F5 and Oracle Database Solution Guide
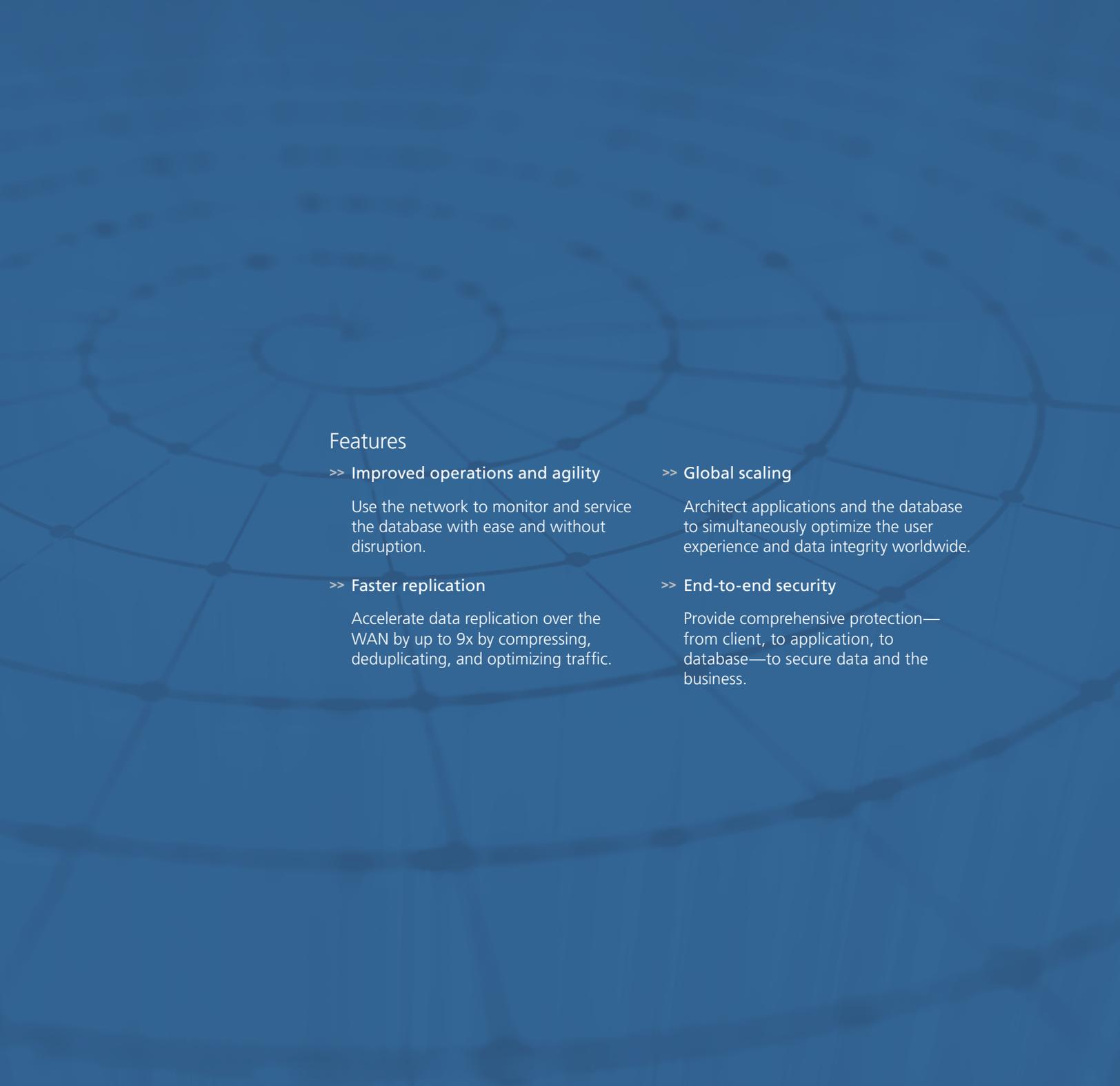
Solutions to optimize the network
for database operations, replication,
scalability, and security

Features

>> Improved operations and agility

Use the network to monitor and service the database with ease and without disruption.

>> Faster replication

Accelerate data replication over the WAN by up to 9x by compressing, deduplicating, and optimizing traffic.

