WaTech
Washington Technology Solutions

State of Washington Generative Artificial Intelligence Report

September, 2024

WaTech

Table of Contents

1.0 Purpose of the Report

As required under Executive Order 24-01 on Artificial Intelligence, this report provides an assessment of potential generative AI initiatives pertinent to agency operations and objectives, as well as the feasibility, benefits, and challenges of integrating generative AI into agency operations and services. This report also includes a plan and timeline for WaTech to establish the infrastructure to conduct pilots of projects involving generative AI technology, including approved environments to test such projects.

1.1 Executive Summary

The Washington State Generative Artificial Intelligence (GenAI) Report outlines a strategic roadmap for the adoption and integration of GenAI technologies across state agencies. Generative AI is a powerful and rapidly evolving technology that offers significant benefits, such as improving communication and making data more accessible and understandable.

However, its adoption also carries challenges related to content accuracy, bias, data privacy, security and more. Successful implementation requires mature data systems, which may necessitate the modernization of legacy systems, and could impose financial burdens, particularly on smaller agencies with limited budgets.

WaTech is leading an enterprise approach to GenAI adoption, leveraging existing technology approval and oversight processes to manage risks and ensure responsible use.

A coordinated, adaptive approach will enable state agencies to harness the power of GenAI – enhancing customer engagement, generating deeper data insights, and improving business processes. By continuously refining and improving AI solutions, state agencies can drive innovation and improve operations, ensuring that these advancements not only meet Washington's strategic goals but also deliver powerful, measurable outcomes that directly benefit the citizens and the state's overall performance.

Key takeaways

- **AI use cases:** GenAI can help transform Washington state government in many areas such as boosting communication, data analysis, efficiency, and citizen services:
  - **Enhanced communication and accessibility**: GenAI breaks language barriers with real-time translation and speeds up the creation of important documents, making government services more accessible and efficient. One example, the Department of Social and Health Services (DSHS) is already using artificial intelligence to break down language barriers by implementing technology that offers simultaneous multi-language interpretation during client meetings.

- o **More accessible information**: With GenAI, state agencies can create a better understanding and easier access to data, leading to more accessible, understandable information for agency staff and state residents.
- o **Improved resident Services**: GenAI-driven chatbots and virtual assistants can ensure residents get instant, personalized help, allowing human staff to focus on solving more complex issues.

- **Addressing challenges**: While GenAI offers substantial benefits, it also presents challenges that need to be carefully managed. These include:
  - o **Content accuracy**: The potential for GenAI to generate inaccurate or misleading content, which could have serious implications if not properly managed.
  - o **Bias and fairness**: The challenge of perpetuating or exacerbating biases within AI-generated content, particularly concerning historically marginalized communities.
  - o **Data privacy and security**: The handling of sensitive data by AI systems poses privacy risks that must be mitigated through robust data governance and security protocols.
  - o **Data maturity:** For generative AI tools to work well, they need good, accurate, and easy-to-access data. However, many state agencies struggle with old systems that weren't designed to handle the large amounts of data or the complex processes that modern systems can. Updating these old systems is crucial to improve data quality, make information more accessible, and get the most out of generative AI.
  - o **Financial considerations**: The cost of implementing and maintaining GenAI systems could be significant, particularly for smaller agencies with limited budgets.

- **A Statewide approach to GenAI adoption**: A coordinated, statewide approach to GenAI adoption is needed to ensure all state agencies benefit from standardized practices, shared resources, and a consistent approach to managing risks. WaTech will serve as the broker of generative AI technology for state agencies, leading efforts to adopt and integrate GenAI across the state enterprise. WaTech will deploy a phased, iterative approach to deploying statewide GenAI technologies. Key WaTech initiatives underway include:
  - o **Governance:** WaTech will provide governance for GenAI adoption by maximizing the use of existing technology policy processes. This will encompass security, privacy, and compliance requirements to ensure that all AI activities adhere to state and federal regulations.
  - o **Shared Services and Resources:** WaTech will offer shared services that includes secure sandbox environments (which enable users to experiment with and test AI capabilities without affecting live systems), centralized licensing for GenAI tools, and access to generative AI capabilities through WaTech's services. These resources are designed to support agencies in their initial use of AI while ensuring consistency and cost-effectiveness across the state.

