

# SOFTWARE DEFINED STORAGE

AGILE SOLUTIONS FOR SMARTER STORAGE



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## Abstract

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The past few years have witnessed flurry of action and hype around Software Defined Storage (SDS). There are numerous vendors claiming to grind out SDS solutions and products every other week. The Technology is great and disruptive, but there are adoption barriers for end users. The intent of this white paper is to provide a perspective to the technology, benefits and challenges of adoption, and how and where System Integrator can fill the gaps and help the user in leveraging the best benefits of SDS.

## Data: New Currency Of Today's Business

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The storage required for exponentially growing data due to IoT, digitalization, social media, mobility etc., is in the range of about 40% to 60% per annum, as per industry reports and analysis.

Based on this level of growth, storage capacities double every 18 months. For many datacenters the growth rate is in excess of 100% per year. Yet, only 65% of enterprise storage is effectively utilized. Before we discuss what Software Defined Storage is and how it is helping datacenter metamorphosis let's look at the challenges of today's storage world.

### Key Challenges in Storage World:

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- Managing Storage Growth
- Proper Capacity Forecasting
- Storage Reporting
- Storage Provision Takes Time
- Managing Costs
- Migration Data and Volumes Require Lot of Time
- Managing Complexity and Heterogeneity of Storage
- Required Storage Performance Can't be Met in Current Scenario
- Vendor Lock-ins
- Opex is Even More Than Capex
- Lot of Manual Intervention Required for Storage Management

## Traditional Storage

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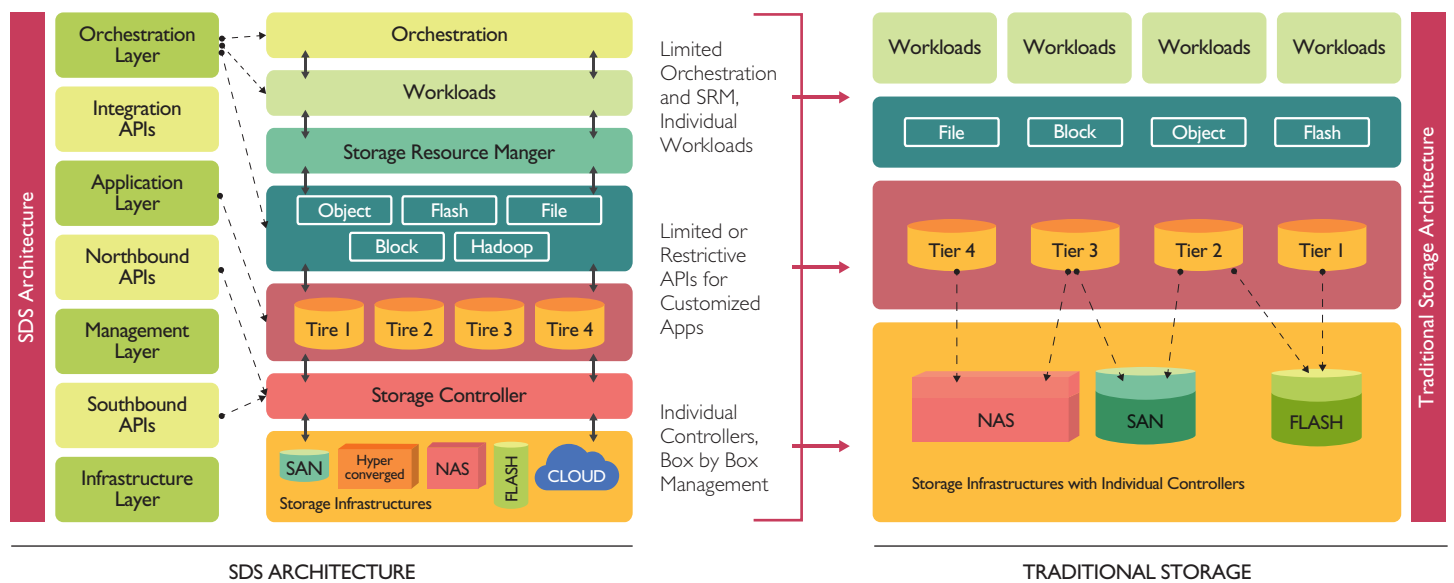
In the past and in many datacenters now, legacy systems deliver storage through dedicated hardware devices. Configuration of these devices is done box by box. Troubleshooting is even more complex, requiring deep expertise in product architecture and that too different skill set for different vendor configurations. Managing storage includes a mundane set of activities like creating volumes, assigning LUNs, backup, repeated configuration tasks, fulfillment of requests and keeping the lights on. Most storage products are proprietary and with very limited openness either in software or hardware. Proprietary storage management software from the respective product vendors is needed to manage this complex infrastructure. Thus, traditional storage architectures are a vertically integrated stack of proprietary closed systems. These problems are driving end users to look outside their datacenters for an answer. Cloud technologies and services represent the fastest way for the business to reach new buyers.