>> Global scaling

Architect applications and the database to simultaneously optimize the user experience and data integrity worldwide.

>> End-to-end security

Provide comprehensive protection—from client, to application, to database—to secure data and the business.

Realize the full potential of the database tier with F5 and Oracle Database solutions

Many factors can slow or prevent user access to enterprise applications and data. Database maintenance, data replication, and scaling applications for globally dispersed users can all affect performance. In addition, providing mobile users with fast, remote access while protecting the increasing amounts of data that travel over the web has become more complicated.

F5 and Oracle have a long history of working together to find solutions to these issues. Through joint solutions, the two companies offer ways to accomplish the following:

· Maintain the database without user and business disruptions

· Speed data replication over the WAN for business continuity and disaster recovery

· Build a globally distributed application and database architecture

· Provide comprehensive application and database security

With F5 and Oracle, you can provide fast, consistent, and secure service to users, even under the most challenging conditions.

Database Operations and Management

Manage the database without user and business disruption
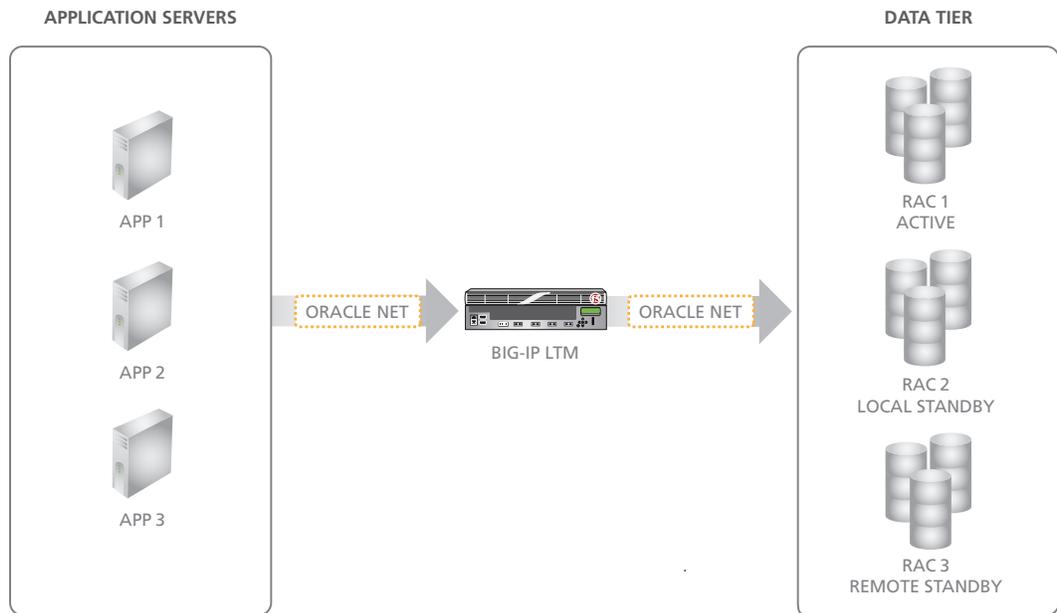
THE CHALLENGE

A database can go offline for many reasons, but the result is the same—a disruption of business. Whether from an unplanned interruption or a planned maintenance event, database outages can affect customers, partners, and employees.

When a database is down, timeout periods can last minutes or longer while the application server waits for a response from the database server. Customer transactions can be orphaned, employee productivity hindered, and business lost.

In addition, during day-to-day operations, database administrators face limited ways to gracefully pull out individual nodes without taking down the entire system. While this type of maintenance has long been available at the web and application tiers, the tools to unobtrusively perform maintenance at the database tier have not been available.

Key benefits

- Respond quickly to planned and unplanned outages
- Improve monitoring of the database health and nodes for faster failure detection
- Provide new tools for database management

APPLICATION SERVERS

DATA TIER

APP 1

APP 2

APP 3

ORACLE NET

BIG-IP LTM

ORACLE NET

RAC 1
ACTIVE

RAC 2
LOCAL STANDBY

RAC 3
REMOTE STANDBY

THE SOLUTION

At the database tier, F5® BIG-IP® Local Traffic Manager™ (LTM) intermediates between the application server and Oracle database to provide a layer of abstraction and health monitoring. In the event of a node failure (including standalone or Oracle Real Application Clusters [RAC] configurations), traffic can quickly be redirected away from unresponsive database servers. With health monitoring centralized on BIG-IP LTM, application servers are offloaded, freeing valuable resources. Moreover, even though application servers might have different software, versions, and behavior in terms of timeouts and connectivity, BIG-IP LTM provides a reliable connection to the database to help ensure consistent performance across all applications.

