# CASE STUDY

## Leading Municipal Authority ensured uninterrupted services during disasters with Perpetuuiti

### About the Client

The client organization is a government municipal body with jurisdiction over city services and the upkeep of facilities in the Emirate of Dubai, United Arab Emirates, and reports directly to the Executive Council. The agency is led by a Director-General who sits on the Executive Council. The department has been led by Director-General Eng. Dawood Abdul Rahman Al Hajiri since 2018.

# Client Challenges

## Manual DR Drill Activities

Various DR drill activities required manual execution by the client, as listed below.

- Switchover (Planned DR)

This planned activity facilitates moving the production environment to the DR site during a DR drill or major planned activities at the production data center, involving significant downtime or major upgrades/changes. The client can use this option to operate from the DR site while data is replicated from the DR site to the primary site.

- Switchback (Planned Fallback):

This planned activity allows the client to return to the primary site once the DR drill or upgrade/patch activities are completed.

- Failover (Unplanned):

This unplanned activity occurs suddenly due to a disaster. It aims to recover the critical IT environment at the remote site and ensure continuity.

### Complexity of Manual Processes

The above processes involved numerous steps, including various sanity checks and dependencies that needed to be considered while conducting the respective DR drill activities, resulting in significantly higher overall execution time.

### Dependency Challenges

Manual execution created a high degree of dependency between stakeholders during DR drills, affecting overall efficiency.

### Visibility Concerns

In a large infrastructure landscape, visibility is crucial for smooth process flow. Manual processes required separate activities to be performed by each stakeholder during a disaster, posing challenges if stakeholders were unavailable due to geographical constraints.

### Challenges with SO/SB/FO Process

The initial manual execution of SO/SB/FO processes resulted in increased RTO and possible failures due to human error or sequential script execution, with substantial human intervention.

### Lack of Real-Time Visibility

There was an absence of real-time visibility of RPO/RTO across the entire IT environment from a DR perspective, including business service availability.

### Dependency on SME Coordination

Dependence on the availability and coordination of Subject Matter Experts (SMEs) at the same time, especially during off-peak hours.

### Absence of Automation

Lack of automation across the Disaster Recovery process.

### Limited Impact Analysis

No real-time impact analysis, leading to increased Mean Time to Recovery (MTR).

### Inability for Parallel DR Recoveries

No capability to incorporate parallelism within DR drill procedures and conduct pre-flight/sanity checks before DR drills.

### Human Intervention in Conducting Recovery Drills

Heavy dependency on stakeholder availability along with substantial human intervention during DR drill execution.

## Problem Statement

The client organization required Continuity Patrol to manage ITDR automation for 125 business applications that were in scope. Current DR activities in the environment were entirely manual, requiring the involvement of multiple IT teams and application stakeholders for both planned and unplanned DR drills.

The client also required IT Business Continuity consultancy across IT processes and departments, including Business Impact Analysis (BIA), Risk Assessment (RA), and preparation of the ITDR plan.

Activities such as DR drills were conducted manually, and the documented RTO and RPO were based on discussions with process/service owners and technical owners rather than system insights. Server patching and updates were not centrally monitored across services. DR drills could not be performed at any time without checking team availability and dependencies.

