

WHITEPAPER

Blueprint for transforming on-premise
business applications to cloud



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Blueprint for transforming on-premise business applications to cloud

Preface

With the rapid development and adoption of Cloud technologies, business enterprises see Cloud not only as a technology shift, but also as a powerful driver of positioning their business applications to maximize customer value. Enterprises view Cloud technology processing as an endeavor to make technical and business assets accessible on demand to clients. To maximize the potential of on cloud application, the IT infrastructure set-up must be flexible, adaptable, and secure to respond to Cloud-based distributed computing system.

This whitepaper identifies the challenges faced by IT professionals in efficient migration of business applications to Cloud, and provides an efficient business strategy for delivery of application transformation. This whitepaper addresses different cross-slicing issues that are integral to application transformation.

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Challenges in migrating applications to cloud

Overview

According to the International Data Corporation (IDC), over 70% of the CIOs have adopted a "Cloud-first" strategy for their business enterprise. However, the challenges facing the transformation of on-premise business applications to cloud, including the software, maintenance, and process change, are immense.

Increased industry acceptance and adoption of Platform-as-a-Service (PaaS) and Infrastructure-as-a-Service (IaaS) has resulted in data and process migration to cloud, either public or private. When the right path is adopted, Cloud-enabled applications not only provide cost benefits, but also enable scalability and enhanced performance.

Irrespective of whether business enterprises implement cloud solutions by migrating on-premise applications to cloud or from one cloud environment to another, it is critical for organizations to identify each of the business and technical challenges and address them individually.

Business challenges

Listed below are the business challenges faced by organizations:

- **Time & Cost**
Migrating on-premise applications to cloud includes bandwidth cost of migration and the transfer time.
- **Risk**
One of the major risk factors is the security aspect of business. To reduce the risk factor, companies must identify and manage data sensitivity and business agility. The on-premise environment must have higher priority over data storage and other infrastructure elements.

Changing your cloud service provider post application migration can be easily done, and can contribute to minimizing the migration risk and costs.
- **Complexity**
90% of CIO's surveyed in a 2016 Morgan Stanley report stated that complexity of application infrastructure architecture was a major issue.
- **Flexibility and Agility**
Point-to-point integration solutions can provide basic SaaS to SaaS connectivity, but they are not sophisticated or flexible enough to handle more complex scenarios. Application integration solutions must be able to support a variety of integration flows moving in both directions across cloud and enterprise, and should scale up as the number of endpoints increases.
- **Standardization**
Platform standardization and identifying third-party dependencies is an inherent challenge. Genuine interoperability requires interpretation of particular application and administration usefulness starting with one cloud and then onto the next, and this is impossible without standardization.

“ Cloud-enabled applications not only provide cost benefits, but also enable scalability and enhanced performance. However, it is critical for organizations to first identify the business and technical challenges associated with cloud migration and address them. ”

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Technical challenges

Listed below are the technical challenges faced by organizations:

- **Application security:** Enhancing the security of an application frequently by discovering, settling and avoiding security vulnerabilities is the major concern of cloud movement. This could be avoided by implementing secure coding practices and strong cryptography.
- **Application performance:** Public-hosted clouds are available to multiple users and can lead to poor bandwidth access or outages. This can be overcome by improving application performance by reducing over-provisioning.
- **Application compatibility or interoperability:** Application compatibility is one of the biggest concerns in application migration on cloud. It involves the testing of new or upgraded applications for OS compatibility and interoperability with other applications.
- **Application integration (network, database and servers):** Comprising of application dependency, SOA framework, business flows, and business cycles. The key concern is whether application integration involves real-time processing or batch processing of the business applications.
- **Application governance (monitor & manage):** Involves managing operational performance, performance reliability, operational effectiveness, strategic directions, and operational risks.