For operations and maintenance tasks, BIG-IP LTM gives administrators the ability to bleed connections off a server or pool of servers onto other servers without losing connectivity between the users and the applications. Once removed, a server can be updated, epaired, or replaced, and new connections can be directed to that server once it becomes available. This gives the database administrator additional flexibility and control over routine management tasks, while providing users with more uptime and availability.

Business Continuity and Disaster Recovery

Accelerate database replication and backup over the WAN

THE CHALLENGE

For business continuity and disaster recovery efforts, it makes sense to maintain databases in different locations. New industry and government rules concerning data protection and disaster recovery reinforce this need. However, securing and replicating data over distances using the WAN can be difficult, especially while providing uninterrupted service to users.

Oracle provides a number of different solutions for database replication and backup, but challenges can arise when moving large amounts of data over the WAN. Existing WAN links might be too slow and network-based backups can cause network congestion, slowing down application servers. Latency and packet loss are also risks in WAN networks not optimized for large data transfers. Adding bandwidth is expensive and might not solve the problem. In the end, businesses face challenges meeting recovery time objectives (RTOs), recovery point objectives (RPOs), and application performance SLAs.

Key benefits

- Accelerate data replication and backups over the WAN

- Save bandwidth and encrypt communications

- Meet business operations requirements (such as RTOs, RPOs, SLAs) and regulatory requirements

DATA CENTER 1

DATA GUARD
RECOVERY MANAGER
STREAMS
GOLDENGATE

EXADATA

BIG-IP LTM
+
WAN OPTIMIZATION
MANAGER

WAN OPTIMIZATION
COMPRESSION
ENCRYPTION
DEDUPLICATION

DATA CENTER 2

BIG-IP LTM
+
WAN OPTIMIZATION
MANAGER

DATA GUARD
RECOVERY MANAGER
STREAMS
GOLDENGATE

EXADATA

THE SOLUTION

F5 BIG-IP Local Traffic Manager (LTM) with BIG-IP® WAN Optimization Manager™ (WOM) overcomes latency and congested network issues to provide secure, rapid data transfers for data replication while providing fast application performance for users.

BIG-IP LTM with iSessions technology offers secure and compressed site-to-site communication for data traveling over the WAN. Any two BIG-IP LTM devices can be deployed symmetrically to create a site-to-site secure connection to improve transfer rates, reduce bandwidth, and offload applications for more efficient WAN communication.

BIG-IP WOM enables two BIG-IP devices to communicate across the WAN to optimize traffic during data replication and backup. It also provides secure symmetric adaptive compression to ensure the fastest data reduction for any TCP traffic between BIG-IP systems. This offloads the CPU cycles required to do compression and encryption on the host.

Global Scalability

Build a globally distributed application
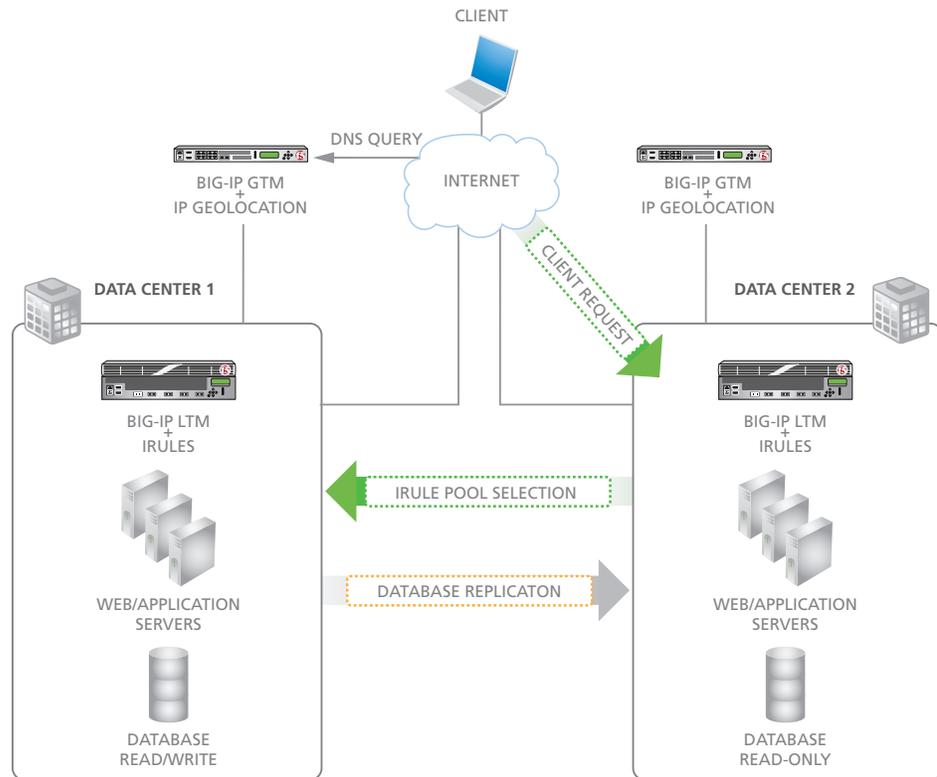and database architecture

