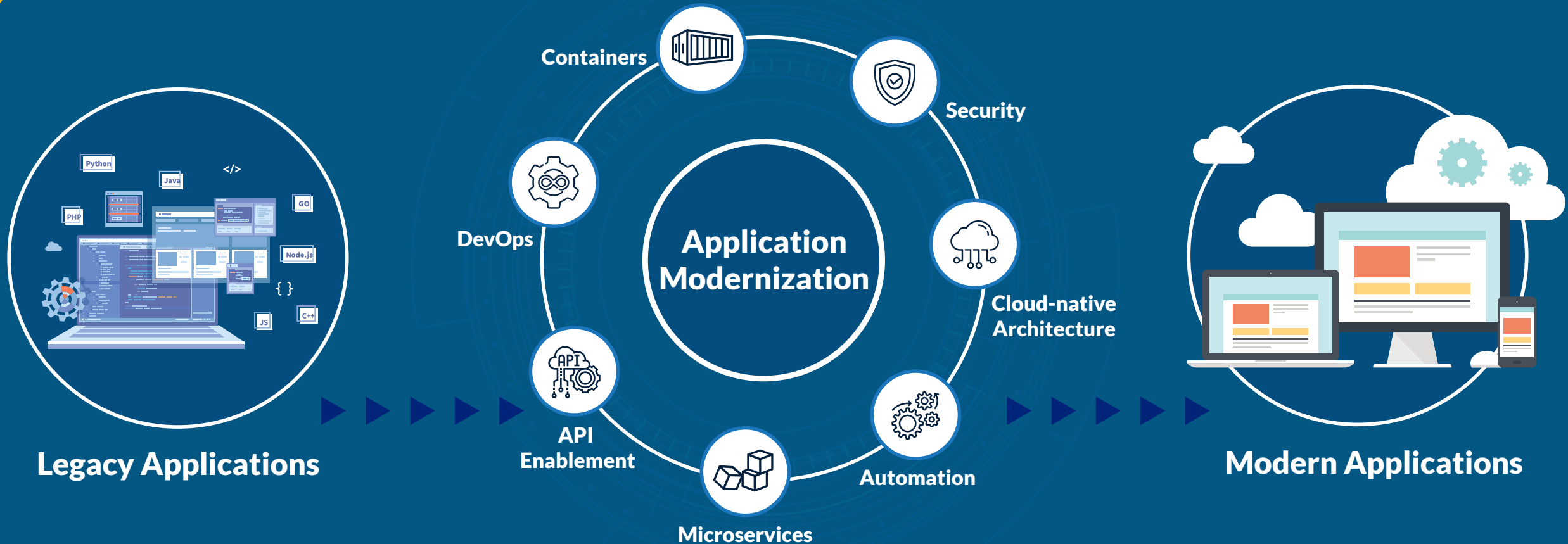


# Legacy Application Modernization with API and Integration for Seamless Digital Enablement



Point of View





## Key Challenges

- **Obsolete Technology with End-of-support:** The support for Visual Basic 6.0 IDE [integrated development environment] is no longer available as of April 8, 2008. However, VB 6.0 runtime support is continued but is limited to the Windows OS support lifecycle. For example, if the target OS is in extended support, VB6 cannot have a higher level of support than the extended support. Additionally, the VB 6.0 runtime may face compatibility issues if you are thinking of replacing or upgrading your hardware on which VB 6.0 apps are running.
- **Security Vulnerabilities:** Legacy systems are vulnerable to cyber attacks and can leave holes in an organization's security hygiene. Even software providers stop releasing critical patches like security updates, leaving users to either figure out their own workarounds or continue using applications and platforms that contain severe security vulnerabilities.
- **Workforce:** IT departments find it increasingly difficult to hire developers qualified to work on applications written in the languages no longer used in the modern technologies.
- **Maintenance:** Legacy systems require constant maintenance and complex updates to keep up with digital transformation needs. Legacy applications require more maintenance time, which leads to higher OPEX as they age and new technology platforms become the norm.
- **Performance:** Classic Visual Basic is limited to 32-bit and cannot create a 64-bit executable. Running 32-bit apps on a 64-bit processor is like running a racing car with a 10 KM speed limit. There are performance bottlenecks for I/O-intensive applications running on 32-bit. In short, 32-bit apps are slow.





