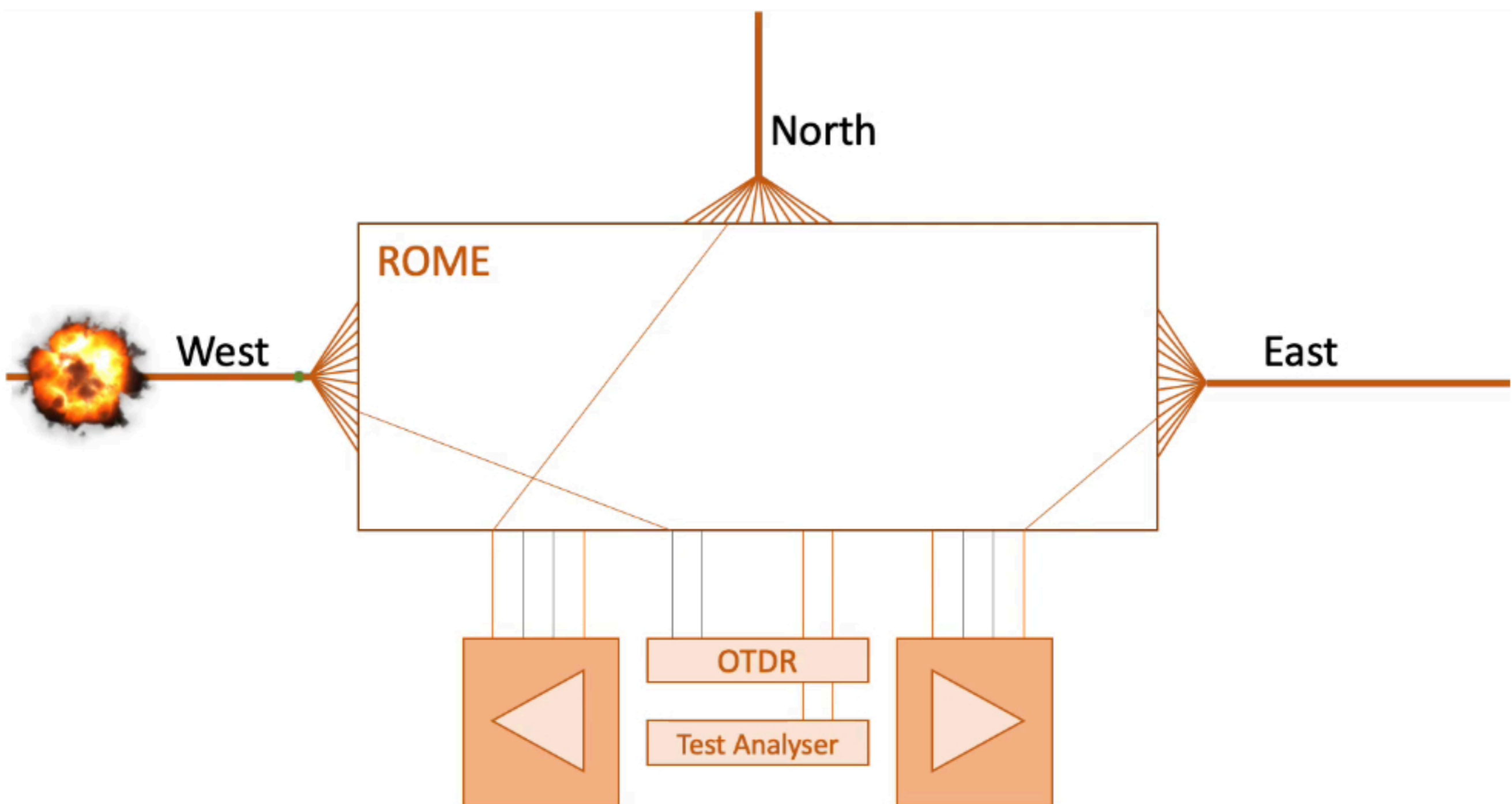
Physical Fiber Re-Routing Automated

Reacting to changes in the physical network is a slow, manual process. Even if a service is protected by a sub 50ms switch to the backup route, the service is now in an un-protected state where it can remain for weeks.

The restoration process usually includes the following steps:

1. Identify restoration route and confirm fiber availability from manual spreadsheet records.
2. Schedule and dispatch engineers to all necessary patching points to make physical patching changes. Records are frequently out of alignment which means a new route/fiber must be planned & engineers rescheduled to make the changes.
3. Engineer scheduled and dispatched to perform an OTDR shot on faulty fiber to determine fault location.
4. Engineer scheduled and dispatched to fault location to repair/splice fiber.
5. Engineer scheduled and dispatched to carry out end to end fiber characterization/baseline.
6. Engineer scheduled and dispatched to perform traffic roll back in maintenance window.

Throughout the process there are ample opportunities for human errors to propagate, from mis-patching, incorrectly updating manual documentation, poor splicing necessitating repeat visits. Throughout much of this process the customer's traffic is in an unprotected state where a further failure could trigger performance penalties.



- Protected traffic is connected west & east.
- Connectivity on the west route is lost.
- New path identified via North Route and traffic is reconnected.
- OTDR connected to identify fault location.

Being able to **SOFTWARE Defined** and control the physical layer allows most of the restoration process to be automated with little or no reliance on human intervention. With automatic updating of fiber records full visibility of alternative routes is available and the route can be manually calculated or determined at the SDN layer using OSPF or equivalent. Once the restoration route is determined, all necessary patching changes along the route can be instigated in a matter of minutes, bringing the customer circuit back into a fully protected state.

At this stage the system can automatically connect the failed fiber to an OTDR to determine the fault location and an engineer can be scheduled to make the repair. While the engineer is still on site, the system can automatically connect the repaired fiber to the necessary test equipment to ensure the repair is complete and within the network tolerances, if further work is needed the engineer can commence almost immediately.

Once repaired the preferred route can be brought back into service in a matter of minutes, the restoration path released and all the records updated automatically. The system also makes it quick and painless to move services to allow for planned maintenance windows, with a quick restoration afterwards.