THE CHALLENGE

Companies with customers, partners, and employees around the world need a strategy
for building applications that serve global audiences. Two key challenges businesses face
are updating data while maintaining performance for users and scaling to handle a surge
in use of an application.

To solve latency and performance issues, databases can be distributed around the world
so that they are geographically close to users. The challenge then becomes how to direct
write request transactions to the data center hosting the master database, replicate that data
to additional data centers, and direct read request transactions to the closest data center.

In addition, companies need the ability to scale during both predictable and unpredictable
surges in the use of an application.

Key benefits

- Improve scale, performance, and user
  response time
- Easily scale a globally distributed database
  architecture
- Add redundancy
- Optimize database replication

CLIENT

DNS QUERY

INTERNET

BIG-IP GTM
+
IP GEOLOCATION

BIG-IP GTM
+
IP GEOLOCATION

CLIENT REQUEST

DATA CENTER 1

DATA CENTER 2

BIG-IP LTM
+
IRULES

BIG-IP LTM
+
IRULES

IRULE POOL SELECTION

DATABASE REPLICATON

WEB/APPLICATION
SERVERS

WEB/APPLICATION
SERVERS

DATABASE
READ/WRITE

DATABASE
READ-ONLY

THE SOLUTION

F5 BIG-IP devices enable a globally distributed application and database architecture with high performance and scalability. BIG-IP® Global Traffic Manager™ (GTM) with IP geolocation sends users to the closest data center for the best performance.

To support scaling, BIG-IP Local Traffic Manager (LTM) directs traffic using an F5 iRules® script that determines whether the transaction is a read request (to be handled at the local data center) or a write request (to be directed to the data center hosting the master database). Because the majority of transactions are read requests, users get a fast response, no matter where they are located.

BIG-IP WAN Optimization Manager (WOM) optimizes the data replication necessary to ensure database read consistency for a global architecture.

In addition to the BIG-IP system, F5 offers the VIPRION® blade architecture hardware platform. As traffic increases, additional blades can be added to instantly handle the increased load without any additional configuration required.
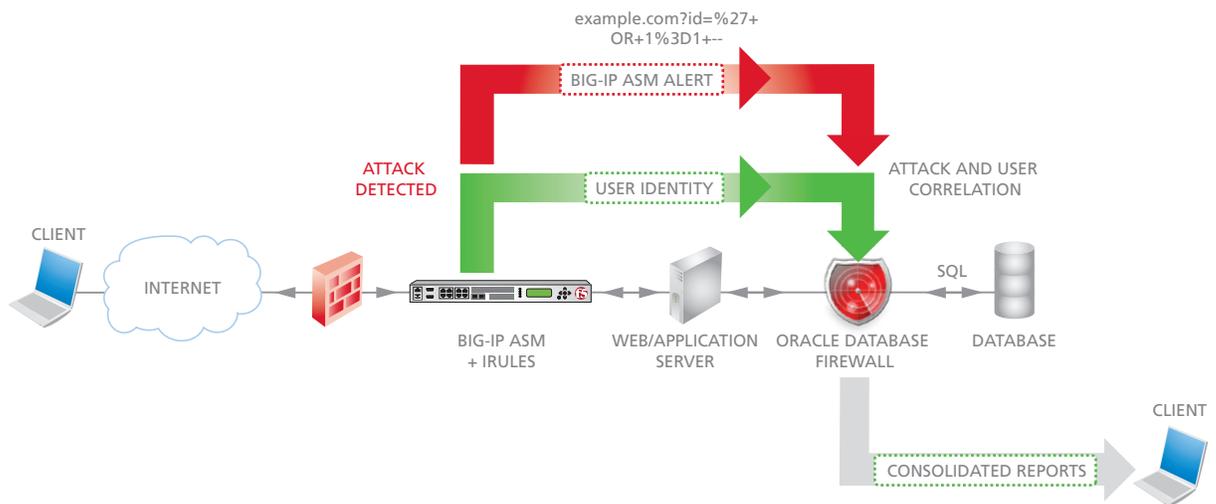
Application and Data Security

