



PLATFORM TRANSFORMATION WITH ORACLE EXADATA CLOUD @CUSTOMER

Abstract

Mission-critical Oracle Database workloads —OLTP, analytics, AI, billing, payments, and systems of record —power modern enterprises but often run on fragile, costly, self-assembled commodity infrastructure. Oracle Exadata Cloud@Customer (ExaCC) delivers the complete engineered Exadata platform with a cloud consumption model inside your data center, meeting data-residency, regulatory, latency, and security requirements. This paper argues ExaCC's superiority and provides a playbook to plan, migrate, operate, and govern the transformation.

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Introduction

For most enterprises, the database platform decision has quietly become one of the highest-leverage choices in the technology estate. The database sits beneath revenue systems, online transaction processing (OLTP) systems, analytics, customer experience systems, and compliance reporting; its performance, availability, and unit economics set a ceiling on everything above it. When the platform is engineered for the workload, the business barely notices it. When it is not, the symptoms surface everywhere —slow analytics, SLA misses causing penalties, missed batch windows, poor customer experience, fragile failover, and refresh budgets that arrive in large, lumpy increments.

The conventional response has been framed as a binary: stay on-premises for control or move to the public cloud for agility and consumption-based economics. For a large class of regulated, latency-sensitive, or sovereignty-constrained organizations —in financial services, payments, insurance, healthcare, energy, and the public sector —that binary is a false one. These enterprises cannot relocate their most sensitive databases to a public region, but they are equally unwilling to keep funding the operational burden and capital cycles of build-it-yourself infrastructure.

Oracle Exadata Cloud@Customerdissolves the trade-off. It runs Oracle’s most capable cloud database service on engineered Exadata infrastructure, managed by Oracle, while the data itself stays physically inside the customer’s data center[1]. This paper examines the business case, the platform’s differentiators, and —most importantly —how to execute the transformation safely and govern it well.



The Business Challenge

Running mission -critical enterprise -grade Oracle databases on generic hardware carries a set of structural disadvantages that compound over time.



Storage that cannot help the database

In a conventional architecture built on database servers and general -purpose SAN or direct -attached storage, satisfying a large query means transporting vast volumes of data from the storage tier to the database servers — only for the majority of rows and columns to be filtered out and discarded once they arrive [2]. This creates a bottleneck at the interconnect and database server CPU — one that worsens as data expands.



High availability is only as good as the design

Resilience on generic infrastructure depends on how well the customer has engineered clustering, replication, and recovery — and on keeping that design current as the estate evolves. Inconsistent or under -tested high availability is a common cause of avoidable downtime.

For organizations whose revenue and compliance obligations rest on these databases, the cumulative effect is a platform that constrains — rather than enables — the business.

Why Exadata Cloud@Customer?

Exadata Cloud@Customer (ExaCC) addresses these challenges directly because it is a purpose -engineered database platform delivered as a managed cloud service inside the enterprise data center.



A platform engineered for Oracle Database

Exadata has been the leading platform for Oracle Database for more than a decade, and Oracle positions it as the highest -performing, most available, and most secure platform for deploying Oracle databases. It was designed from the outset as a scale-out cloud architecture, pairing high -performance database servers with intelligent storage servers, and it supports OLTP, data warehousing, in -memory analytics, AI, and mixed workloads — making it a consolidation platform rather than a single -purpose appliance [1]. Crucially, the database servers, storage servers, and network arrive pre -configured, pre -tuned, and pre -tested by Oracle, with end -to-end validation across database software, operating system, hypervisor, drivers, and firmware to remove bottlenecks and single points of failure [4].