# A Way to Overcome Challenges

## Objective

- Modernize VB 6.0 to a modern technology platform for ease of enhancement and maintenance
- Ensure long-term software support for the target technology in future
- Keep your applications secure from external threats (and internal security breaches)
- Get ready to scale in the future by transforming your IT stack into an agile and innovative platform for future change
- Increase multi-platform support & portability

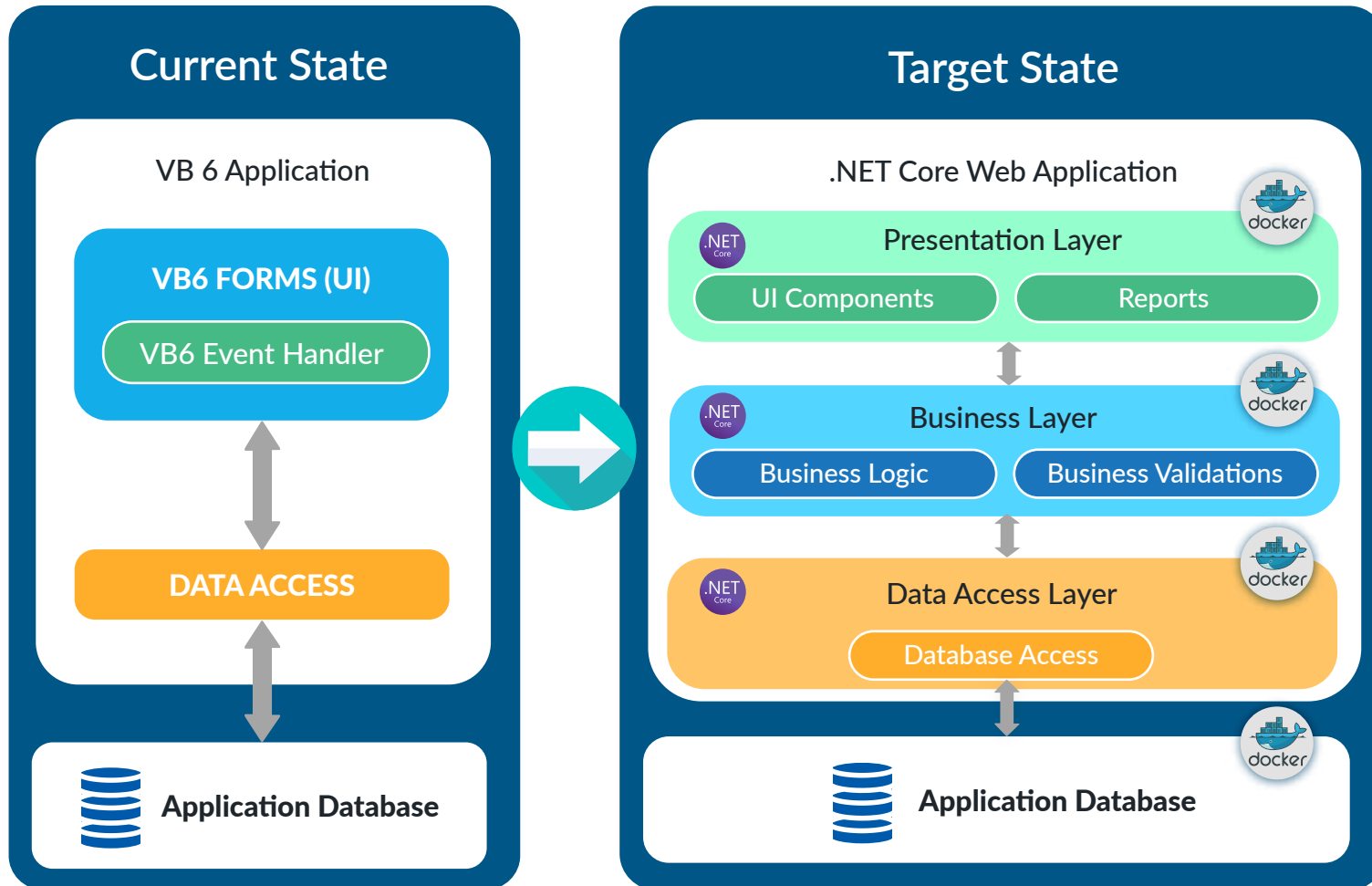
## Values

- Experience better performance, more reliable processes, and reduced risks with a better functioning system and containerized applications
- Gain higher customer satisfaction and happier employees by meeting UX and performance standards, enable better aesthetics for marketing
- Maintain (or create) competitive advantage by building a light-weight solution when compared to your competitors
- Experience better performance, more efficient applications, increased processing capability and greater options