# SDS Changing The Game

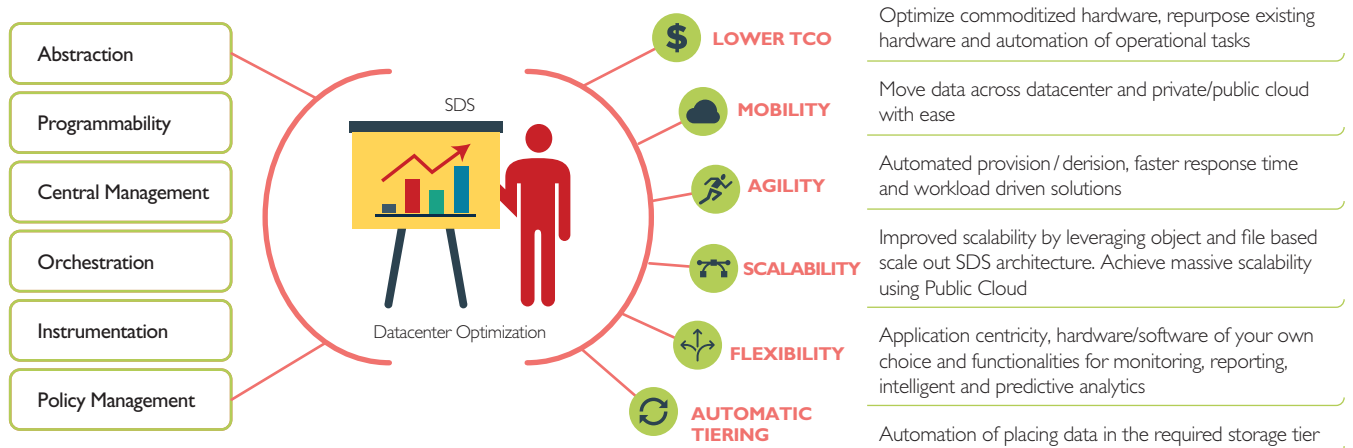
SDS abstracts storage capabilities, dynamically derived from physical/virtual devices, independent on class/type of storage to offer agility, scalability, quality of service while optimizing costs. These services are orchestrated via interoperable, programmable interfaces through the software layers (typically REST APIs) that are separated into a control plane (management and policy implementation) and data planes (infrastructure and data transport), independent of where data is placed and stored to meet a defined policy or SLA.

Multiple layer of abstractions allow to introduce more innovative and cheaper solutions, which can be integrated with existing ones using APIs thus demoting the vendor lock-ins.

Figure below shows how SDS architecture is different from traditional storage with SDS controller and storage resource manager that can help in managing different types of storage from single pane of glass.



# SDS Features And Benefits



## SDS Use Cases



### Backup Solution Transformation

- Flexible solutions with deduplication at source and compression in target
- Benefits: Lower Restoration and recovery time, scale out architecture



### Automated and Policy Based Archive

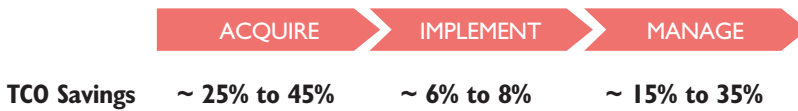
- Automation of archiving to cloud (Public/Private) storage
- Benefits: Lower TCO, cheaper archive solutions like cloud, scale out architecture and seamless discovery