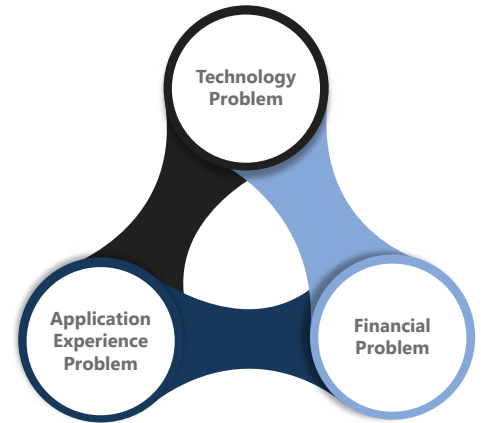
The following section presents an efficient roadmap for the process of application transformation, taking into account various impediments and pitfalls which might affect clean closure.

Transforming on-premise business applications to cloud

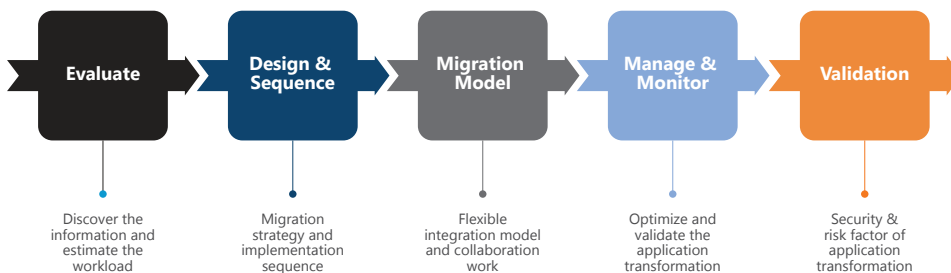
Getting started with the application transformation

Application transformation to cloud begins with a detailed assessment of the business and technology needs, leading to a roadmap documenting the phases and solutions of the migration along with expected results.

The use of a transformation roadmap can eliminate any inconsistencies in the process, along with the ability to maintain visibility and security during each of the phases.



“ Application transformation to cloud begins with a detailed assessment of business and technology needs, which will lead to a roadmap documenting the phases and the solutions of the migration, along with the expected results. ”



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Application transformation comprises of the following steps:

- **Evaluation**
Define and estimate the migration workload along with the assessment of the on-premise application. Identify key aspects of your application infrastructure architecture.
- **Design and sequence**
Following the evaluation or definition stage, the 'Design' step involves your cloud migration strategy, along with identification of the right cloud service provider, based on business requirements and cloud strategy.
- **Building flexibility into your migration model**
This step involves building a technical approach, along with integrating flexibility into the organizational framework to ensure the growth of business mode.
- **Security and validation**
As security is a major concern with any organization, evaluate the risk factors of the application transformation to ensure a well-secured cloud platform for the applications.
- **Monitoring and management**
Monitoring and management of cloud-based solutions, as compared to internal application is a complex process due to the change in environment. This final step is to address concerns about troubleshooting the applications using the right management tools.

The following sections describes the details of each of these application transformation stages.

Evaluation and definition

This is the initial step, that involves all the major decisions about cloud migration and sets the roadmap for the remaining migration steps. The Return on Investment (RoI) is estimated to evaluate the potential benefits of migrating applications to Cloud. Based on the RoI, the cost benefits can be analyzed and established.

Based on the organizational goals, a robust cloud strategy can be formulated along with the migration roadmap, that provides information on the included phases, approach, and potential cloud services.

One of the decision points facing technology leaders is to identify the right cloud technologies and mechanisms.

Enterprise application workloads indicate the amount of workload that is versatile, along with others that are interlocked with added packages. To evaluate the transition to Cloud, you need to identify the main points, indicated by your application infrastructure architecture.

It is imperative to determine the number of legacy applications, along with the number of complex or custom-built applications.

“ Evaluation & definition forms the initial step, which involves all the major decisions about cloud migration and sets the roadmap for the remaining migration steps ”

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The figure below displays a decision framework that can propel organizations on the road to high business growth along with cost benefit in an objective way.



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Design and sequencing

Following the evaluation stage, the 'Design' phase is the stage when the selected cloud strategy is executed, along with the detailed migration roadmap. Based on the business needs, the design parameters, for identifying the right cloud implementation partner are established. Based on the design parameters, potential cloud vendors are evaluated before selecting the right partner for cloud migration.