# Modern Architecture View



- .NET Core is an open-source Development Platform designed and maintained by Microsoft.
- Docker is an open-source project centered on the virtualization of applications for multiple OS.
- Running applications in containers brings several benefits as follows:
  - Portability
  - Performance
  - Agility
  - Isolation
  - Scalability





# Manual Migration

Traditional way of looking at the legacy modernization approach with high development cost & time

## Manual Reverse Engineering Activities

- Analyze the application and identify the list of components for migration
- Prepare the code for the migration: Code cleanup/re-factoring
- Baseline code for migration

## Manual Forward Engineering Activities

- Create a .NET Core web project
- Add each module step by step to the .NET Core project
- Test and fix the defects

## Migrate Legacy Application to the Latest Modern Technology

- Containerize the migrated application for cloud readiness
- Deploy to production using DevOps pipeline
- Perform UAT and sign-off



## Details

The VB 6.0 application would be manually migrated to the latest modern technologies. All the constituent code components of the VB 6.0 application would be rewritten to the latest modern technologies. Relevant third-party components would be examined, and as per need, their latest technology counterparts would be procured. The existing screens would be redesigned in the IDE. All the required user controls would be redesigned in technology depending on the requirement and functionality, third party controls would be evaluated, and a list of control packages would be presented to the customer for procurement. We would follow best practices, coding standards, and naming conventions.

## Pros

- Manually migrated source code is easily extendable and maintainable
- Quality and consistency of migrated code will be of high standards since they follow best practices
- Technical Architects can specify and design modern and high performing application architecture of choice

## Cons

- High cost
- High migration time
- Manual testing efforts are high
- High risk
- Not very high quality



# Accelerated Migration

Digital transformation with speed of delivery and effort optimization using Hexaware's tools & expertise

## Reverse Engineering using Third-party Tool

- Analyze the application and identify the list of components for re-write
- Prepare the code for migration: Code cleanup/re-factoring
- Baseline code for re-write

## Forward Engineering with Hexaware Tools/ IPs

- Use Modern Delivery product development approach
- Create a .NET Core web project
- Add features & functionality to the application
- Quality checks with Test Automation
- Deployment automation using Agile DevOps
- MVP release at the end of the sprint cycle

## Cloud Readiness and Automation

- Containerize the migrated application for cloud readiness
- Database migration using Amaze

## Details

The obvious choice to migrate VB 6.0 application is to “Re-write” the application to modern technology guided by the organization’s strategic priorities. Re-engineering can be broken down into two major activities: reverse engineering and forward engineering of the application. Reverse engineering involves code mining, code analysis and documentation of the application functionality, and business logic within the application. There are third-party tools available in the market for reverse engineering but it involves cost. For forward engineering, Hexaware brings together its proven processes, technology expertise, and tool suite to develop applications on modern technologies. We leverage upon our development levers such as Modern Delivery, Talos for test automation, agile DevOps and Amaze for productivity improvement, quality, and cost efficiency.

## Pros

- Migration using Modern Delivery results in delivering the right features in rapid succession, increased velocity & reduction in delivery cost
- Migration with agile development, DevOps, automation and cloud-native architecture delivers maximum collaboration and transparency
- Modern architecture brings scalability, reliability, and reduced maintenance costs
- Efficient database migration
- Effort optimization with tool-based automation

## Cons

- Additional cost for tools
- High learning curve, if any new tools are introduced-High





# Levers for Accelerated Migrations



## Modern Delivery

- **Increased Velocity:** Full stack development pods
- **Delivery Cost Reduction:** Cloud-native development/ re-platforming
- **Customer Engagement:** Product management approach with design thinking

## Test Automation (TALOS)

- Enable rapid test automation for applications developed across multiple platforms
- Enable 2X productivity of test automation design

