OBSERVATIONS FROM GARTNER

THE INFRASTRUCTURE, OPERATIONS AND CLOUD STRATEGIES SUMMIT

DECEMBER 2021

GLOBAL TECHNOLOGY SOLUTIONS GROUP

CONTENTS

GTSG LISTENS TO GARTNER

GTSG listens closely to what Gartner has to say. Why? Our firm has over 100 consultants, architects, technical subject matter experts, and technical project managers deeply involved in mission-critical client engagements over durations ranging from weeks to years.

By contrast, each Gartner analyst has perhaps 1,000 interactions with a broad range of organizations per year. These interactions are then synthesized, with best practices (and emerging best practices) crystallized into research representing the analysts' best thinking over the full range of industry segments.

At GTSG, we regularly engage with <u>dozens</u> of these analysts. We benefit from their unparalleled collective insight; our clients benefit from the broad market scan and the security that comes from knowing that GTSG's methods are consistent with Gartner's practices and solution paths.

TRACKS AND EMPHASIS

The 2021 event was virtual, as was 2020's. GTSG has worked this event from 2014 until 2019 in Las Vegas. While we continue to miss the interaction with both end users and analysts in the live setting, as you might expect, Gartner does the virtual event as well as it does everything else- about as well as it can be done.

One hundred thirty-five sessions were available from a list of tracks, including

- Disruptive Technologies and Trends
- Impact or Evolution of Edge Environments
- Cloud Migration Strategies
- Delivering Workloads: Anywhere
- Anywhere Infrastructures
- Cloud and Operations Management
- Staffing and Leadership

with spotlight tracks including Diversity, Equity and Inclusion, Automation, the Cloud Journey, Cost Optimization, DevOps & Agile, I&O Security and Infrastructure Resilience, Midsize, and Technical Insights.

GTSG is Gartner-recognized for cloud strategy, workload migration, disaster recovery, and mainframe expertise. Our summary is focused on our competencies.

As a provider of SLA-based managed services, be assured we are closely attuned to the runtime/operational implications of any guidance we hear.

THE KEYNOTE ADDRESS
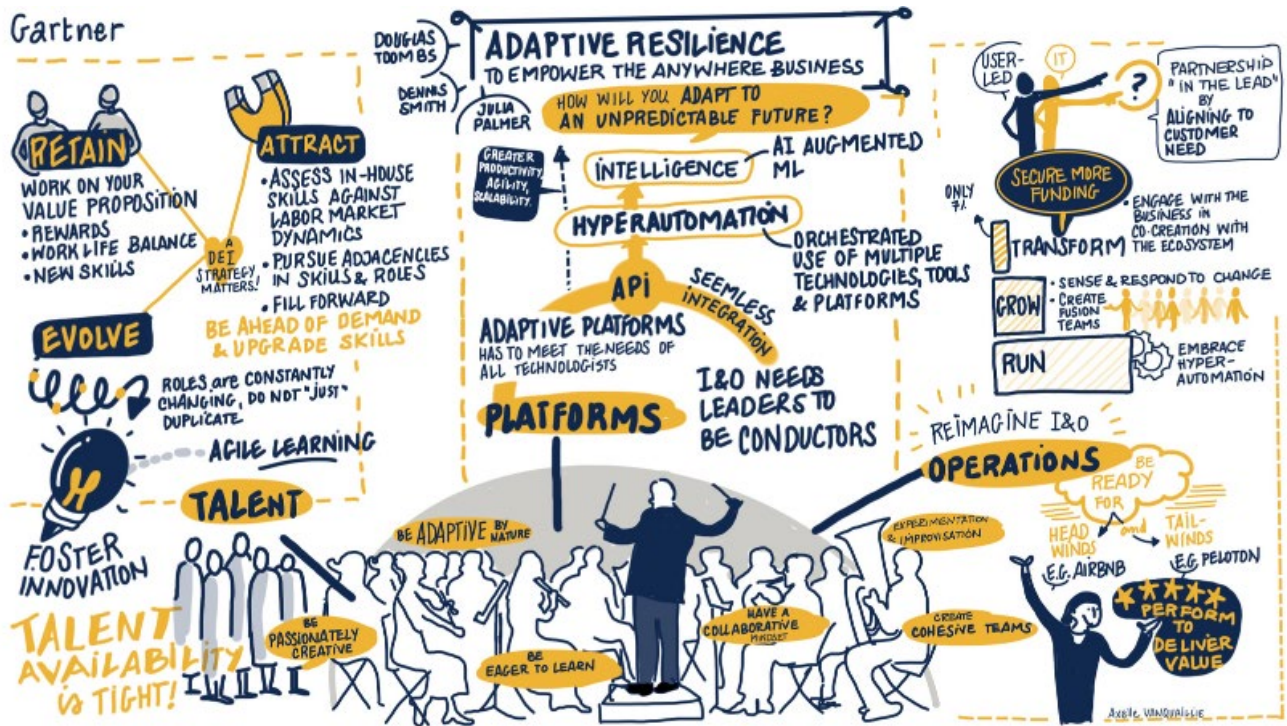
Gartner Research Vice Presidents Douglas Toombs, Dennis Smith, and Julia Palmer collaborated to present this year's keynote, entitled "Adaptive Resilience to Empower the Anywhere Business."