Provide comprehensive security
from clients to the database

THE CHALLENGE

As more application traffic moves over the web, sensitive data is exposed to new security
vulnerabilities and attacks. Independent technologies that protect against web attacks or
database attacks are available, but they have not been linked to provide unified notification
and reporting. Organizations need an end-to-end web application and database security
solution to protect data, customers, and their businesses.

Key benefits

- · Deliver application and database security
  event correlation
- · Unify security information management
- · Monitor security more easily
- · Protect applications and databases from
  unauthorized access

example.com?id=%27+
OR+1%3D1+--

BIG-IP ASM ALERT

ATTACK
DETECTED

USER IDENTITY

ATTACK AND USER
CORRELATION

CLIENT

INTERNET

SQL

BIG-IP ASM
+ IRULES

WEB/APPLICATION
SERVER

ORACLE DATABASE
FIREWALL

DATABASE

CLIENT

CONSOLIDATED REPORTS

THE SOLUTION

The F5 BIG-IP® Application Security Manager™ (ASM) and Oracle Database Firewall
solution links a web application firewall with a database firewall. The two products share
common reporting for web-based attempts to gain access to sensitive data, subvert the
database, or execute Denial of Service (DoS) attacks against an organization's databases.
Unified reporting for both the application firewall and database firewall provides more
convenient and comprehensive security monitoring.

When threats to data are detected, they are monitored, alerted, or blocked, and the
identity of the user is shared between BIG-IP ASM and Oracle Database Firewall by means
of an iRule. Malicious or compromised users can be isolated, forced to re-authenticate, or
prevented from accessing the application, in real time. Subsequent attacks from the same
user can be prevented, diverted, or rendered inert.