## DevOps

- Automated release pipeline
- Enhanced software quality
- Scalable & secure

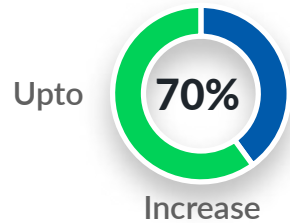
## Database Re-platform (with Amaze)

- Re-platform databases like Oracle, SQL server, DB2 to cloud-friendly databases like PostgreSQL using Amaze
- Data migration on target database

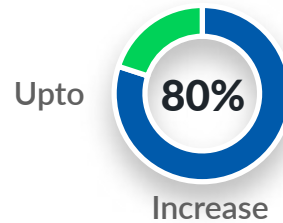


## Value Proposition

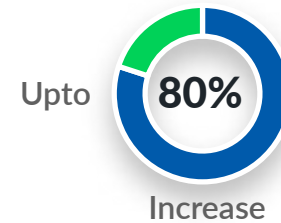
### Productivity



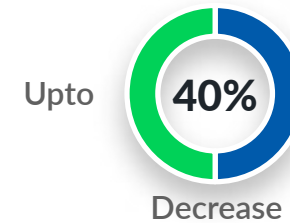
### Quality



### Release Cycle



### Effort Savings for Migration





# Key Benefits

Business benefits are two-fold through modernization of existing IT systems:  
**Driving Operational Improvements** and **Gaining a Competitive Edge.**

## Driving Operational Improvements

- Improve performance, stability and reliability
- Keep systems secure from external threats (and internal breaches)
- Introduce simpler integration with new software
- Reduce inefficiencies and eliminate waste
- Take advantage of support

## Gaining a Competitive Edge

- Leverage cloud technologies
- Open-source proven modern frameworks
- Meet the expectations of your users with improved UX
- Reduce friction and increase agility
- Make your applications work in the way you need them to







# Case Study



## Client

- A leading marine insurance company in UK
- The client manages insurance for UK P&I, defenses and TT clubs, which are leading mutual insurers for third-party liabilities for ocean-going merchant ships, transport, and logistic insurance

- A leading insurance company in UK
- Client specializes in wealth management

- A leading ICT company in Europe



## Challenges

- Client's suite of VB 6.0 applications for claims processing, account reporting, auto reference, claims printing, ETR monitor had to be migrated to VB .NET
- Mitigate unsupported technology risk and people risk associated with the VB 6.0 suite of applications
- User experience changes had to be kept at minimum

- Ensuring that the existing functional aspect wouldn't change especially when there was no documentation
- The team had to master the application beforehand to enable understanding an appropriate level of testing
- Hexaware deployed a functional expert on the team to achieve this
- Achieve the same or better quote calculation time

- Migration of tailor-made applications developed in VB to VB.NET
- Develop integrations between ticketing systems, like remedy, with migrated tailor-made systems
- Interface with various adapters like WCF, SOAP, SQL, FILE, FTP, EDI, SMTP/POP3 etc.
- Optimize SQL queries
- Integrations of customer's data with backend systems



## Approach

- Due diligence and assessment performed to evaluate options of migration (manual, tool-based or hybrid)
- Manual migration chosen post deliberation with the client
- Forms, classes, modules, VB 6 controls and third-party controls were migrated to VB .NET native controls
- VB 6.0 ADO & ODBC DSN converted to ADO.NET & ADO.NET ODBC data provider to connect to AS400 backend
- Agile development, automated testing, DevOps, and CI/CD automation

- A web-based application in .NET with centralized access to quote generation process
- The migration also involved re-factoring & analyzing code
- For each VB class, there was an equivalent C# class created
- The database calls were replaced with calls to Data Access Layer (DAL) with ADO.NET
- Enable tracing mechanism
- Enable configurable for various quote processes

- Migrate tailor-made applications to VB.NET
- Develop common interfaces to support adapters and to connect with Remedy
- Dedicated QA team for testing of all the integrations
- SQL queries are optimized and we ensured that it adapts with data access layers in the .NET application
- Migrate customer's data to backend systems using Hexaware's database migration strategy



## Benefits Delivered

- Migration to a Microsoft-supported technology stack
- Mitigated technology risk as VB.NET will have relevant upgrades, patches, and security fixes
- Improved business continuity, growth, reliability, and supportability
- User experience retained as-is, ensuring better continuity
- Agile DevOps and automation improved efficiency of development, testing, and deployment by 70%