According to Gartner, Infrastructure & Operations professionals should be very proud of the past two years, given the efficiency they have brought to the unprecedented need to adapt to working anywhere.

The need for adaptability applies equally to the talent, whom Dennis analogizes to expert musicians: adaptive by nature, creative, eager to learn, seekers of improvisation. We should get the best people we can, versatility where we can, and nurture collaboration while encouraging improvision. We need to understand that talent has access to even more potential employers given remote work and a fiercely competitive labor market. The proper response is to sharpen our value statement to the talent pool, certainly with opportunity and work/life innovation, but also new technology and respect from the organization. **"Talent availability" is the most significant adoption barrier to 64% of emerging technologies.**

Diversity, Equity, and Inclusion (DEI) is fundamental to the adaptive organization: the data make it simple.

Organizations in the top quartile for racial and ethnic diversity are 36% more likely to have financial returns above their industry medians.

Roles and organizational constructs are constantly changing:

By 2025, 70% of existing I&O personnel will work in DevOps teams, platform engineering and operations teams, or even fusion teams.

Leaders should pursue skill and role "adjacencies" to help the talent evolve: for example, from network engineer to edge computing, or ITIL Analyst to Site Reliability Engineering. They should also embrace principles of agile learning as part of a culture of innovation.

Automation is essential to platform success:

Gartner estimates that by 2024, organizations will lower IT and business operational costs by 30% through hyperautomation solutions.

APIs are fundamental to hyperautomation. Gartner also assumes that

By 2025, 60% of I&O teams will use AI-augmented automation across enterprises — up from 1% in 2020 — enabling greater IT productivity, agility, and scalability

Illustrations from the pandemic provide contrasts in adaptive operations: Airbnb (who experienced incredible tailwinds) and Peleton (headwinds). Notably, Airbnb had to scale down 80% yet came out of this period 2.5% stronger at the cost of revenue line.

Who should lead the transformation? Gartner's research tells us to transform adaptively with co-creation, the business and IT working in partnership to sense and respond to opportunities and challenges.

The charge, in summary:

- **Invest** in the people
- **Integrate** the "symphony" of infrastructure choices
- **Reimagine** I&O

TOP TRENDS IMPACTING INFRASTRUCTURE & OPERATIONS

The Top Trends Impacting I&O

Just-In-Time Infrastructure	Data Proliferation
Digital Natives	Business Acumen
Management Confluence	Career Ladders to Career Lattices

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Jeffrey Hewitt again presented this year's trends, introducing the topic with CIO challenges (culture change, business alignment, and change-friendly platform creation) and barriers (insufficient resources, digital skills, and cultural challenges).