Tools for alerts and reports provide immediate notification on the type and severity of
threats. Additionally, these tools can be applied to compliance auditing.
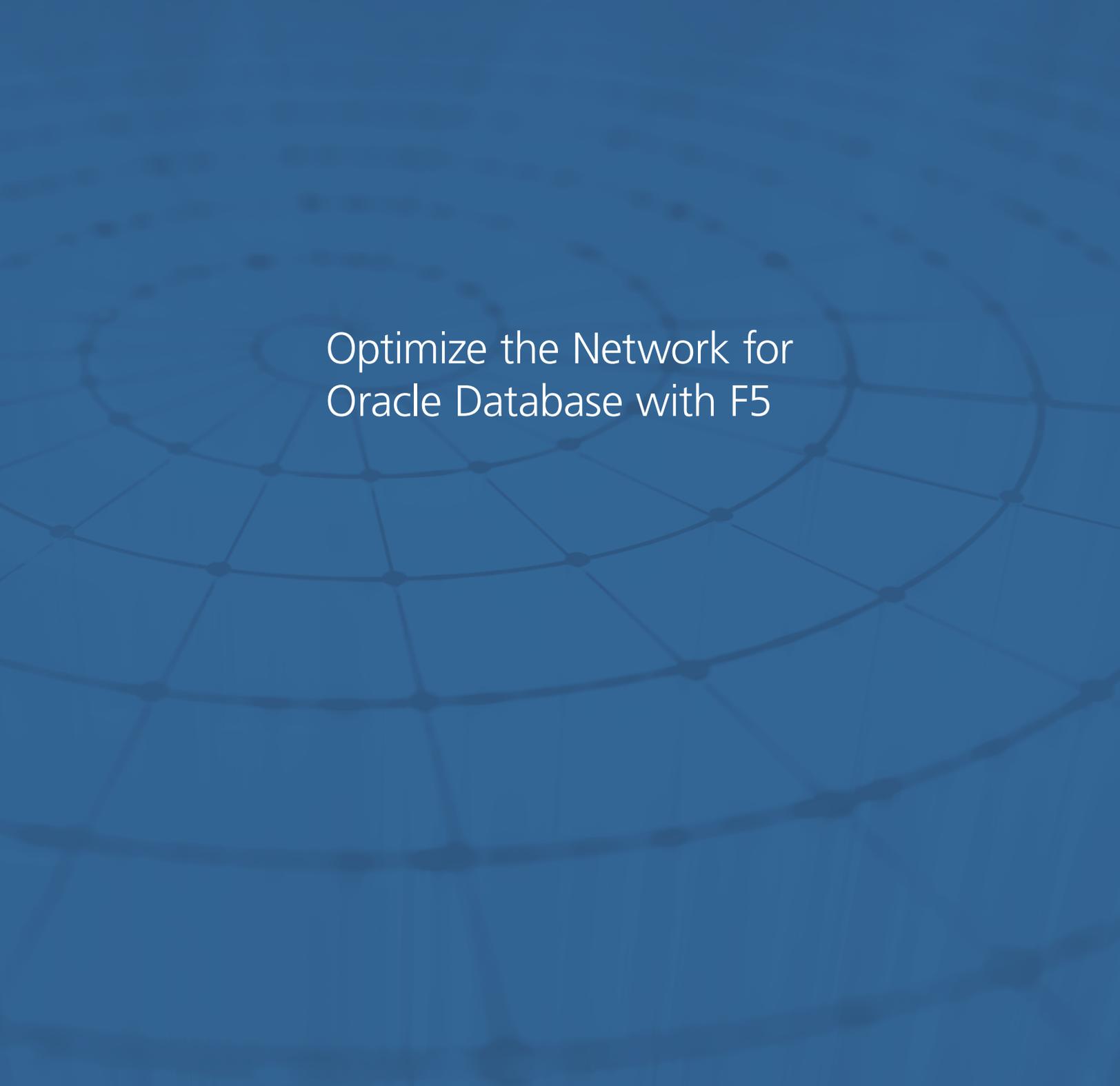
Optimize the Network for Oracle Database with F5

Maximize the benefits of Oracle Database with F5 solutions

BIG-IP LOCAL TRAFFIC MANAGER

· Optimizes connections between users and the database

· Offloads network-intensive operations to increase database CPU capacity

· Monitors the health of database servers to redirect traffic from unresponsive servers

· Gives database administrators the tools to perform management and operations
 tasks without disrupting users or business

BIG-IP WAN OPTIMIZATION MANAGER

· Accelerates data replication over the WAN

· Uses compression, deduplication, and advanced TCP technologies to effectively utilize
 bandwidth and maximize throughput

· Encrypts data for secure transmission

· Enables quick backup and recovery times

BIG-IP GLOBAL TRAFFIC MANAGER

· Uses IP geolocation to route users to the closest data center for the best performance

· Improves scale, performance, and user response time in a globally distributed architecture

BIG-IP APPLICATION SECURITY MANAGER

· Ensures application availability by protecting against layer 7 DoS and brute force attacks,
 dangerous FTP and SMTP commands, and more

· Provides automatic security policies for faster application development and deployment

· Integrates with Oracle Database Firewall to provide comprehensive application security,
 from users to the database

· Helps enable security standards compliance and cost reduction with built-in protection

VIPRION

· Meets the performance needs of the most demanding application and data environments

· Scales on demand

· Enables blades to be removed and added without disruption

Learn more about F5 and Oracle Database solutions

For more information on F5 and Oracle Database solutions, see the following resources or visit the **Oracle Database** page on **F5.com**.