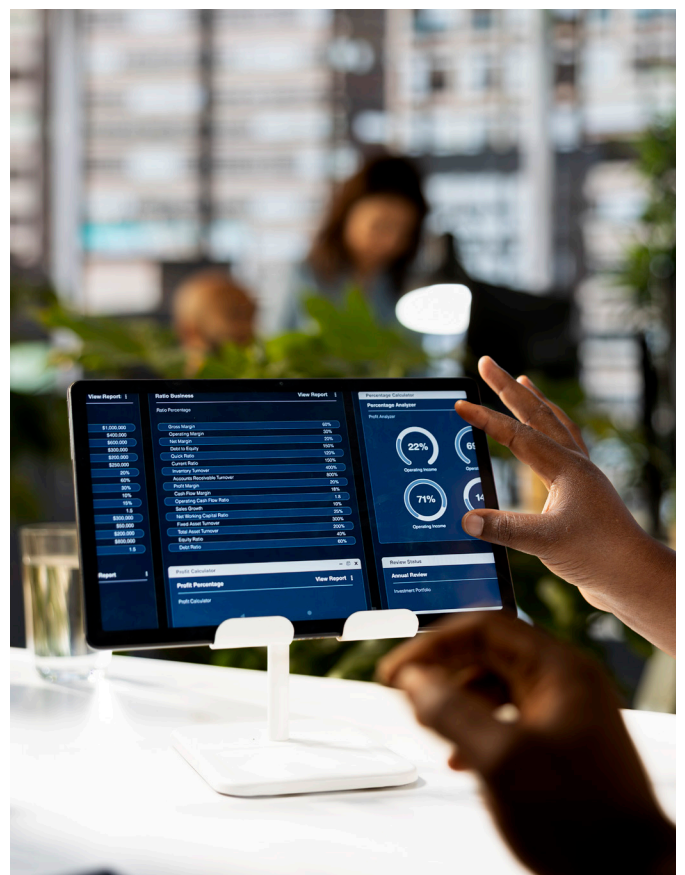
Integration and lifecycle burden falls on the enterprise

On a self-assembled stack, the customer owns sizing, component compatibility, firmware and driver currency, high - availability engineering, patch orchestration, and the hardware refresh cycle. Each of these is a source of risk and effort, and each competes for the same scarce specialist attention that could be directed at business outcomes.



Cost is unpredictable and front-loaded

Capital refresh cycles force enterprises to size for peak demand years in advance, paying upfront for capacity that sits idle for much of its life. The result is poor capital efficiency and a cost base that is difficult to align with actual consumption.





Intelligent storage and SQL offload

The defining differentiator is Smart Scan, which offloads data-intensive SQL operations from the database servers directly into the storage servers. Filtering and processing occur in parallel across all storage servers as data is read, and only the rows and columns relevant to the query are returned to the database tier [1]. Mechanically, Smart Scan performs predicate filtering — returning only the rows that match the query's conditions — and column projection — returning only the requested columns. It automatically optimizes full table scans and fast full index scans [3]. The effect is to reduce database-tier I/O by orders of magnitude, eliminate interconnect bottlenecks, and free database server CPU to increase overall throughput [2][3]. Storage Indexes reinforce this by maintaining in-memory summaries that let Exadata skip storage regions that cannot contain matching rows, replacing physical I/O with a few in-memory lookups, while Hybrid Columnar Compression reduces both stored capacity and the I/O required to scan it [1].



Performance and low latency by design

Exadata's integrated architecture — full RoCE (RDMA over Converged Ethernet)-based scale-out networking, Exadata RDMA Memory (XRMEM), PCIe NVMe flash, and database-optimized algorithms — delivers throughput that, in Oracle's assessment, all-flash storage arrays cannot match [1]. The latest X11M generation reduces storage latency to as low as approximately 14 microseconds, and the Exafusion direct-to-wire protocol allows database processes to exchange Oracle RAC messages directly over the network to improve OLTP response time and scalability [1].



Resilience built to Maximum Availability Architecture

Exadata is engineered with fully redundant hardware and software and is deployed according to Oracle's Maximum Availability Architecture (MAA) — a tiered set of high-availability and disaster-recovery best practices spanning Oracle Real Application Clusters (RAC), Automatic Storage Management, RMAN (Recovery Manager), Flashback, Active Data Guard, and Application Continuity. ExaCC is deployed with these MAA best practices by default, giving enterprises immediate access to active-active clustering and physical standby disaster recovery, including the fastest RAC node-failure recovery and the fastest Data Guard redo apply [1].



Cloud benefits with on-premises control

ExaCC is the hybrid-cloud delivery of this platform for customers who want cloud economics and a cloud consumption model but must keep their databases on-premises — for reasons of data-residency law, regulation, corporate policy, security, network latency, or tight coupling to other systems. The data remains physically in the customer data center, behind the firewall, while Oracle Cloud Operations manages the infrastructure layer: database and storage servers, the RoCE network and switches, the hypervisor, Exadata System Software, and firmware [1]. At the same time, customers retain meaningful control — root access to the database virtual machines and full DBA privileges, the ability to configure VMs and install their own backup, monitoring, and host-security agents, and customer-governed Oracle Operator Access Control (OpCtl) that makes operator access time-bounded, recorded, and terminable at the customer's discretion [1]. The same Cloud Control Plane, user experience, and REST APIs used in Oracle's public cloud apply here, so applications migrate with minimal disruption and no application changes [1].