The Trends:

Just in time Infrastructure emphasizes the best execution venue and brings on the infrastructure at the right time. This trend reintroduces modular concepts, and it requires an evolution of provider relationships and the production of compelling business cases.

Digital Natives: There will be more significant digital-native opportunities for I&O leaders, and traditional brands and organizations will continue to be threatened by them. The upside is that I&O will have the opportunity to lead with innovation. Still, the challenge is that these methods are contrary to traditional approaches and require a real effort by I&O to re-brand itself as innovative. For non-digital native organizations, Gartner recommends planning to shift to greater agility and cost-efficiencies to compete effectively, to provide solutions that improve customer experience.

Management Confluence: while there is (still) no "single pane of glass," there are a variety of management/monitoring tools with different to support I&O as it increasingly sees its role as "integration and operations." The goal is a more highly leveraged view of what management tools provide, and alignment with the hyperautomation technology trend improves I&O agility. Still, it's not easy, to say the least, and requires collaboration. Jeff recommends an inventory of current management tools and the use of tools like AIOps, DPC, VSMP, DEX solutions to unify management and automation into a single dashboard.

Data Proliferation: Jeff describes data as "the most valuable commodity combined with the most' junk.'" He notes that cloud and edge implementations will drive the proliferation, although data will sometimes be created and destroyed right away at the edge. As data management challenges increase, effective data retention policies will become paramount. I&O can help by bringing a long-range planning view to optimizing data retention, although more in I&O's "circle of influence" than direct control, so we must collaborate with the Chief Data Officer, and utilize file analysis software in conjunction with enterprise information archiving.

Business Acumen: reflects alignment with public cloud and edge usage to bring business-based thinking, a "value stream" view of digital business. Jeff has heard of I&O environments requiring 15% of new hires from outside I&O; these tend to be from business backgrounds. So while the collaborative upside is clear, this does present a challenge to traditional recruitment. Nontechnical I&O hires must be positioned to demonstrate I&O-led innovation to business leaders.

Career Ladders to Career Lattices: this trend is driven by workload changes, accelerated by ongoing core modernization, and requires more learning agility. Ideally, it helps the organization move from "territorial thinking" and transition into a more collaborative environment. Skills gap identification, engagement with Human Resources, and the offer of training and development to support these new career paths is essential.

ANYWHERE OPERATIONS, WORKLOAD PLACEMENT STRATEGY & INFRASTRUCTURE AS MESH

Conference Co-Chair Dave Cappuccio took the strategic topic of "what runs where – and why?"

The context: Dave opens by recognizing the substantially seamless transition to work at home in 2020, stating that this achievement led to the biggest challenge in IT today – as he puts it, "miracles are the new baseline."

The Challenge: I&O leaders must enable "anywhere operations" – characterized by a distributed infrastructure supporting dispersed workers in support of ubiquitous customers.

This, Dave says, is "a laudable goal which introduces many new problems" – principal among which is, "when infrastructure can be anywhere, how will I&O deliver the right workload as fast as possible?"

The History: infrastructure delivery models have evolved from what now seems like a simple primary and secondary data center configuration, adding first SaaS, then IaaS, then PaaS to the mix, and now expanding to edge deployments.

Workload placement strategies: organic growth drives chaos; "letting 1000 flowers bloom is not a good strategy. So we begin by building a workload placement strategy (WPS). Dave's recurring theme is the priority of business needs over those of the technology or the IT organization.

When we're doing it right, customer intimacy is driving workload placement. Dave Illustrates this with a story any one of us can envision: a big box store whose POS devices had been swapped out over the weekend, but for whatever reason, had the network refreshing pages at 15-20 seconds. **Twitter was not suffering from performance degradation, and** the customer standing next to him critiqued

the store's performance in real time. So this problem went from an "IT project" problem to a customer service problem to a corporate reputation problem almost literally at the speed of thought.

There is no single answer. On-prem, colo, Iaas/Paas, SaaS, edge, hosting solutions all have advantages and disadvantages relative to individual workloads. On-prem typically provides for availability and regulatory compliance; IaaS+PaaS for agility and innovation; edge proximity.