### Disaster Recovery

- SDS enables on demand and cost effective DR solution, leveraging all host based replicated workload and data at DR site
- Benefits: DR as a service, DR site on SDS solution, lower TCO

TCO savings offered by SDS over traditional storage solutions in different stages of storage use is approximately given:



## SDS Challenges

SDS CHALLENGES	
<b>Enterprise Readiness</b>	SDS might be a good bet for greenfield projects, but introducing SDS in existing datacenters / brownfield projects requires detailed analysis
<b>Integration</b>	SDS offers capability to have integration with any vendor hardware, any monitoring, orchestration and cloud solutions, but integration is challenging and requires skills and knowledge on various vendors solutions
<b>Different Interpretations</b>	SDS has been interpreted by each vendor differently hence there is need to carefully look at vendor future SDS roadmap, architectural principals before finalizing any solution
<b>Too Many Vendors</b>	There are many vendors in SDS market with different offerings leading to confusion among end customers
<b>Abstraction Not Attracting</b>	Abstraction functionality may add more complexity due to the need of extensive compatibility testing and handling multi-vendor support for escalation and troubleshooting, thus adding to opex costs
<b>Comprehensive Solution</b>	Though there are many vendors with different solutions, but a comprehensive solution is still not available in today's market
<b>Management</b>	Management challenges in defining the scope of control given to SDS controller
<b>Lack of Cloud Economics</b>	SDS though cheaper than traditional lacks granular and aggressive pricing offerings like cloud

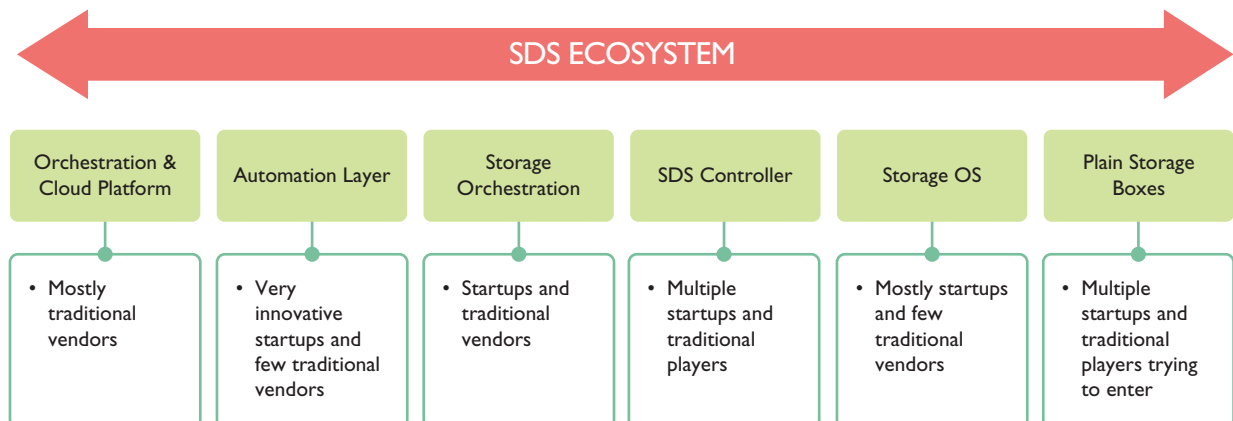
# SDS Vendor Ecosystem

SDS is delivered in multiple ways in today's market. Below is information on some of the vendor's offerings:

MODELS TYPES	SOFTWARE ONLY MODEL		CLOUD BASED MODEL	HYPER-CONVERGED MODEL		HARDWARE FOR SDS SOLUTIONS
What?	Software without associated hardware		Pay-as-you-go model	Preconfigured Systems	Build-your-own-array	Hardware for SDS
How?	Open Source	Proprietary	Hosting the SDS platform on a public cloud infrastructure, can also be delivered as a virtual private cloud	Software-centric architecture that tightly integrates resources and other technologies in a commodity hardware box supported by a single vendor.		Hardware boxes for installation of SDS environment
Vendors	Communities & new startups	Traditional Vendors and multiple startups	Few existing cloud players and new startups	Many new startups	Mostly traditional players	New Startups and traditional players trying to enter
Pros	<ul style="list-style-type: none"> <li>• Easy to install</li> <li>• Affordable</li> <li>• Can leverage general purpose storage arrays by driving down costs</li> <li>• Less capex</li> <li>• Granular features</li> </ul>		<ul style="list-style-type: none"> <li>• On the fly provision</li> <li>• Pay as per use</li> <li>• No capex</li> <li>• Scale up/down on demand</li> </ul>	<ul style="list-style-type: none"> <li>• Preconfigured and tested solutions from vendors</li> <li>• Adoption not an issue</li> <li>• Hardware and software support from a single vendor in many cases</li> </ul>	<ul style="list-style-type: none"> <li>• High scope of innovation</li> <li>• Less TCO</li> <li>• Increased Flexibility</li> </ul>	
Cons	<ul style="list-style-type: none"> <li>• Support of hardware and software from different vendors</li> <li>• Most SDS products have limited certified interoperable list, leading to interoperability issues</li> </ul>		<ul style="list-style-type: none"> <li>• No transparency of infrastructure</li> <li>• General public cloud concerns like security, network latency</li> </ul>	<ul style="list-style-type: none"> <li>• Inability to make granular upgrades or tweaks</li> <li>• Tuning storage disk configuration for a particular application is a challenge</li> <li>• Dependence on hardware vendor to maintain competitive pricing</li> <li>• Limitation in choosing additional hardware and dependent on HCL mentioned by vendor</li> <li>• Upgradation of storage requires addition of hardware</li> </ul>	<ul style="list-style-type: none"> <li>• New concept</li> <li>• Compatibility guidelines need to be followed as per providers</li> <li>• Inability to make granular upgrades or tweaks</li> </ul>	

## SDS Solutions Layer By Layer Offerings

Not only the number of vendors in market is huge, but the kind of offerings are different and the amount of abstraction features offered by each vendor is different too. Below are some:





# SDS Industry Analysis

- Though traditional players have clear dominance in storage market, but SDS will allow inclusion of many other vendors in the storage space leading to less vendor lock-ins
- Threat of substitutes is low; though technology is changing continuously and capex will reduce, but core storage functionality will change at very lower pace
- Customers enjoy huge bargaining power given the technology is new and brand loyalty is less. Also there are a lot of price & product differences

### STRENGTHS:

- SDS market expected to grow from \$1.4bn to \$6.2bn (CAGR 34.6%) by 2019 (Markets & Markets Research, 2015)
- Multiple Channels to reach customers

### WEAKNESSES:

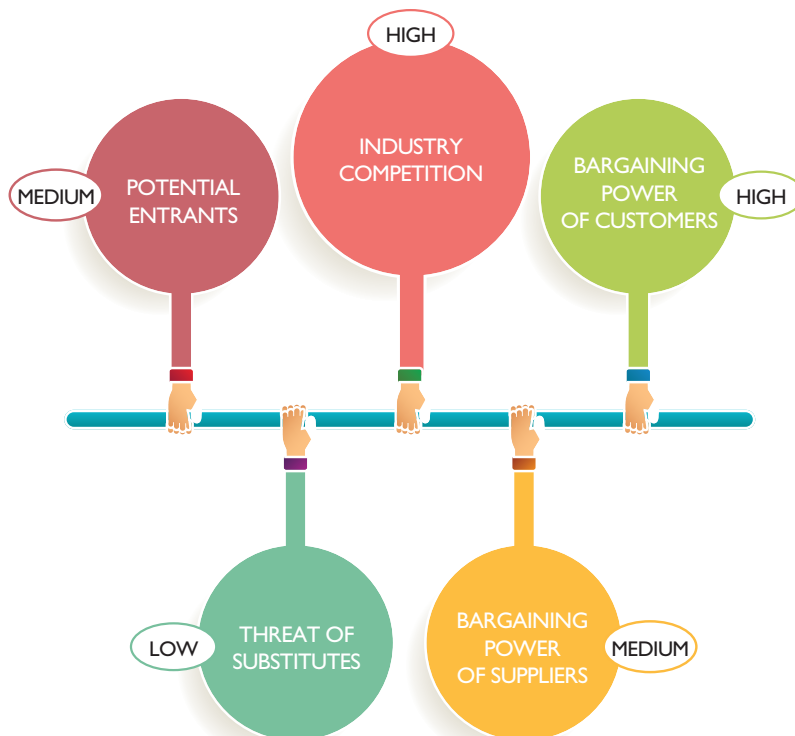
- Numerous vendors
- Difficulty of migration/integration
- No standard skill set
- Multi-vendor management