In short, ExaCC removes the structural disadvantages of generic infrastructure while preserving the control that regulated enterprises require.

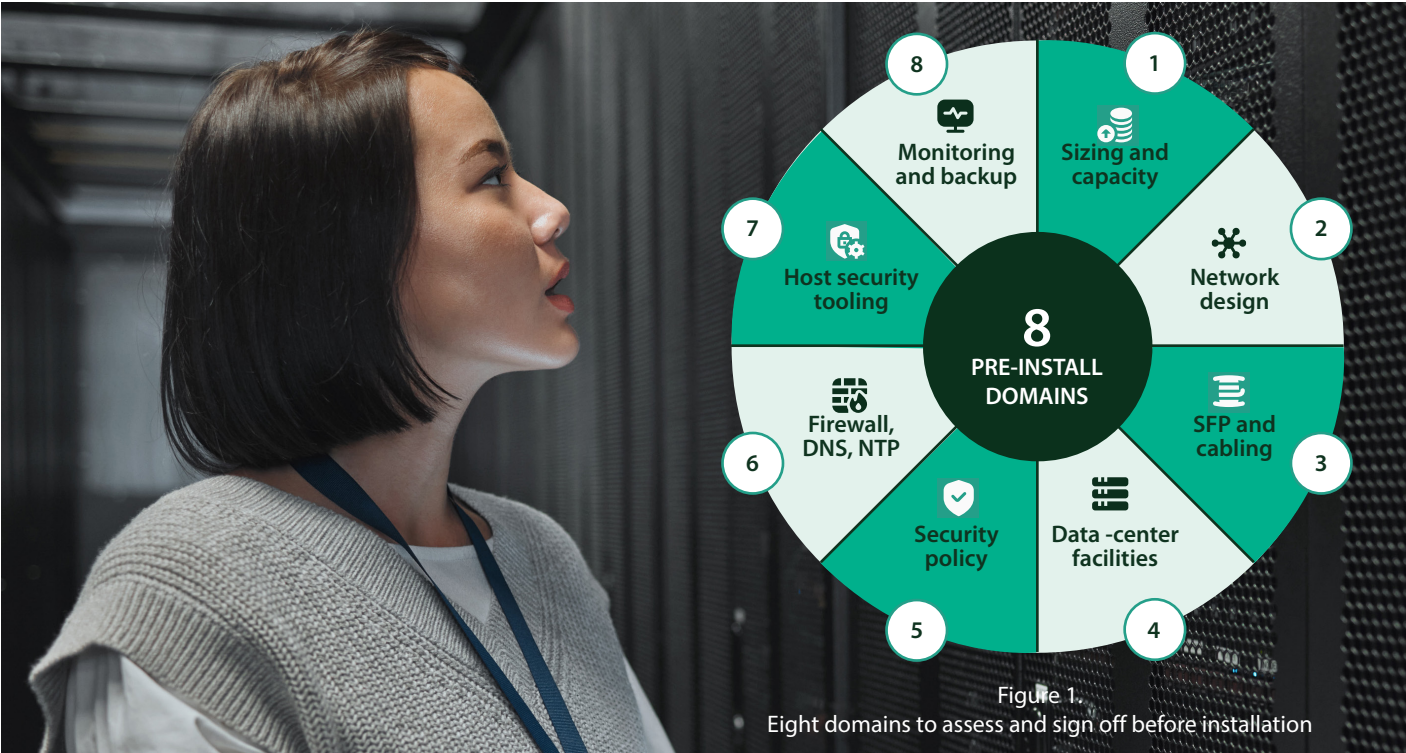


Dimension	Generic Oracle - on commodity infrastructure	Exadata Cloud@Customer
 Storage intelligence	None — full data blocks shipped to the database tier [2]	✓ Smart Scan / SQL offload performed in storage [1][2]
 Stack integration	Customer -assembled; compatibility and tuning risk	✓ Pre-configured, pre -tuned, pretested by Oracle [4]
 High availability	Customer -engineered, variable maturity	✓ MAA by default: RAC + Active Data Guard [1]
 Infrastructure operations	Customer	✓ Oracle Cloud Operations [1]
 Economics	Capital refresh cycles, sized for peak	✓ CapEx -to-OpEx, elastic ECPU (Elastic Compute Unit) scaling [1]
 Data residency	On-premises	On-premises, behind the firewall [1]

Table 1. Generic infrastructure compared with Exadata Cloud@Customer

Transformation Approach

A platform of this caliber rewards a disciplined transformation. Experience shows that the database itself is rarely the thing that fails during a move; the risk lies in readiness gaps and in the systems that surround the database. A structured approach addresses both



Establish a readiness gate before deployment.