Risk, cost, agility, innovation, availability, performance, proximity, and regulatory concerns must be considered, and the deployment options considered **nodes** on the infrastructure mesh.

Colocation can serve as a data center replacement or an infrastructure building block. The carrier choices, ability to leverage on-ramps and interconnection, private and public cloud access, make it the right approach for many. Many will offer metal as a service and distributed cloud as we move forward.

In the end, the job is to have two basic strategies – workload placement and the infrastructure delivery strategy - nodes defined by workload type, supported by ecosystems of partners.

For several years, Gartner has recognized GTSG for its competence in Workload Placement Strategy. If we can help, reach out to us at Partners@GTSG.com

CLOUD

How central is the cloud? A search of the 77 "track sessions" (not keynote, not vendor) from the event returns 43 sessions- or 56%.

The breadth of the sessions includes general sessions on its future, on moving from strategy to transformation, and more specific topics including resiliency, cost management, storage, networking, and distributed cloud, to name a few.

We'll cover a few takeaways here, aligned to our own Gartner recognition around Hybrid Cloud Workload Placement Strategy and our recognition and long experience with migration and resiliency.

FROM "THE CLOUD COMPUTING SCENARIO: THE FUTURE OF CLOUD"

- Strong statement: between now and 2025, "cloud computing will shift from a technology style of computing to the foundation for business innovation." In support, organizations are 17 times more likely to increase cloud spend than reduce it over the next 12 months, a trend supported and reinforced during the pandemic.

- "Cloud-first" will become standard, and cloud spend will become the majority with "cloud-native" platforms as the foundation for more than 95% of new digital workloads by 2025.

- Over 50% of enterprises will use a distributed cloud option to process data at the location of their choice.

- Distributed cloud, which is frequently understood in the context of Outpost/AzureStack/Anthos, is taxonomized on a continuum from

    o On-Premises Public Cloud (for the data center)
    o Metro Area Community Cloud (at the city center)

- o 5G Mobile Edge Cloud (in the carrier network)
- o IoT Edge Cloud (for edge devices)
- o Network Edge Cloud (global PoP)
- By 2025, 70% of new applications will use low-code or no-code technologies

FROM "HOW TO BUILD A CLOUD MIGRATION COST ESTIMATE"

David Wright summarized the six ways in which cloud migrations typically "run off the rails:"

- Wrong teams - whether a partner or internal staff

- Rushed application assessments - missed requirements, wrong sequencing

- Wrong emphasis- too much lift & shift, not enough "adapt to the cloud"

- Poor landing zone design, creating management and security difficulties, and higher operating costs

- Dependency bottlenecks (what David describes as cascading migration delays, idle resources, and schedule creep)

- Hidden indirect costs, which include organizational transformation & residual costs

FROM "STRATEGY TO TRANSFORMATION"

David Smith revisits a longstanding theme- the need for a cloud strategy reemphasizes what it is (a concise point of view on the role of cloud in the organization) and what it is not (a plan to migrate everything to the cloud).

Of the ten most common mistakes in building a cloud strategy, David identifies (1) excluding the business from its development, (2) the absence of an exit strategy, and (3) the conflation of cloud strategy with cloud adoption/migration/implementation as the most prevalent- and identifies "outsourcing the strategy" as the most potentially dangerous.

One of the benefits of the document (and again, of working in lockstep with the business) is reinforcing that *cloud is not all about saving money*- it's about the business benefits. Key elements of the document include guiding principles (part of GTSG strategy documents for three decades) and workload analysis, which we've been doing just as long. Business alignment, and again, the exit strategy are also key elements.

David reminds us that most firms haven't done it the right way yet and that there's "plenty of time" to get it right – writing the document in tandem with execution is better than no formal strategy at all.

If we can help you get your cloud strategy developed, refined, and documented, reach out to us at Partners@GTSG.com.