### OPPORTUNITIES:

- Venture capital funding of SDS-related companies is rising
- Market embrace open source
- Focus on software over hardware

### THREATS:

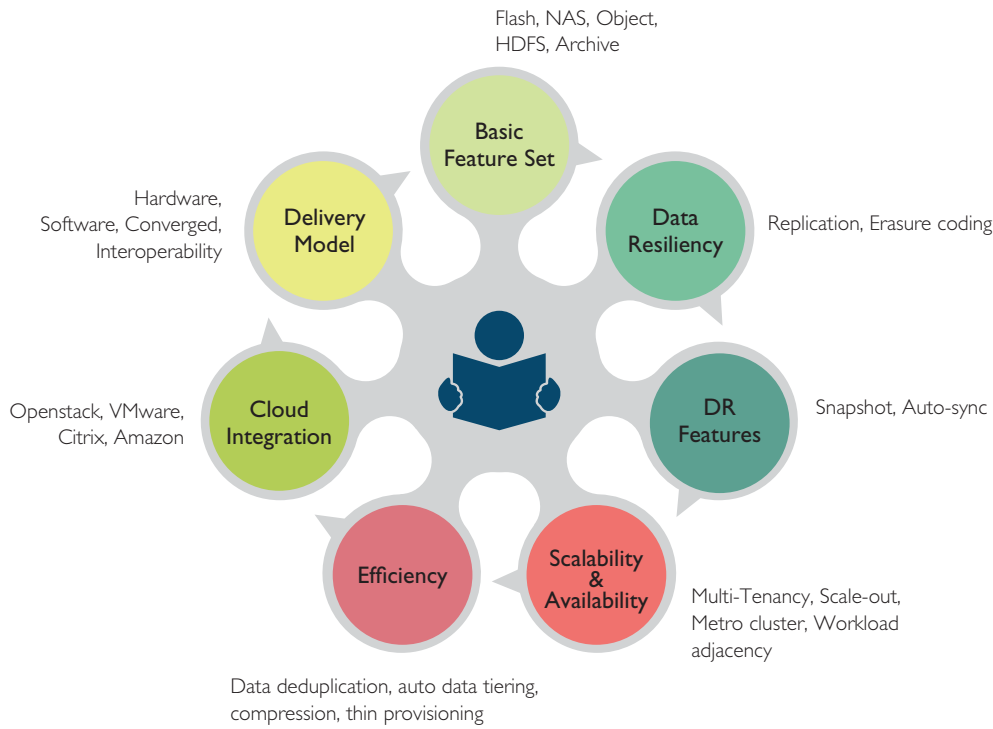
- Frequent technology changes
- High customers' bargaining power