- Usage of XML made the application extensible
- Lowered maintenance costs as the entire application was on one platform (.NET)
- Reduction of average calculation time achieved: From 4 seconds to 1 second
- Process simplification of quotes for pensions based on input parameters and configurable facility
- Helped in business continuity, growth, reliability, and serviceability

- Developed generic interfaces for adapters and re-usable components, resulting in reduced development time and effort
- Easier monitoring and tracking of communication with adapters by using logs
- Legacy application transformation to the modern platform in the agreed timeline
- Improved database performance through SQL optimization



## References

### Hexaware Tools and links:

#	Tool Name	Link
1	Amaze	<a href="https://hexaware.com/services/application-transformation-management/cloudify-application/amaze-application/">https://hexaware.com/services/application-transformation-management/cloudify-application/amaze-application/</a>
2	TALOS	<a href="https://hexaware.com/services/digital-assurance/test-automation-services/multi-channel-testing-services/">https://hexaware.com/services/digital-assurance/test-automation-services/multi-channel-testing-services/</a>
3	Modern Delivery	<a href="https://hexaware.com/services/application-transformation-management/modern-delivery/">https://hexaware.com/services/application-transformation-management/modern-delivery/</a>
4	DevOps	<a href="https://hexaware.com/services/infrastructure-management-services/devops/">https://hexaware.com/services/infrastructure-management-services/devops/</a>

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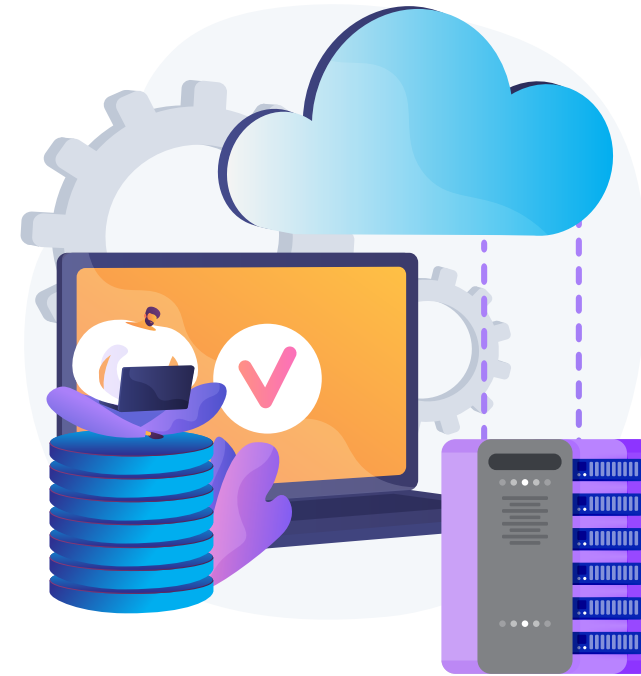
Amol Kulkarni has 20+ years of IT experience and has worked in various roles like application developer, technical lead, delivery manager and solution architect. He has been a part of complex development project across technologies and geographies. He has an experience in providing solutions for requirements around application development, SOA, modernizing the legacy applications, and cloud transformation journey.



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Edwin Sahaya Kumar has 19+ years of IT experience in areas such as application development/migration, agile/Scrum, DevOps, transition, ITIL support, and interacting with different stakeholders. He has domain knowledge in telecom, oil & gas, IFE, HCM, and healthcare, and worked in different roles such as technical leadership, project management, architect. He has experience in technologies like C/C++/VC++, Perl, Shell Script, .NET technologies, Angular, SQL Server, Azure cloud, DevOps tools, and has worked in both Windows & Unix/Linux platforms.



## About Hexaware

Hexaware is the fastest growing next-generation provider of IT, BPO and Consulting services. Our focus lies on taking a leadership position in helping our clients attain customer intimacy as their competitive advantage. Our digital offerings have helped our clients achieve operational excellence and customer delight. We are now on a journey of metamorphosing the experiences of our customer's customers by leveraging our industry-leading delivery and execution model, built around the strategy— 'Automate Everything™, Cloudify Everything™, Transform Customer Experiences™.' Hexaware services customers in over two dozen languages, from every major time zone and every major regulatory zone. Our goal is to be the first IT services company in the world to have a 50% digital workforce.

Learn more about Hexaware at <http://www.hexaware.com>

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