RESILIENCY & DISASTER RECOVERY

Digital business requires always-on IT, so it's no surprise that there were three Gartner sessions and nine vendor sessions focused here. To the three Gartner sessions:

PRACTICAL IT RESILIENCE: WHAT YOU NEED TO KNOW AND HOW TO GET STARTED

Analyst Ron Blair emphasized:

Chasing any one of the elements- of enablers – of resilience- whether AIOps, Platform Ops, DevOps, ITSM, SRE practices or even cybersecurity – to the exclusion of others will cause you to veer off-course. Ron's prescription: (1) identify your IT hazards, (2) utilize proven approaches (while avoiding proven mistakes), and gain momentum and credibility with measured efforts, rather than attempting to re-engineer everything at once.

Memorable turns of phrase included:

- "Mirages of overconfidence" best exemplified by this disconnect:
    - On the one hand, according to a recent Gartner survey, 86% of respondents believed they met or exceeded CIO recoverability expectations
    - Yet barely ¼ of this group checked all three boxes for the fundamentals of a DR program — formalizing scope, a proper BIA, and detailed recovery procedures.
- "Disaster recovery theater" involves "play acting through exercises" but not being ready for even the most basic scenarios.

WILL DISASTER RECOVERY AS A SERVICE SAVE YOU MONEY?

Gartner assumes that by 2025, 30% of disaster recovery implementations will utilize DRaaS, up from 15% in 2021.

Cost of downtime is critical to justify any form of DR- whether DIY or DRaaS. A generic estimate won't impress business leaders, but rather, the number should be based on impacts specific to the organization.

These key components must be present to evaluate a solution as DRaaS properly: on demand IaaS, replication, recovery SLAs, and automated recovery and failback. Comparing costs is problematic, including and especially for requirement changes and vendor evaluation/selection, but also for exit/ switching, labor and services, and facilities for traditional DR.

As you'd expect, there is no one-size-fits-all answer to the question. Building from scratch or existing DR; available skills; time frame required: all play into this decision.

TOP MISTAKES TO AVOID WHEN IMPLEMENTING DISASTER RECOVERY IN THE PUBLIC CLOUD

Analyst Stanton Cole's list demonstrates the consequences of failing to be proactive. Specifically,

- Not starting with a strategy (which incorporates criticality tiers and an Application Recovery Matrix, elements of a proper business impact analysis), along with a ransomware response plan

- Not aligning cloud strategy with DR

- Not using the cloud as part of the resilience strategy

- Not understanding what types of failures to plan for (whether at the level of application, fault domain, full data center, availability zone, region, and full geography)

- Not continuously innovating DR, utilizing continuous testing

Planning for effective recovery is a passion at GTSG for which Gartner has recognized us. Please reach out to Partners@GTSG.com to talk further.

THE EDGE

The emergence of this topic is reflected by the number of sessions, covering

- The current state of the edge, and its future

- Building a strategy and roadmap,

- Storage and networking,

with a session dedicated to the styles of distributed computing.

Key edge analyst Tom Bittman delivered three sessions entitled Exploring the Edge: What's Really Happening Out There, The Future of IT, Business and Life on Edge, and Building an Edge Computing Strategy. Our key takeaways:

1. Digital transformation has changed everything: new interconnections, more and real-time business moments, more insight near the data, and the blurring of digital and physical have changed how people and things interact, and where data and infrastructure live.

2. Four imperatives are driving compute to the edge:

   o The Law of Physics: latency
   o The Law of Economy: bandwidth
   o The Law of the Land: regulations
   o Murphy's Law: connections go down

3. Latency was the primary driver of edge computing use cases in 2021. It can be addressed by embedded intelligence, fast connection to external compute, and, if needed, local edge processing.

4. However, by 2025, the principal driver will be bandwidth. IoT deployments are growing at a CAGR of 11% (to 18 billion devices by 2039), and the data grows even faster, perhaps 4x. And the data is noisy and ephemeral. While bandwidth and bandwidth costs are improving, the cost of computing is reducing even faster. So the edge device - the video camera and the wind turbine - will compute.