Besides selection of the right cloud implementation partner, the Design stage also involves the following exercises:

- **Evaluating cloud readiness**
This exercise involves the review of the application architecture for suitability and stability for cloud, aimed at discovering the risks and challenges involved in the execution. Evaluation of cloud readiness typically identifies the changes to be made in existing applications to host them on a cloud-based platform.
- **Selecting the cloud architecture**
Based on the cloud technology, the cloud architecture may be selected, which comprises:
 - Configuration of the computer resource
 - Security architecture
 - Load balancing
 - Backup or disaster recovery plan
 - Configuration of alerts and monitoring
 - Implementation plan for DevOps
- **Developing the cloud migration plan**
The cloud migration plan includes details of the migration phases, application batch processing, and data migration and testing plans.

Building flexibility into your migration model

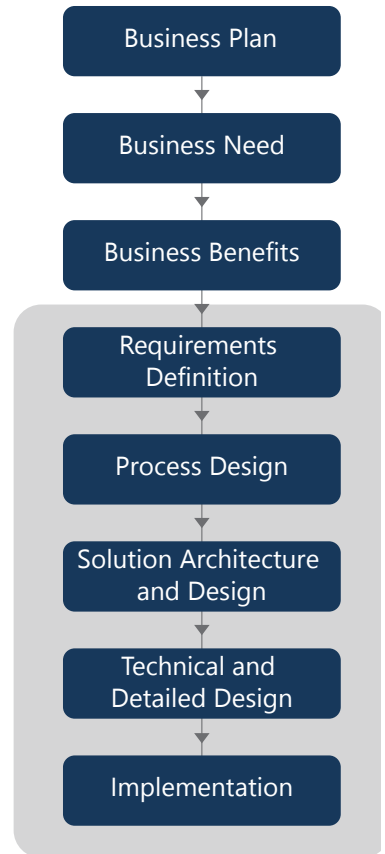
One of the challenges of building flexibility into the cloud migration model is synchronizing the applications effectively to enable ease of data share

Application optimization is a key factor that enables applications through:

- The use of EAI (Enterprise Application Integration) connectors
- Custom software to move data from application to application
- The use of an integration services bus to provide an integration backbone

When it comes to complete migration of application to cloud, some of the key questions that must be addressed are:

- How to integrate dependency between application being migrated and other systems?
Applications may depend on each other through
 - Control integration (invoke each other) and through third-party tools
 - Data integration (read/write same database or files)
 - Presentation integration (mashed up on the same window or web page)
- How extensive are the integrations?
- What is the business requirement model for application transformation?
- What are the protocols used?
- Which are the additional utilities or runtime library dependencies?
- What are the performance requirements, such as frequency of connections or the amount of generated data?



You may iterate these steps multiple times, refining details at each stage

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Security requirement analysis

Cloud-based implementations typically have their security framework shared between the user and cloud providers. Some of the major security challenges faced on the cloud include:

- Users not being aware of their virtual machine (VM) security model
- Cloud providers not being aware of the type of the content and processes executed on the VMs
- Different data security standards for the current cloud infrastructure and that of the cloud provider

Cloud-based services need a security wrapper to provide an umbrella of safety, such that any access to any object on the cloud platform should pass through security components. Security threats for the cloud infrastructure can be divided into three main categories namely:

- Hypervisor attacks
- vSwitch attacks
- VM attacks

Listed below are some key points of application transformation related to security concerns:

- Security measures are integrated with every application workload to any public or private cloud
- Standard and uniform security policies are implemented across all data centers and cloud workloads
- Ensure scalability and security of application workloads in the cloud or data center
- Build and test security policies, thus reducing application outages and application changes

Validating applications for cloud transformation

Along with addressing security aspects, cloud applications need to be validated in order to benefit from expanded accessibility, better execution and cost benefits. Validation must involve both technical and business evaluation.