Eight domains to assess and sign off before installation

 Sizing and capacity	Selecting the elastic shape and VM Cluster design that match real workload profiles, sized for a baseline plus elastic headroom rather than for peak, given that processing capacity scales online [1].
 Network design	Planning the service, control -plane, client, and backup networks, and ensuring that administration -network addresses do not collide with the corporate network, since the infrastructure reaches DNS and NTP services indirectly through the control plane servers [7].
 SFP and cabling	Deciding between supplied and customer -built network equipment and confirming the optics and cross -connect plan [6].
 Data -center facilities	Verifying floor space, front -to-back airflow, power feeds and redundancy, and cooling against the published environmental specifications [1].
 Security policy	Mapping enterprise controls onto the platform, including Transparent Data Encryption with keys held in the VM wallet or an external key store, network encryption, and OpCtl governance [1].
 Firewall, proxy, DNS, NTP	Enabling outbound TCP 443 from the control plane servers to the required Oracle Cloud endpoints (inbound 443 is not required and may be blocked) and provisioning reliable DNS and NTP services [6][7].
 Host security tooling	Using the supported path for customers with root access to install micro -segmentation agents such as Illumio, endpoint protection, and host firewall rules, validated against the platform's minimal operating system image [1].
 Monitoring and backup	Choosing backup destinations such as local disk, the Zero Data Loss Recovery Appliance, or an NFS target, and defining the boundary between Oracle's infrastructure monitoring and the customer's database and operating -system monitoring [1].

Coordinate the boundary systems explicitly.

A database migration ripples across the application tier (connection strings, service names, connection pooling, Application Continuity), the network (routing, firewall rules, load -balancer repointing, latency validation), security (key and certificate availability, host-agent policy, OpCtl approvals), backup (destination cutover and first verified backup), batch scheduling (job re -pointing and freeze windows), monitoring (agent deployment and re -baselined thresholds), ETL and data integration, reporting and analytics, and any downstream systems consuming feeds from the database. Each boundary needs a named owner, a validation step, and a defined freeze -and-cut point.

Rehearse, cut over, and stabilize.

A full mock migration against representative data validates timings, replication lag, and automation, and yields a measured cutover duration to size the production window. The cutover itself follows a sequenced runbook with clear go/no-go and rollback criteria, executed within an agreed maintenance window. A time-boxed hypercare period follows, featuring heightened performance monitoring. This includes verifying that Smart Scan offload is occurring, checking backup success and Data Guard health, and reconciling boundary systems. Explicit exit criteria must be met before returning to business-as-usual operations..

Migration Strategy

The recommended migration approach is a physical migration using an Oracle Data Guard standby database, orchestrated by Oracle Zero Downtime Migration (ZDM). This approach is low-risk by construction: it builds the target while the source keeps running, and the standby relationship doubles as the rollback safety net.

Full compatibility between on-premises Oracle databases and databases on ExaCC makes the move straightforward, and Oracle recommends ZDM as the best practice for migrating workloads to ExaCC, supporting online migration from Linux x86, AIX, and Solaris sources [1]. ZDM is the MAA-recommended migration solution; it follows MAA principles and uses Oracle Data Guard, together with RMAN and Data Pump, to provide zero-to-negligible production downtime depending on the scenario [5].

In a physical online migration, ZDM instantiates a standby database on the ExaCC target —through a restore from service, active duplication, or an existing backup —and then keeps the primary and standby synchronized with Data Guard until cutover, at whichpoint a switchover promotes the target [5]. Several practical prerequisites apply: the target is provisioned as a placeholder from the cloud console without automatic backups enabled; for ExaCC the source and target share the same database name while the unique name differs; the SYS password matches across both; and Transparent Data Encryption is handled within the automated workflow [5]. Where a database cannot use the physical path —for example, a cross-version or cross-endian move —a logical migration using Data Pump or GoldenGate provides the alternative [5].

The strategic value of the standby-based design is that rollback is genuine and fast: the original primary remains intact and resynchronizable until post-cutover validation passes, so the enterprise can reverse the switchover within the maintenance window if acceptance criteria are not met [5].

Infosys Solution Framework

Infosys operationalizes this transformation through a phased delivery framework that converts platform potential into a governed, repeatable outcome.