5. While every industry will have an edge play, Tom sees the hottest opportunity in

   o Communications, Media & Services
   o Manufacturing & Natural Resources
   o Energy and Utilities

- o Retail

6. **Why we need a strategy, in three Gartner Strategic Planning Assumptions:**

    - o Through 2025, 50% of edge computing solutions deployed without an enterprise edge computing strategy in place will fail to meet goals in deployment time, functionality, and/or cost.

    - o Through 2022, a lack of standards or broadly accepted architectures for edge computing will ensure that over 85% of enterprises will deploy multiple incompatible technology stacks

    - o Through 2022, 50% of edge computing solutions that worked as proofs of concept will fail to scale for production use

7. **An edge computing strategy contains five key elements:**

    - o A vision linked to digital business and technology strategies. These include cloud, IoT, immersive, and machine learning (ML). ML will find its home in this data; Tom reports that 30% of his client inquiries include ML right now.

    - o The use cases, determined proactively, collaboratively, and reactively

    - o The challenges: risks, inhibitors

    - o Standards: architectures, best practices, and skills

    - o Execution: management of deployment and continuous improvement

WHO AUTOMATES, WINS

Chris Saunderson tells us that in a recent survey on techniques for reducing costs, automation appears in the top 5 of 80% of respondents, exceeding even the acceleration of cloud (in the top five of only 68%).

Key takeaways:

1. Automation metrics tell the story of the work you're doing and the value you bring-- to stakeholders and the team. They need to inform, which requires understanding the audience well enough to connect with them for support. The metrics also need to be helpful in measuring progress and course correction as appropriate.

2. The value of automation begins with efficiency gains, which are foundational, progressing to productivity improvements, which chip away at human error, and to cost optimization.

3. 'Business metrics matter to your customer; internal metrics matter to you.' For example, business metrics are

    - o Self-service enablement (receiving service without delay, self-service answers)

    - o Reaction improvement (MTTD/MTTR improvements, automated incident response)

    - o Service agility (the combination of past and incremental new investments to meet new demands-) whereas IT metrics might be

    - o Wall time reduction (reducing the time to deliver service via automation)

- o   Coverage of automated service delivery (increasing the number of automated tasks)
- o   IT staff effort on nonautomated tasks - "shifting leftwards."

THE NETWORK

Andrew Lerner discussed "Innovations Driving the Future of Networking." He opens by noting that recent innovations in networking have been evolutionary, for example:

- ▪   SD-WAN, an improved branch router, optimized for cloud

- ▪   ZTNA, an improved VPN, delivered as a service, optimized for cloud

- ▪   NextGen Firewall which consolidates several point solutions

The innovations Andrew discusses are five:

- ▪   **SASE:** Secure Access Service Edge tightly integrates multiple networking and security functions, delivers them as a service (built on a cloud-native platform). SASE currently sits on the Hype Cycle at the Peak of Inflated Expectations, with Gartner expecting 2-5 years before the plateau is reached.

- ▪   Cloud Networking Software:

  - o   by 2025, 40% of enterprises will adopt SD-WAN and cloud-delivered secure web gateways from the same vendor, up from less than 5% in August 2021
  - o   by 2023, 40% of all enterprise workloads will be deployed in public cloud infrastructure and platform services. Still, there are notable gaps in public cloud providers' networking capabilities, and public cloud providers only support their environment
  - o   this new market enables the design, deployment, and operation of a network within multiple cloud environments. It has no hardware aspect

- ▪   **Networking as Code:** By 2024, 20% of on-premises data center networking activities will be integrated into a continuous integration/continuous (CI/CD) delivery pipeline

- ▪   **SONiC**: 40% of organizations operating large data center networks (200+ switches) will run SONiC, which is intended to replace proprietary vendor NOS and unlock innovation

- ▪   **FAC** (or NextGen SmartNIC): handle key network functions such as vSwitch, NOS, Load Balancer, Firewall, etc., to offload server host or displace appliances. On the hype cycle, these sit at the entry point, the innovation trigger, with Gartner expecting more than ten years to reach the plateau of productivity. Nonetheless, Gartner expects that in 2025 the number of FAC ports shipped will be 18x higher than 2021.