Porter's Five Forces SDS Industry Analysis

# Buy What You Need

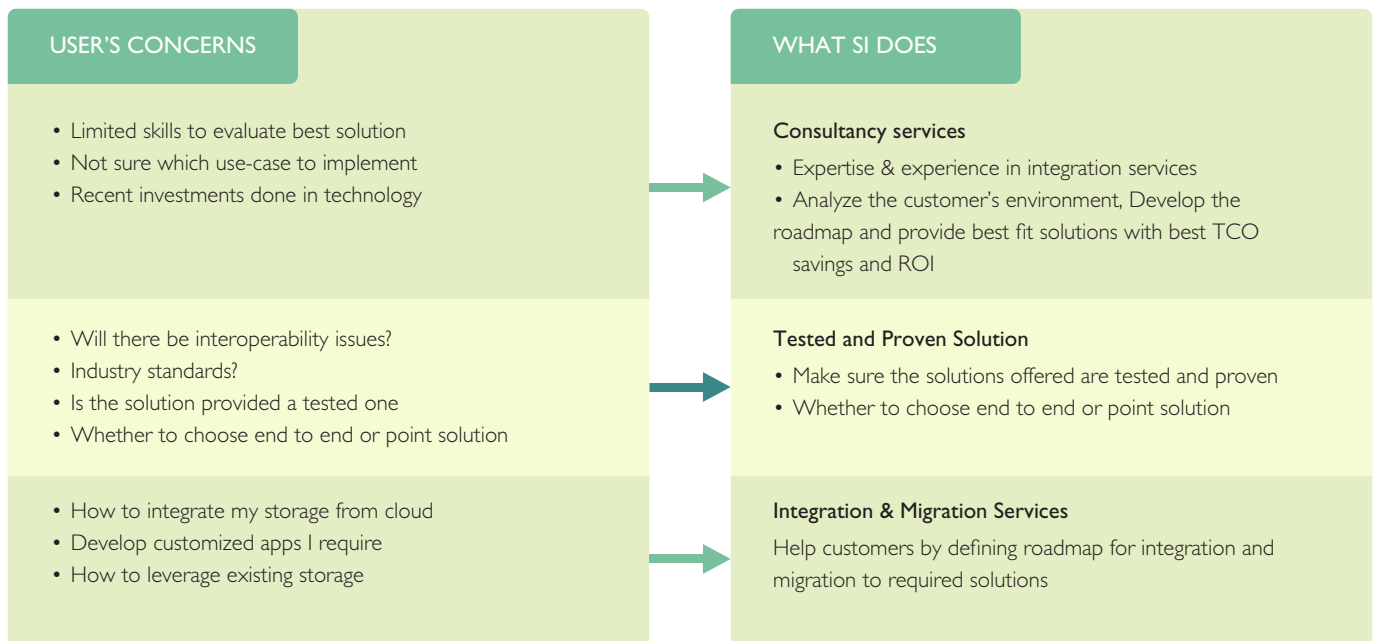
Make sure you know the scope of solution offered the monitoring & performance capabilities, virtualization, troubleshooting and security features of SDS solution. Below are some of the other important features offered:



- Know what you need  
**BE INQUISITIVE**
- Know what you get  
**BE PREPARED**
- Know how to optimize  
**STAY ALERT**

# Buyers Concerns And SI Role

System Integrators (SI) can fill the gaps here as they are already providing storage integration services. By acquiring required new skill set and partnerships in SDS, they can help customers in their adoption journey which is a major concern of SDS market today.





- How to collaborate with different vendors
- How to handle administration involving an environment of different vendors