  - o **Support:** WaTech will support agencies with technical assistance, access to resources such as the Community of Practice, the Emerging Technologies

Program, and the Innovation and Modernization Program. These initiatives will help agencies explore, implement and scale GenAI technology effectively.

2.0 Introduction

The rapid advancement of GenAI has the potential to transform government business processes, changing how state employees perform their work and ultimately improving government efficiency. As Washington state agencies look to adopt GenAI technology, it is imperative that there is a common understanding of what GenAI is and how it can be used to benefit both staff and customers.

2.1 What is generative AI?

GenAI is "a technology that can create content, including text, images, audio, or video, when prompted by a user. GenAI systems learn patterns and relationships from large amounts of data, which enables systems to generate new content that may be similar, but not identical, to the underlying training data" (Exec. Order 24-01, 2024). While it is considered a subset type of AI, it differs from other types in that it creates original content instead of being built to perform specific tasks that rely solely on existing data like classification, object identification, etc. Because of its unique ability to generate content on its own without relying on being fed pre-existing data, generative AI is commonly used in the application of creating content such as image generation, storytelling, and document writing.

2.2 Where does generative AI fit in the world of AI?

GenAI is a subset of Artificial Intelligence (Figure 1) that uses machine learning and deep learning to generate responses based on prompts that query the data sets provided to the large language models. Generative AI relies on machine learning to manage the complex data sets within its model and identify common patterns. Because of the complexity and mass of the data sets used to create new content, generative AI tools rely on the deep learning capability.
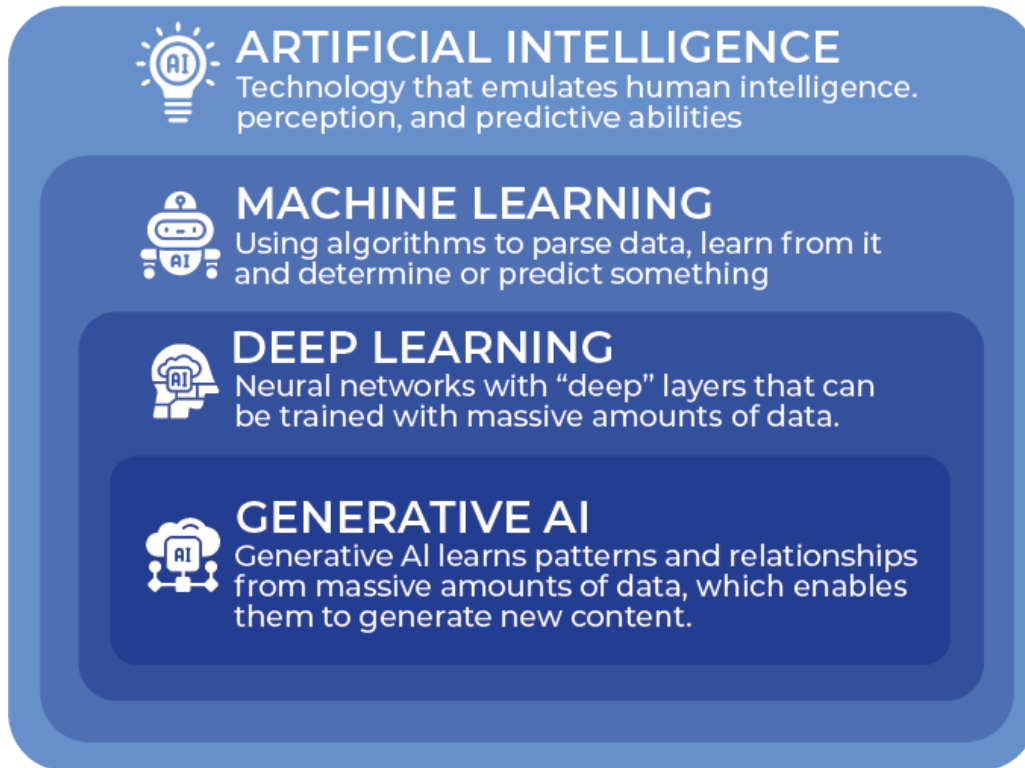
Figure 1: AI vs. ML vs. Deep Learning vs. Generative AI