Database Operations and Management

· Deployment Guide: Deploying BIG-IP LTM for Oracle Database and RAC
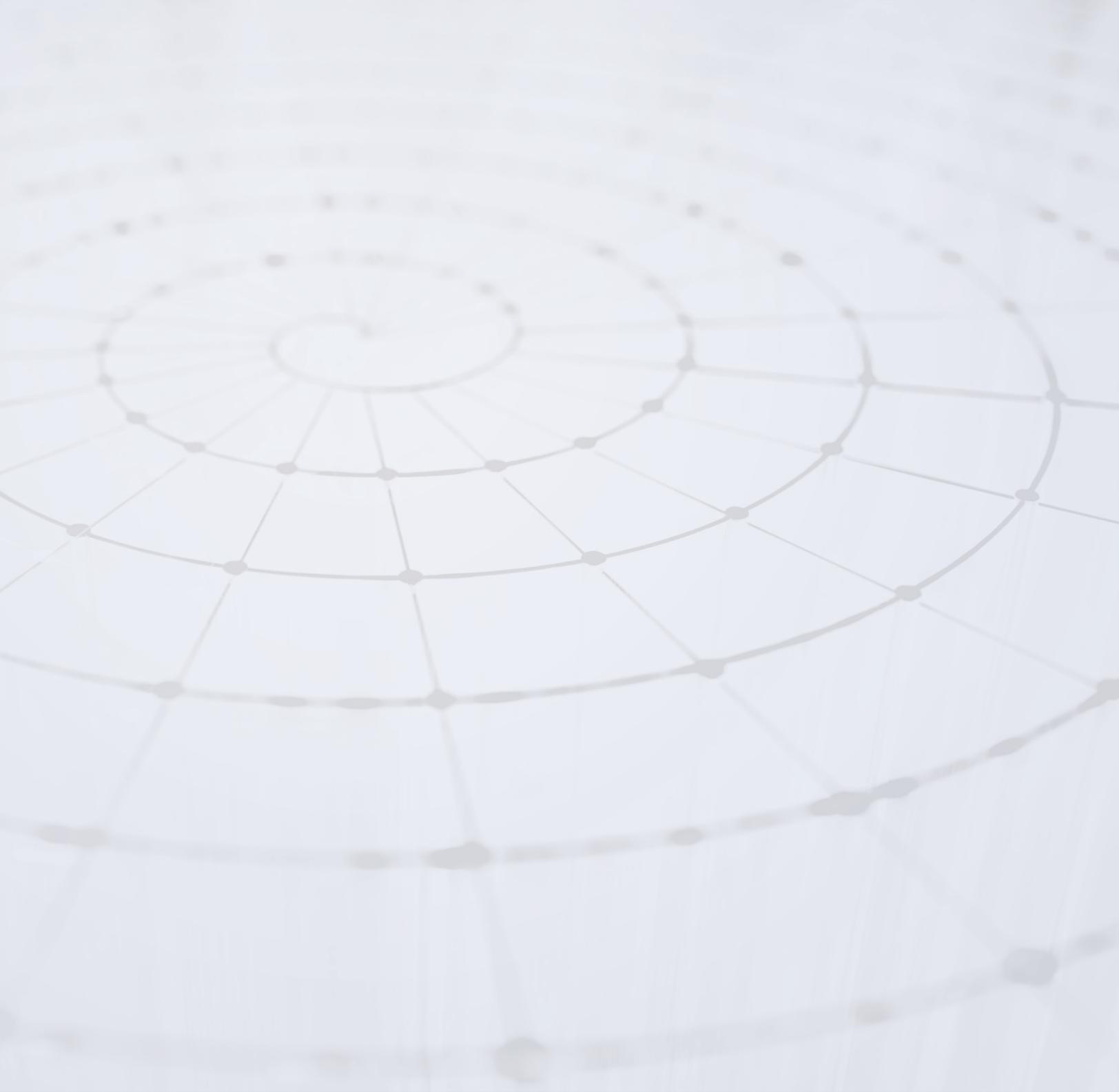
Business Continuity and Disaster Recovery

· Deployment Guide: Configuring BIG-IP WOM with Oracle Database Data Guard, GoldenGate, Streams, and Recovery Manager

· Video: Accelerating Oracle Recovery Manager (RMAN) with F5 WAN Optimization Technology

Global Scalability

· F5 DevCentral Video: Active-Active Database Load Balancing

Application and Data Security

· Solution Overview: F5 BIG-IP Application Security Manager and Oracle Database Firewall

For more information about F5 and Oracle solutions, visit **F5.com/oracle**

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ORACLE® **Gold Partner**