Listed below are some key points you must consider during application validation:

- Technical testing for overall performance, quality and sustainability
- Security testing for access control and scalability
- Business unit testing for cost analysis, service level agreement (SLA), and risk factors

Monitoring and managing the cloud migration

Although the cloud platform ensures significant cost savings and increased flexibility, organizations do face the challenge of managing a new and complex environment. Traditional IT monitoring and management tools are not as effective in these environments as they are in internally hosted applications.

This phase focuses on the management part of your cloud environment, including process automation to reduce the scale of manual intervention. Cloud monitoring is an important aspect of cloud management, which needs to be implemented at both the infrastructure and application levels using the tools provided by the cloud service provider and by external monitoring tools.

Lack of standards and interoperability:

Lack of standards in how cloud-hosted users and applications interact with the cloud has led to the *Hazy Cloud* phenomena. Consumers cannot use different cloud vendors to host their infrastructure. This has created a lack of resource optimization as some features are available on some cloud service providers and not on the others. Additionally, the architecture of proprietary cloud applications makes it very difficult to integrate cloud services with an existing organizations legacy system.

“ Along with addressing security aspects, cloud applications need to be validated in order to benefit from expanded accessibility, better execution and cost benefits. ”

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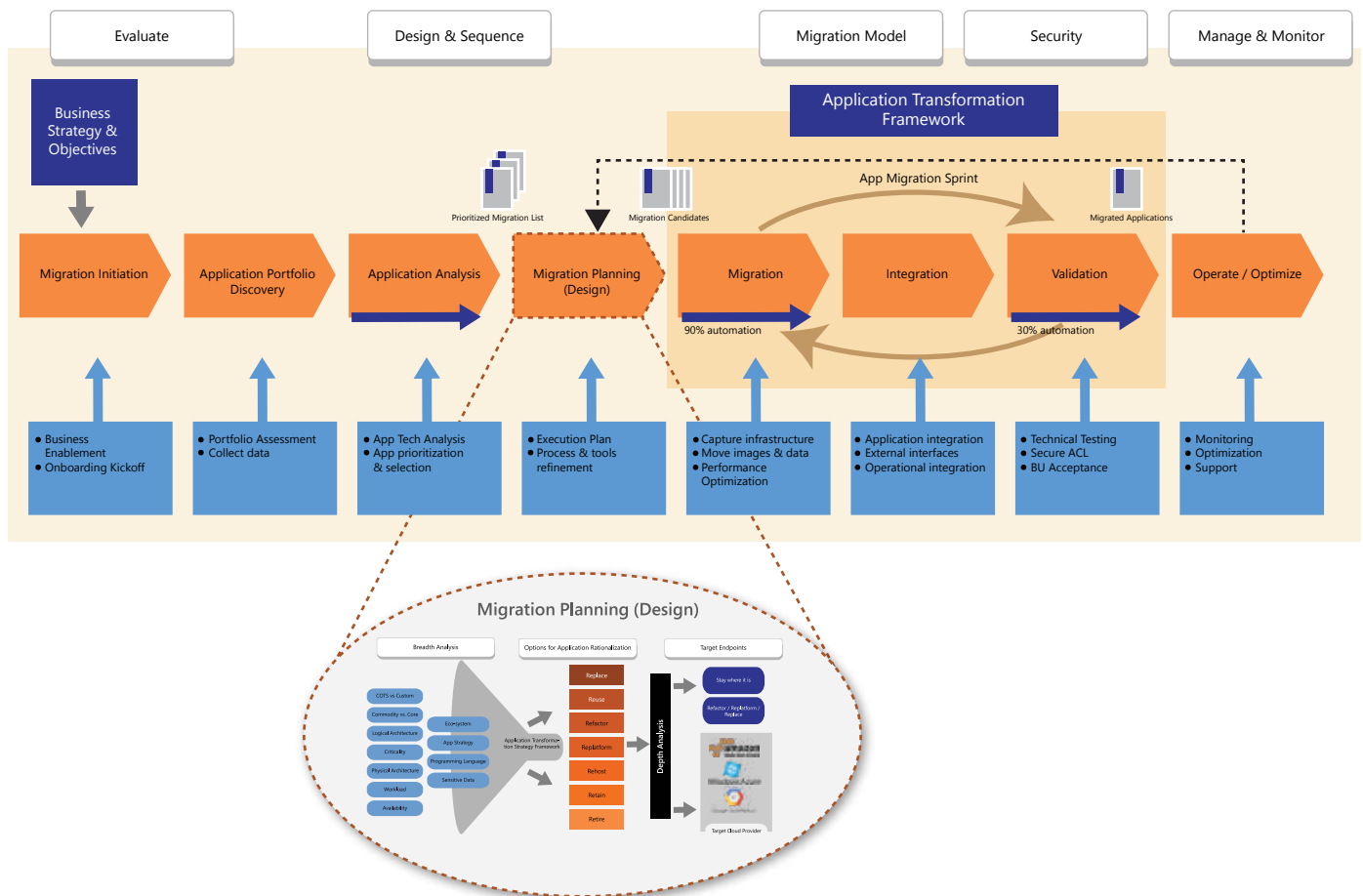
Microland’s solution framework for application transformation