MIDSIZE ENTERPRISE

Longtime Midsize Enterprise VP Analyst Mike Cisek delivered two sessions, on cost optimization and I&O maturity.

First, the context of the midsize enterprise: flat organizational structures; a close relationship between business and IT; the prevalence of versatilists and the scarcity of specialists, the absence of (for example) dedicated NOCs and SOCs. He noted that the same stretched pool of resources is responsible for Operations (Run) and Projects (Grow and Transform). Economies of scale frequently do not apply, and architectures are typically n-2.

Some of our key takeaways:

1. Mike expects 60% of MSE workloads to remain on-premises through 2025. As modernization and migration costs stay high and capex benefits and/or opex impact continue to weigh heavily, on-premises/SDx solutions will remain more cost-effective at scale.

2. Among I&O goals for the midsize enterprise, improving maturity ranks behind only enhancing alignment with the business, ranking among the top 3 goals of half of those surveyed.

3. Mike's recommendations for maturity include (1) regularly assessing (using the Gartner ITScore methodology); (2) staying focused; not trying to address many deficiencies simultaneously; and very practically, (3) don't chase maturity for its own sake. Goals and priorities should impact resource utilization, operational efficiency, technical debt, and financial transparency.

4. From a cost perspective, Mike provides a "business value decision tree," netting down to

   o Is it revolutionary? Does it impact the potential for new markets/ industries?
   o Does it "keep the lights on," i.e., support or improve essential functions that are not directly revenue-generating?
   o Does it make money? Does it enhance, extend or differentiate business capabilities?

5. As surveyed, the top three cost optimization investments for MSEs are upgrading the Digital Workplace for end-users, IT Operations monitoring tools, and IT service management tools.

6. Again as surveyed, the top three cost optimization approaches are

   o Focusing solely on the mission-critical
   o Working with sourcing to get more and better from providers
   o Accelerating the adoption of cloud (SaaS, PaaS, IaaS) for cost efficiency

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ii https://www.gartner.com/en/newsroom/press-releases/2021-12-06-gartner-it-infrastructure-operations-and-cloud-strategies-conference-2021-americas-day-1-highlights, retrieved 01.06.22
ii https://www.gartner.com/en/newsroom/press-releases/2021-12-06-gartner-it-infrastructure-operations-and-cloud-strategies-conference-2021-americas-day-1-highlights, retrieved 01.06.22

If you'd like to discuss planning the future of your mainframe workloads, please reach out to Partners@GTSG.com.

HYBRID CLOUD STRATEGY AND MIGRATION

Strategic Approach
- Business case development
- Transition planning
- Technical modeling
- Non-disruptive execution

Application Analysis Methodology and Tools
- Decomposition
- Affinities
- Wave planning

Project Leadership

Implementation Subject Matter Expertise

INFRASTRUCTURE TRANSFORMATION

Transition Services
- Insourcing/Outsourcing
- Knowledge transfer and interim support
- Application migration
- Service management design

Disaster Recovery Design and Implementation

High Availability Design and Implementation

Application Assessment and Deployment
- Reference Architecture
- Infrastructure Alternatives/Recommendations
- Implementation/Migration

INFRASTRUCTURE SUPPORT SERVICES

Managed Services
- Multi-platform including DB & MW
- Service-level based or FTE-based
- Architecture, administration, programming, systems management
- Remote or Onsite

Project Based Services
- Platform upgrades
- Workload migrations
- Implementation services
- Consulting and Assessment (performance, DR, HA.)
- Project Management

INFRASTRUCTURE OPTIMIZATION

Architecture Assessment and Design

Server Virtualization/Consolidation

Storage Optimization

Data life-cycle management
- Tiering
- Standardization/Automation

Application Decomposition Application

Re-design/Remediation Performance

Management and Tuning Latency

Analysis and Consulting