For example, imagine generative AI as a chef in a kitchen. The chef has access to a huge pantry full of ingredients (data sets). When someone places an order (a prompt), the chef uses their experience and knowledge of recipes to create a dish (output). The more the chef cooks, the better they get at recognizing which ingredients work well together, which is like machine learning. As the chef gains more experience, they learn to handle complex and unique orders that require special skills, like deep learning. In the end, the chef uses all their knowledge to prepare a dish that satisfies the customer's request.

2.3 How do we experience generative AI in the tools we use to do our work?

Generative AI is quickly being added to the technologies used by Washington state agencies. It's important for staff to recognize how this technology is being used, so they can use it correctly and avoid problems. These problems can include data spread (when information gets scattered across too many places), data loss (when important information is accidentally deleted or misplaced), and technical issues (when different technologies don't work well together). Generative AI tools commonly present in three patterns:

- **Intentional generative AI** is used in day-to-day staff activities such as developing draft documents and as an automatic language translator to provide customer service to limited English proficiency (LEP) customers over the phone. These applications of generative AI are known as "intentional generative AI" as they represent technology solutions that are specifically generative AI-enabled and acquired specifically for their

generative AI capabilities. Examples include ChatGPT, Dall-E, and other similar products.

- **Incidental generative AI** refers to new or existing technologies that have generative AI embedded within them, but it's not their primary purpose. At times, existing technologies that in the past did not have generative AI capabilities might opt to enhance their offering with generative AI without informing their end users of the change. Examples of incidental generative AI include tools that auto-generate text and grammar recommendations. Examples include Adobe Firefly and Microsoft Edge Copilot.
- **Third party generative AI** is where a vendor working directly with Washington state could have a data sharing agreement with a third party that uses generative AI to manage that data. For example, a contractor is supporting a program and wants to use generative AI to auto-transcribe meetings he has with state employees and auto-summarize that transcription to add content in deliverables they owe the state.

2.4 Why use generative AI?

The adoption of generative AI in state government has the potential to be beneficial to agency staff and the populations they serve in several ways:

- **Enhanced customer service:** GenAI can help state agencies improve services by facilitating access to information in near-real time, regardless of language preference, through chat bots and virtual assistants.

- **Improve information access and value:** GenAI can improve access to information, reduce the spread of disinformation, and help prevent bias in recruitment and hiring decisions.

- **Increase industry compliance:** Staff working for regulatory agencies can use generative AI to create clear and accessible summaries of state laws and regulations so they're easier to understand and comply with.

- **Enable the workforce through automation:** GenAI can augment common tasks like generating communications, transcribing meetings, and summarizing lengthy documents, thereby freeing up staff for more complex work.

- **Modernize the state's technology:** IT Developers can use generative AI tools to translate legacy coding languages into modern versions more quickly and easily, thereby reducing the state's reliance on a diminishing pool of contractors.

GenAI in action: Lessons learned from a language access project

DSHS was looking for a better way to meet with limited-English proficiency (LEP) clients where they could communicate easily in real-time despite language differences. The department purchased a product to pilot its use for language translation and integration abilities into existing technologies. Through this pilot project it was discovered that the department needed an environment with proper governance and controls set up so that it could test the software's AI capabilities and integration in a safe setting. In addition, DSHS identified the need for more guidance around how to responsibly integrate and configure generative AI technology and deploy the technology DSHS-wide.