## Our Solution

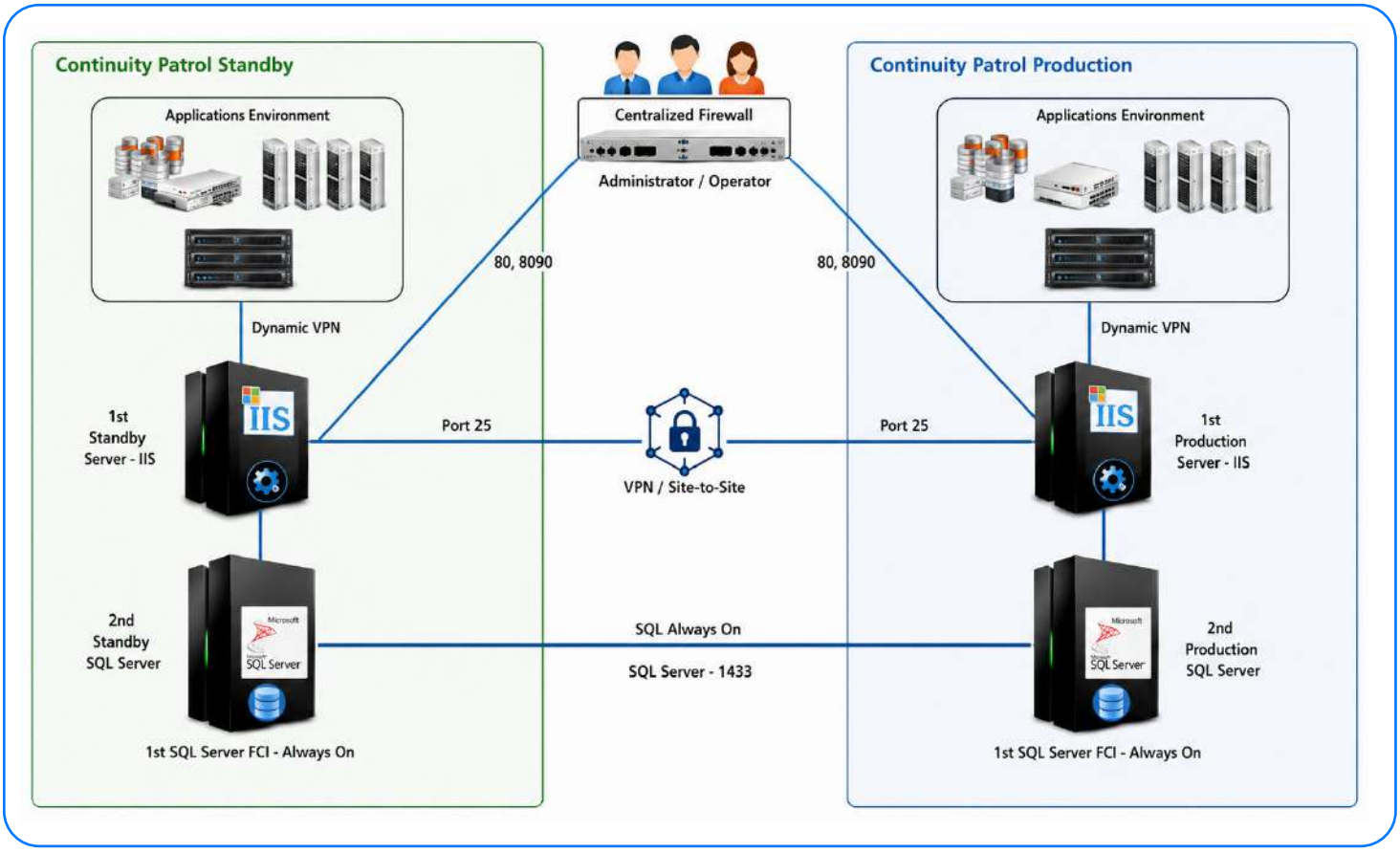
- By configuring all in-scope applications in Continuity Patrol, the client organization was able to monitor infrastructure components across the Primary DC and DR sites, including Linux, Solaris, and Windows servers, Oracle databases, and application services through a centralized dashboard.
- IT Business Continuity consultancy was conducted across IT processes and departments. The ITDR scope was identified, BIA and RA were performed, reports were shared, and ITDR plans were prepared.
- Continuity Patrol ensured system integrity at both Primary and DR sites through continuous monitoring of servers, databases, and business services.
- The platform provided real-time visibility into DR readiness, RPOs, and RTOs, with automated alerts to stakeholders in case of deviations.
- Using Continuity Patrol, the client organization automated the entire DR process with a single click through both CxO and IT dashboards.
- Custom workflows were created to automate pre-flight/post-flight checks, application services, database services, and network-related activities such as DNS modifications, minimizing manual intervention.
- Parallel workflow execution significantly reduced RTOs, and application interdependencies were managed effectively within workflows.
- Runbooks were prepared for respective applications as part of ITDR consultancy.

## Solution Diagram

Continuity Patrol has been hosted on the DR data centre of Dubai Municipality as an active instance and an inactive instance on their Primary data centre.

- 125 Applications
- 188 VMs
- 18 Oracle DBs, 20 Exchange DBs, 371 SQL DBs
- MSSQL Mirroring
- MSSQL Always On
- Oracle ODG
- vSphere VMware replication
- Exchange DAG

- HNAS Storage Replication – NFS/CIFS
- NetApp
- NSX-T segment gateway failover
- Harbor replication – TKGI
- Infoblox
- GTM
- Storage – FortiGate, Huawei
- CI/CD
- rsync
- SFB
- SCCM



## Results And Benefits To Business

Continuity Patrol has been hosted on the DR data centre of Dubai Municipality as an active instance and an inactive instance on their Primary data centre.

