

Department of Information Technology Resilience Report 2022

Department of Information Technology is energizing our organizations push for State and Local governments to consider evaluating where their information technology assets are located, to address alternatives to ensure their business portfolios can perform as climatic impacts increase over time. When evaluating recent hurricanes and flooding events, it is apparent that State and Local government services were impacted sufficiently. There are two approaches that DIT leadership and staff are focusing on; one, planning to assist State Agency's and Local governments within the Coastal/Western areas to discuss vulnerabilities to climate change related to their information technology assets and two, evaluating DIT data centers services vulnerabilities to climate changes.

- The first approach is to assist agencies and local governments identify, document, and assess the IT assets vulnerabilities within the hurricane and flood zones along the coastal areas and the western part of the state addressing IT assets within flood plain areas. IT assets rely on operational environments that require protected/secure environments, appropriate environmental sustainment standards, redundant capabilities when failure happens, to include disaster planning during these climate induced events. These discussions will include information technology equipment limitations under extreme heat conditions, extended flooding impacts and against tornados and hurricanes. These discussions will include building support systems that provided the appropriate environmental conditions for supporting critical information technology systems that could impact on first responders that are dependent on their technology systems to support life and property.
- The second approach is the continued evaluation of State Data Centers against long-term "Electrical Power Loss" impacted by major climate stressors that affect and can shut down building electrical systems are high winds, storm conditions and flooding associated with hurricanes and other high wind events. Electrical system reliability is dependent on the severity and duration of tropical storms. Ice storms and heavy snowfall may also result in loss of electrical power." While DIT data centers do have minimal electrical redundancy infrastructures already built into their facilities, additional infrastructure services must be evaluated against ageing equipment, concerns of long lead times for high-cost replacement of major systems such as generators, chiller systems, and electrical power distribution systems.
- As North Carolina is a geographically and climatically diverse state with a climate already defined by extreme and changeable weather it is highly likely that the climate impacts identified in this report will exacerbate the frequency and impact of natural hazard events across all regions of the state. It is important to note that response to extreme weather events and disasters are a routine part of DITs mission and services. Because of North Carolina's naturally variable climate, plans and protocols, DIT continues to evaluate response to the existence of the natural hazards outlined in the Climate Science Report, including the North Carolina Emergency Operations Plan and the North Carolina Hazard Mitigation Plan. The overall impact of climate change will then be shifts in the frequency, magnitude, duration, or scale of the responses to hazards North Carolina already experiences. Planning and process improvements will be needed to

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accommodate extreme events that occur more often, more intensely, last longer, or cover broader areas of the state.

Activity Chart

In the activity chart below, the subsections could be designed as subcategories or as offices within the agency. The “Status” column content could include “Complete,” “Underway,” “Planned,” “Proposed,” and “Ongoing.” The “Completion Date” column could be as specific as listing a month and year for anticipated completion, or as vague as “short-term,” “medium-term,” and “long-term,” as long as those “terms” are defined within the report. For example, the agency might define “short-term” as less than one year, “medium-term” as 1-2 years, and “long-term” as more than 2 years.

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The potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources. (GCoM, 2019). DIT leadership understands climate hazards potential for disruption to information technology programs and services to the citizens of North Carolinians. DIT’s next steps is to share its technology knowledge with agencies, local governments, and tribal organizations located within vulnerable areas within North Carolina. The intent is to provide educational information and recommendations in migrating risk and exposure to ensure information technology services and systems are available during extreme weather events.

Activity	Status	Completion Date
<i>1.0. Data Center Facilities</i>		
1.1. Evaluate existing data center services resiliency	Complete	Completed Summer 2021
1.2. Development of short/long term requirements	Completed	Completed Fall 2021
1.3. Coordinate funding requirements with DIT CFO	Underway	Estimated: Spring 2022
1.4. Identify projects within SCO Interscope System		
1.5. Identify funding availability for implementation	Planned	Estimated: 2022/2023
1.6. Implement approved & funded projects	Planned	Estimated: 2022/2023
<i>2.0. Virtualization Data Center</i>		
2.1. Evaluation opportunities for increasing data center server virtualization in reducing the physical footprint of server hardware.	On-going	Estimated: 2022-2023
2.2. Increase/deployment of additional data center server virtualization/cloud capabilities	Proposed	TBD