The engagement begins with Assess and Advise —workload discovery, consolidation analysis, a licensing strategy that weighs Bring Your Own License against License Included, sizing, and a total-cost-of-ownership business case. It proceeds to Architect and Plan, where the target shape and VM Cluster design, the network and security architecture, the readiness gate, and the MAA-aligned high-availability and disaster-recovery design with RAC and Active Data Guard are established. The Build and Migrate phase enables the ExaCC environment, executes the ZDM-based physical migration with Data Guard, runs mock migrations, and coordinates the boundary systems. Cutover then delivers the sequenced runbook execution with its rollback safety net. Hypercare follows, delivering stabilization and a clean handover to operations. Finally, Operate and Optimize provides managed operations, monitoring integration, continuous performance and offload assurance, and the FinOps practice described in the next section.



Figure 2: Infosys Solution Framework

Underpinning the phases is cross -domain delivery — database administration, infrastructure, network, security, application, integration, and reporting working in concert — and a set of reusable assets: the readiness checklist, the boundary -coordination map, the cutover runbook, and the FinOps dashboard. This combination is what makes the difference between a one -off project and a transformation the enterprise can trust and repeat across its estate.

Our Cloud Predictability and FinOps Framework

Cloud economics translate into predictable costs only when consumption is governed as continuous discipline. Infosys provides this discipline through its Cloud Predictability and FinOps Framework for Exadata Cloud@Customer estates once they are in production. It rests on an operating model of three recurring behaviors — Inform, Optimize, and Operate — supported by three foundations: a shared understanding of billing and consumption, a continuous process aligned to the agreed migration ramp -up plan, and a technology layer that combines OCI (Oracle Cloud Infrastructure) -native capabilities with Infosys automation tools and accelerators.

Inform establishes visibility into cloud usage and allocation by leveraging the available tooling. **Optimize** reduces over -consumption and informs optimal purchasing decisions, focusing on utilization and rates. **Operate** makes optimizing cloud consumption part of the organization's culture and governance through continuous improvement — so cost discipline becomes routine rather than a periodic exercise.

Operationally, the model runs as a continuous four -stage cycle, repeated in line with the ramp -up plan and the evolving workload profile.

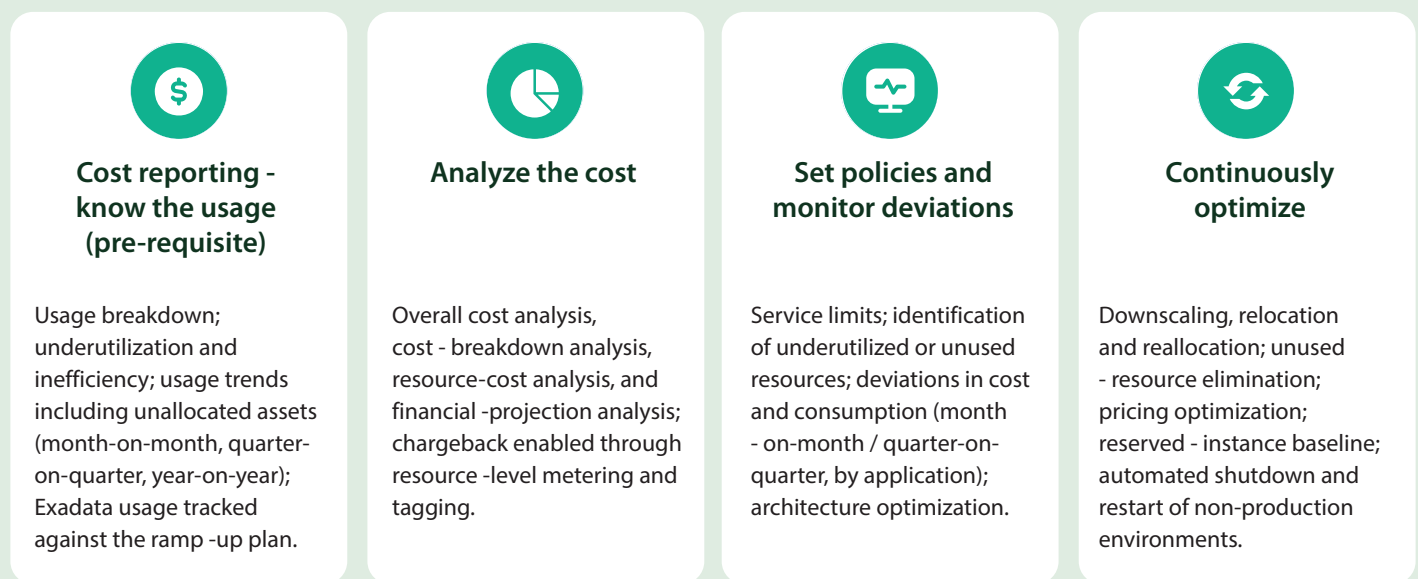


Figure 3. The Infosys FinOps operating cycle for Exadata Cloud@Customer.