- Automated over 100+ applications in scope for ITDR automation.
- Prepared runbooks for respective applications.
- Reduced dependency on SMEs being physically present during SO/SB/FO drills.
- Automated SO/SB/FO drills with minimal human intervention.
- Unified dashboard for visibility into business services, RPO, and RTO.
- Streamlined resource coordination through automated alerts and updates.
- Optimized RTO through parallel execution and orchestration.
- Automation of business service continuity and availability management.
- Pre-flight/sanity checks, DNS/NAT automation, password change management, and ISO-compliant reporting.

**1-CLICK** RECOVERY INVOCATION

**UPTO 80%** REDUCTION IN RTO

**50%** REDUCTION IN OPERATIONAL COSTS

## Rto Achievement Details

The minimum desired RTO was 00:30:00 and the maximum desired RTO was 2 Weeks.

We observed a drastic reduction in RTO across applications, with the minimum achieved RTO at 00:00:09 and the maximum achieved RTO at 02:49:00, compared to desired RTOs ranging from 30 minutes to 2 weeks.

| Sl.No | Application Name | Desired RTO | Achieved RTO |
|---|---|---|---|
| 01 | Power BI | 00:30:00 | 00:00:09 |
| 02 | Crystal Reports | 00:30:00 | 00:06:22 |
| 03 | Dubai Recycle | 04:00:00 | 00:09:44 |
| 04 | Mamzar Chalet | 24:00:00 | 00:27:38 |
| 05 | Environment Application | 24:00:00 | 00:27:38 |
| 06 | Nafith - Inhouse Application | 01:00:00 | 00:28:54 |
| 07 | Food Watch | 04:00:00 | 00:28:54 |
| 08 | Waste Application | 08:00:00 | 00:28:09 |
| 09 | ZAD | 08:00:00 | 00:27:38 |
| 10 | PM Web Application | 08:00:00 | 00:19:16 |
| 11 | Amanah Service | 48:00:00 | 00:27:38 |
| 12 | Amanah Admin | 48:00:00 | 00:27:38 |
| 13 | Aris - Connect | 48:00:00 | 00:20:34 |
| 14 | Planning Application | 08:00:00 | 00:27:38 |
| 15 | Drainage Application | 08:00:00 | 00:28:09 |
| 16 | Survey Application | 08:00:00 | 00:27:38 |
| 17 | Bypass | 01:00:00 | 00:27:38 |
| 18 | Refund fee application | 24:00:00 | 00:27:38 |
| 19 | SBDR | Not Available | 00:27:38 |
| 20 | VR Application | 72:00:00 | 00:25:02 |
| 21 | Circulation System | 08:00:00 | 00:32:31 |
| 22 | Legislation and Legal Opinion System | 04:00:00 | 00:32:31 |
| 23 | Human Resource Management System (HRMS - part of Ioffice) | 72:00:00 | 00:32:31 |
| 24 | Survey Land System (part of Ioffice) | 72:00:00 | 00:32:31 |
| 25 | E-Signature | 72:00:00 | 00:32:31 |
| 26 | Customer Voice | 00:30:00 | 00:32:29 |
| 27 | DCL Services | 00:30:00 | 00:33:45 |
| 28 | CheckMarx SaSt -Source code analysis | 01:00:00 | 00:23:14 |
| 29 | DM Drive | 72:00:00 | 00:25:02 |
| 30 | Labware | 00:30:00 | 00:29:51 |
| 31 | Hotel Revenue System / Cinema Revenue | 01:00:00 | 00:37:32 |
| 32 | Smart CRM | 02:00:00 | 00:37:32 |
| 33 | Smart Inspection System | 04:00:00 | 00:37:32 |
| 34 | NewSmartservice/Manual services paperless | 01:00:00 | 00:36:47 |