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3.0. Educational Campaigns assist State Agency's and Local governments		
3.1. Educate & Assist State Agency's and Local governments within the Coastal/Western areas to discuss vulnerabilities to climate change for preparing for the impacts of climate change	Planned	Estimated: Fall 2022
3.2. Development of budgetary requirements to address vulnerabilities to climate change preparedness.	Planned	TBD
3.3. Implement approved State & Agency solutions to mitigate impacts of climate change	Planned	TBD

Activity Progress

Data Center Facilities

1.1. Evaluate existing data center services resiliency COMPLETE

Data center resiliency evaluation is an uninterrupted process that occurs continuously in ensuring data center services are available 7x24x365, in supporting State Agencies and Local governments. During and after extreme weather, power grids are likely to fail, rendering critical infrastructure unusable. DIT data center services conduct monthly tests to ensure that back-up power systems are working properly. As data centers services extend outside the physical boundaries of the center themselves, it imperative that data center resiliency is evaluated against technology opportunities become more virtualized with external cloud services.

1.2 Development of Short/long term requirements. UNDERWAY

In 2021, data center managers reviewed their operational environments against the availability of providing critical services and support to state government offices for more frequent heavy precipitation events, heat waves, and other natural hazards made worse by climate change. This teams have begun identifying projects necessary to decrease the risk of power outages. Projects identified so far include energy efficiency upgrades, replacement of analog monitoring systems with digital programs and identifying back-up plans for power services to DIT data centers.

1.3. Coordinate funding requirements with DIT CFO UNDERWAY

Data center managers continue to analyze data centers operating environments against possible climate changes, developing adaptive solutions and identification of budgetary requirements for short/long-term requirements.

1.4 Identify projects within SCO Interscope System UNDERWAY

DIT completed request for 13 projects to improve, enhance, replace, and modernize buildings and data centers to mitigate against operational and climate related changes, ensuring services to North Carolina citizens ae available during extreme weather events.

1.5 Identify funding availability for implementation PLANNED

1.6 Implement approved & funded projects PLANNED

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2.0. Virtualization Data Center

2.1. Evaluation opportunities for increasing data center server virtualization UNDERWAY

In 2019, DIT assessed its data center server needs for responding to natural disasters and other climate hazards. DIT data center staff investigated possible solutions for on-premises and off-premises servers' solutions & opportunities to preserve full data center operations during extreme weather event or other climate disaster.

2.2. Increase/deployment of additional data center server virtual/cloud capabilities. PROPOSED

With increasing frequency and severity of extreme weather, existing communication systems, such as cell phones, data center access, citizens services, and broadband access, may be more likely to fail. Service disruptions may occur when user demand exceeds system capacity during the aftermath of an event. DIT is investigating existing and newer technologies for improving access to data center services and applications.

3.0. *Educational Campaigns assist State Agency's and Local governments*

3.1 Educate State, local government, and Tribal organizations. PROPOSED

DIT is proposing to educate and assist State Agency's, local governments, and tribal organizations within the Coastal/Western areas to discuss vulnerabilities to climate change for preparing for the impacts of climate change. Once the most vulnerable areas are address, DIT proposes to expand this approach to other counties and districts to increase sustainability and resources for supporting citizens and first responders' access to needed IT resources during extreme weather events.

3.2 Development of Budgetary Requirements. PROPOSED

DIT is proposing the development of budgetary requirements to address vulnerabilities to climate change preparedness. DIT will work with the Office of State Budget to identify possible funding sources to off-set costs for this initiative in support of climate change.

3.3 Implement approved State & Agency solutions to mitigate impacts of climate change. PROPOSED

DIT is proposing the development of implementation strategy for deployment of educational programs to mitigate climate impact to various State, local governments, and tribal organizations.

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Looking Ahead

DIT is looking forward in implementing various climate impact mitigating strategies beyond 2022, in supporting continuity of State data center services are available to all Citizens, State Agencies, Local governments, and tribal organizations during any extreme weather events.