Automation in place of manual effort. A defining feature of the framework is that capacity is managed automatically rather than manually. Layered on OCI -native capabilities, Infosys automation tools and solutions adjust ECPU allocation dynamically in line with workload patterns and the ramp -up plan, and automatically apply shutdown and restart policies to non -production environments. This removes manual scaling — and the delay and human error that come with it — from day-to-day capacity management, so the estate tracks demand continuously while production workloads remain fully online throughout.

Visibility, show back, and chargeback. Resource-level metering and tagging make consumption attributable by application or business unit, giving the enterprise a defensible basis for show back and chargeback and a clear line of sight from spend to the service that incurred it. Set against the ramp -up plan, this turns raw usage into accountability and into reliable financial projections.

Run as a closed loop, Our Cloud Predictability and FinOps Framework converts the elasticity of Exadata Cloud@Customer into genuine cost predictability — and into an optimized, defensible run rate that the business can forecast with confidence.

Practitioner's View for Successful Transformation

Enterprise ExaCC transformations consistently surface a handful of lessons worth internalizing before the first migration.

The first is to treat the move as a transformation rather than a relocation. The greatest value comes from consolidating work loads and designing the VM Cluster topology deliberately, not from a like-for-like lift of the existing estate. The second is to verify, rather than assume, performance: the platform's gains depend on queries being eligible for Smart Scan offload, so offload should be confirmed in practice after migration rather than taken for granted from the hardware specification [3]. The third is that networking and address hygiene are the most common sources of delay — _administration -network IP collisions, DNS and NTP reachability, and outbound port 443 rules should all be closed out at the readiness gate [6][7]. The fourth is to size for elasticity: since ECPUs scale online, provisioning for peak wastes money, whereas a baseline -plus-headroom design is more economical [1]. The fifth is to sequence the boundary systems explicitly, since the integrations around the database are far more likely to break than the database itself. The sixth is to use the Data Guard standby as a deliberate, rehearsed rollback mechanism rather than an afterthought [5]. The final lesson is operational. With Oracle handling infrastructure and firmware, teams should redirect their effort from routine hardware maintenance to high-value database work, scheduling maintenance windows around critical business activity [1].

Conclusion

Enterprises running mission-critical Oracle databases no longer have to choose between cloud agility and on-premises control. ExaCC delivers the engineered Exadata platform — Smart Scan and intelligent storage, RAC, Active Data Guard, and Maximum Availability Architecture — together with a cloud consumption model and Oracle-managed infrastructure, all inside the customer's own data center and behind its firewall. The platform removes the structural disadvantages of generic infrastructure while preserving the residency, security, and control that regulated organizations require.

The benefits are realized when the transformation is executed with discipline: planned through a structured readiness gate, migrated with a Data Guard and ZDM safety net, cut over with a sequenced runbook and hypercare, coordinated across every boundary system, and governed with a FinOps operating model that makes cost predictable. Infosys brings the framework, the cross-domain delivery, and the reusable assets to make that outcome repeatable across the enterprise estate — turning the database platform from a constraint on the business into a foundation for it.

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About the Author(s)



Ramesh Mantri

Ramesh is an Industry Principal Consultant at Infosys. A technology evangelist and a chartered accountant with over two decades of experience in IT consulting and delivery, he has successfully guided organizations through their cloud -enablement journeys. Ramesh has spearheaded complex digital transformation programs in the financial services industry, focusing on finance, digital, billing, reporting, and cloud transformation. He has also steered implementations of ERP, reporting, finance, and accounting solutions.



Vivek Raaj

Vivek is a Senior Technology Architect at Infosys, an IIM Calcutta alumnus and Oracle ACE Apprentice, with over 25 years in IT strategy, enterprise architecture, and large -scale transformation. He has delivered future -ready solutions through brownfield and greenfield cloud and ERP transformation programs across the highly regulated Banking, Financial Services, and Insurance (BFSI) sectors, with deep expertise across the Oracle technology stack and Oracle Cloud Infrastructure (OCI).

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For more information, contact askus@infosys.com



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