| Sl.No | Application Name | Desired RTO | Achieved RTO |
|---|---|---|---|
| 35 | Smart Advertisement Permit System | 08:00:00 | 00:36:16 |
| 36 | DM 360 | 08:00:00 | 00:37:32 |
| 37 | Food Smart Inspection System (FSIS) | 08:00:00 | 00:37:32 |
| 38 | Vehicle / Fleet Tracking System / Vehicle Notification system | 168:00:00 | 00:17:19 |
| 39 | WhatsApp | 04:00:00 | 00:09:47 |
| 40 | File Net Migration | 08:00:00 | 00:32:31 |
| 41 | Impact | 08:00:00 | 00:32:31 |
| 42 | Children City Website | 02:00:00 | 00:32:29 |
| 43 | VET application | 08:00:00 | 00:28:09 |
| 44 | Children City | 02:00:00 | 00:18:05 |
| 45 | Dubai BPS | 72:00:00 | 00:09:44 |
| 46 | Dubai BPS Admin | 72:00:00 | 00:09:44 |
| 47 | Ras Alkhor wildlife website | 72:00:00 | 00:09:44 |
| 48 | RFID | 01:00:00 | 00:27:38 |
| 49 | Children City Admin | 02:00:00 | 00:57:37 |
| 50 | Children City Application - E - application | 02:00:00 | 00:57:37 |
| 51 | Employee Appraisal Management System (Performance Management System) | 24:00:00 | 00:10:12 |
| 52 | Smart Fine (Web and Mobile) | 02:00:00 | 00:42:53 |
| 53 | Happiness Meter | 00:00:00 | 00:47:14 |
| 54 | Document Classification System | 00:00:00 | 00:17:06 |
| 55 | Employee Attendance/Smart Lite Attendance | 24:00:00 | 00:10:25 |
| 56 | EPM Sharepoint | 72:00:00 | 00:20:25 |
| 57 | Fleet Matic System | 1 Week | 00:13:20 |
| 58 | Service Clean City index/Smart waste/Smart Waste Inspection | 08:00:00 | 00:52:32 |
| 59 | Smart Lite Attendance | 24:00:00 | 00:10:25 |
| 60 | Vehicle Notification | 02:00:00 | 00:50:22 |
| 61 | Password Self-Service Portal | 72:00:00 | 00:18:45 |
| 62 | SMS | 72:00:00 | 00:28:45 |
| 63 | BMC True Site | 72 Hours | 02:49:00 |
| 64 | BMC Atrium Orchestrator | 72 Hours | 02:49:00 |
| 65 | BMC Remedy MIDTIER | 72 Hours | 02:49:00 |
| 66 | BMC Digital workspace | 72 Hours | 02:49:00 |
| 67 | BMC Smart IT | 72 Hours | 02:49:00 |

| Sl.No | Application Name | Desired RTO | Achieved RTO |
|---|---|---|---|
| 68 | BMC Discovery | 72 Hours | 02:49:00 |
| 69 | BMC Smart Reporting | 72 Hours | 02:49:00 |
| 70 | BMC Capacity Optimization | 2 Weeks | 02:49:00 |
| 71 | CMDB/Availability | 2 Weeks | 02:49:00 |
| 72 | App dynamic | 72 Hours | 02:49:00 |
| 73 | Single Window | 8:00:00 | 00:47:49 |
| 74 | Mendix Investment Service | 02:00:00 | 00:47:49 |
| 75 | Smart Office | 8:00:00 | 00:47:49 |
| 76 | Stamps Tracking System (SCOT) – | 8:00:00 | 00:47:49 |
| 77 | Montaji System | 8:00:00 | 00:47:49 |
| 78 | Unified UMA | 48:00:00 | 00:47:49 |
| 79 | Graveyard Application | 02:00:00 | 00:47:49 |
| 80 | PHSD Application | 48:00:00 | 00:47:49 |
| 81 | IRMendixS (Import and Report System) | 02:00:00 | 00:47:49 |
| 82 | Horticulture | BIA Need to be initiated | 00:47:49 |
| 83 | EIS | 8:00:00 | 04:00:00 |
| 84 | GLUU | 00:30:00 | 00:42:45 |
| 85 | LDAP | 00:30:00 | 00:15:00 |
| 86 | Dubai-BPS Building Permit System | 04:00:00 | 02:44:24 |
| 87 | Building Control System | 2 Weeks | 02:44:24 |
| 88 | Food Import Re export System (FIRS) | 02:00:00 | 01:27:25 |
| 89 | Mobile applications for Building permits | 00:30:00 | 00:11:07 |
| 90 | Erad Payment Gateway | 02:00:00 | 01:01:20 |
| 91 | GlassFish Integration Services | {Part of BCS & BPS} | 00:57:00 |
| 92 | SVN | 72:00:00 | 00:04:49 |
| 93 | Physical Access Control System | 04:00:00 | 00:05:30 |
| 94 | ADFS | 00:30:00 | 00:04:28 |
| 95 | AD Connect | 00:30:00 | 00:05:11 |
| 96 | PKI- CA | 72:00:00 | 00:04:03 |
| 97 | Kaspersky - Exch servers | 08:00:00 | 00:11:13 |
| 98 | Air Quality | 02:00:00 | 00:09:57 |
| 99 | Smart Abattoir System | BIA Need to be initiated | 00:09:59 |
| 100 | CI/CD | 72:00:00 | 00:34:45 |