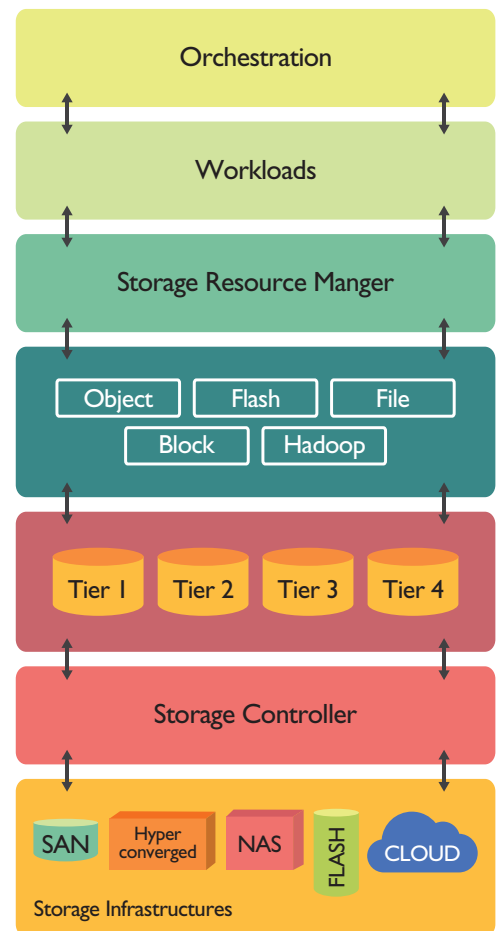
### Managed Service Provider Support

Collaborate with different vendors and provide break-fix support from end to end

## SI Providing Comprehensive Solution



### CREATION OF VALUES ACROSS ALL LAYERS



● AGILITY | ● ELASTICITY | ● COST | ● FLEXIBILITY

## Conclusion

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Traditional IT, including storage systems, aren't poised to fulfil customer's future needs and demands. The unprecedented growth of data (almost doubling every year) has added to new challenges. The unmet needs of businesses along with increasing operating costs, have led to innovation, new architectures and new products culminating into adoption and growth of Software Defined Storage. While some of the business goals are met with SDS - lower TCO along with agility and flexibility is achieved - new challenges and issues have surfaced. Both, the large established vendors and umpteen number of start-ups, offering software defined storage in a wide variety, lead to multiple new challenges around interoperability, storage management, reporting, fragmentation leading to higher TCO, etc.

Software Defined Storage is a new paradigm and requires efforts on integration, manageability and validation of what works and what doesn't in customer data centers. This also requires a new set of tools, technologies and skill sets. This provides an unique opportunity to System Integrators (SI) who are well placed to bring all the benefits of Software Defined Storage, overcoming the challenges, using their home grown adoption methods, tools and technology expertise.

## About the Authors

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### Jitendra Kumar Jain

Jitendra Kumar Jain is a Senior Manager, Software Defined Infrastructure CoE, at Wipro Technologies. He brings 14+ years of experience in Technology and Program Management. Jitendra's diverse background includes leadership role at an Outsourced product development services firm, he co-founded and managed, the role of Engineering Program Manager at NetApp, Inc. and Member, Technical staff roles in various software products development and architecture teams that he was part of. Jitendra holds a Bachelor of Engineering degree in electronics & communications engineering from Gulbarga University and is a Project Management Institute Certified Project Management Professional (PMP). He is married with two children and lives in Bangalore.

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### Manjari Sharma

Manjari Sharma has been a part of the Global 100 Intern program at Wipro and is currently enrolled in the Post Graduate Program in Management at Indian Institute of Management, Calcutta. Before starting out on her management journey, she worked for five and a half years in infrastructure management services at IT majors such as Infosys and Wipro. Her experience is primarily in computing and Network platform. She has a keen interest in Technology and Marketing.

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### Mayur Shah

Mayur Shah is Head Presales - Datacenter, System Integration and Maintenance Services. He is an experienced engineering graduate and IT professional with 17 years of experience in techno-commercial design of large and complex DC transformation solutions and delivery. Varied experience in understanding business requirements and creating Infrastructure Outsourcing Solutions. Experience in the development of IT strategy at a global level and services offerings for business growth. Core skills and experience in Compute and storage delivered through cloud technology. Have successfully delivered various roles in storage domain - SME, Storage Practice Head, Presales and now leading software defined storage practice for global market as one of the key objectives

Rich experience in strategy & operations entailing setting up solution architecture and new business solution development organization. Sound understanding of Infrastructure Technology Outsourcing (ITO) to acquire new business with the distinction of handling many deals of varying size. Managing turnkey contracts, transformational programs, transaction and outcome based pricing, services innovation, unit set up and operations. Broad exposure to the various industry verticals in both domestic and global market.

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## About GIS

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Global Infrastructure Services (GIS), a unit of Wipro Limited, is an end to end IT infrastructure & outsourcing services provider to global customers across 57 countries. Its suite of Technology Infrastructure services spanning Data Center, End User Computing, Networks, Managed Services, Business Advisory and Global System Integration. Wipro, is a pioneer in Infrastructure Management services and is amongst the fastest-growing providers across the world. GIS enables customers to do business better by enabling innovation via standardization and automation, so that businesses can be more agile & scalable, so that they can find growth and succeed in their global business. Backed by our strong network of Integrated ServiceNXT™ Operation Centers and 11 owned data centres spread across US, Europe and APAC, this unit serves more than 500+ clients across with a global team of 23,800 professionals and contributes to over 30% of Wipro's IT Services revenues of Wipro Limited.

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