Microland recommends a phased approach to successfully migrate and manage applications on cloud. Microland’s Soutlion Framework shown below is applicable to most applications.

This framework includes optimizing the application during or post the transformation, which entails running of applications on the cloud, exactly as it was executed on premise. This is due to the “top down” focus from the application downwards into the infrastructure stack. The framework focuses on in-depth analysis of each and every pin-point of application transformation on cloud.

Microland’s Solution Framework presents accurate workload analysis and cost of transformation, along with presenting a clear insight and error scanning techniques.

This shared approach towards cloud transformation is combined with state-of-the-art technology and migration models. Along with a complete state of security, the Microland Solution framework can be executed to keep the challenges of use movement under control.



Source : Microland.com

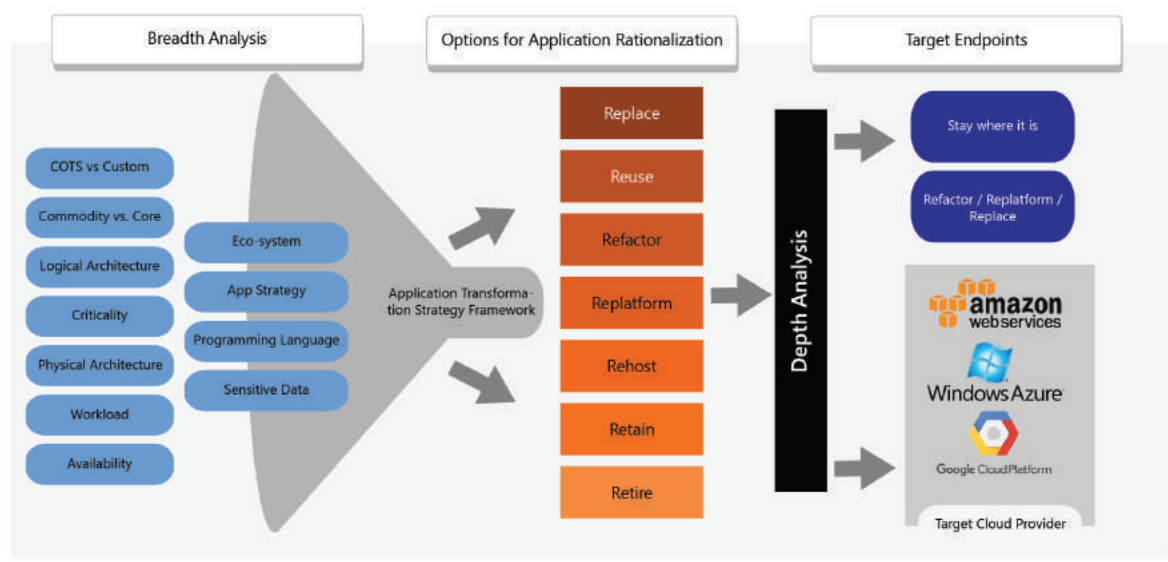
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Let's consider each of the seven available choices of application optimization:

- Replacing using Software-as-a-service (SaaS)**
 The *Replace* mode involves discarding existing in-house applications and replacing them with cloud-based software applications. Users may access the SaaS model through a web browser or any other user tool. Example of SaaS models include Salesforce CRM and LiveMeeting for video conferencing.
- Reusing**
 The *Reuse* mode involves the development and productizing of common business and technical services, along with consolidation of similar applications and services, that do not require migration.
- Refactoring using Platform-as-a-service (PaaS)**
Refactoring is the process of executing your business applications on the Cloud infrastructure or Platform-as-a-service (PaaS). As there is no "one-size-fits-all" model, organizations strive to identify a preferred cloud environment to understand how that cloud platform matches their organization's maturity, culture, and application portfolio.

Application refactoring is PaaS with backward code compatibility, with the required code modification ranging from no changes to major changes that can invoke new API calls. Application developers can use refactoring process to leverage the strategic code that can reuse the existing language, application frameworks, and containers, along with assessment of the workloads or utilizations needed to move to cloud. Some of the accustomed instances of workloads are bartering action programs, e-mail servers, SaaS administrations, outer/internal sites, and FTP servers.

“ By following a planned migration strategy, organizations can implement a smooth Cloud transition with the aid of project planning, task allocation and tracking, project duration, and cost factors ”



Migration Planning (Design)

Source : Microland.com

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- **Re-Platforming**

The *Re-platform* mode involves moving applications to advanced cloud-aligned technology and platform services. Additional integration efforts with cloud operations and monitoring is required for public and other external cloud services.

- **Re-hosting on Infrastructure-as-a-service (IaaS)**

Re-hosting is the migration model of redeploying your applications on a different infrastructural environment with a different configuration. Virtual machine is an example of *Re-hosting*, and can be done for application architecture whose code cannot be modified.

- **Retaining**

The *Retain* mode involves keeping the applications without any change, hence they do not need to be migrated to any Cloud platform.

- **Retire**

Application patterns, processes, teams, and tools that support Cloud-based strategy and end points are recommended for migration. The *Retire* mode involves decommissioning of selected applications, based on their life and utility.

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Conclusion

While the process of application transformation is beneficial to organizations, business leaders and implementers must base their decision on business and technical factors simultaneously considering financial aspects as well. Organizations must select the right applications and infrastructure to be migrated to Cloud, as all of them are not suited for distributed computing. By following a planned migration strategy, organizations can implement a smooth cloud transition with the aid of project planning, task allocation and tracking, project duration and cost factors.

This white paper has recommended application transformation methodologies and principles in line with future cloud innovations. This whitepaper also outlines the possibilities of Cloud application migration along with an application framework for executing your cloud transformation smoothly.

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About the author



Ravi Prakash

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Ravi Prakash is a Senior Lead Architect for Cloud, DevOps and Middleware practices at Microland and is responsible for conceptualizing and building various technology service offerings. With close to a decade of experience in the IT industry, Ravi has played a pivotal role in IT R & D, Technology Consulting, offering creation, transition of complex areas and service delivery. Ravi also works closely with several customer-facing teams as an advisor for engagements involving middleware, DevOps and cloud services, including consulting and assessments, implementation, transformation and operations.

Ravi's other responsibilities include building service capabilities in the areas of Digital Workplace, Middleware, Cloud-API Management, DevOps-API Management and Application Optimization. In this role, Ravi brings in innovative ideas, strategic technology and initiatives that aim to improve the employee experience with various technology solutions. He is a Microsoft Azure Solutions certified architect, AWS Technical Professional certified, ITIL®V3 Foundation Certified and is also certified by International Leadership and Organizational Behavior, Bocconi University.

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About Microland

Microland is a leading Hybrid IT Infrastructure Service Provider and a trusted partner to enterprises in their IT-as-a-Service journey. Incorporated in 1989 and headquartered in Bangalore, India, Microland has more than 3,600 professionals across its offices in Europe, Middle East, North America and India. Microland enables global enterprises to become more agile and innovative through a comprehensive portfolio of services that addresses hybrid IT transformation, workspace transformation, service transformation and end-to-end IT infrastructure management.

Learn more about us at:

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