2.5 Common generative AI use cases and their value to the state

In May 2024, WaTech partnered with the UC Berkeley CITRIS Policy Lab to survey public sector employees on the use of AI, focusing on understanding, governance, and impact. The survey highlighted the most valuable GenAI use cases that were identified by respondents, such as streamlining document creation, summarizing large data sets, enhancing customer service through AI chatbots, and providing real-time language translation. Figure 2 represents the results collated from that survey in descending order of most to least common. Table 1 describes these use cases in more detail.
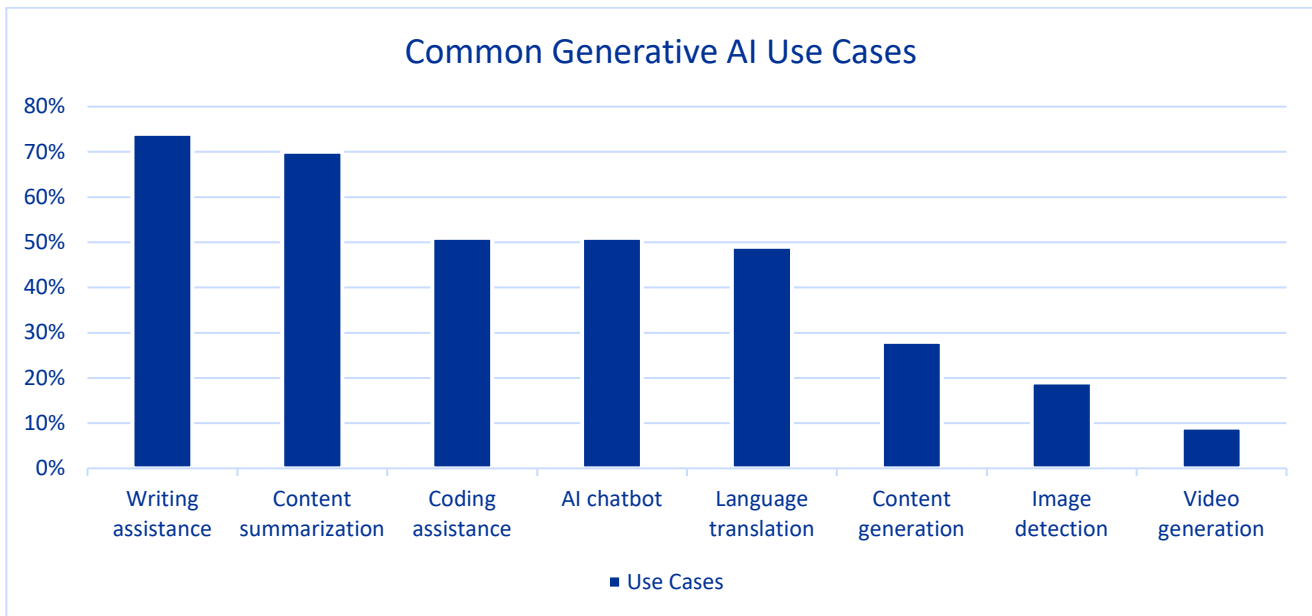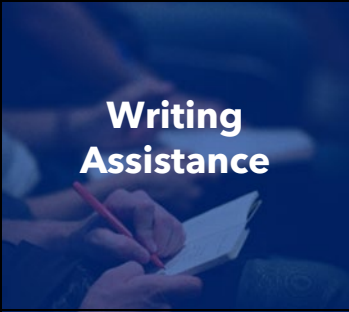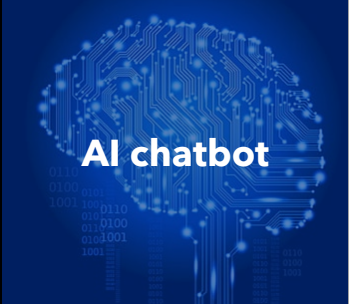

Figure 2: Survey results of common generative AI use cases (Newman, J., Pierson, S., and Nonnecke, B., 2024)

Gen AI Use Case	Benefits	Practical uses
Writing Assistance	The time it takes to draft documentation and review for tone and grammar is reduced, freeing up time for staff to focus on more complex work.	• Review existing documentation for spelling and grammatical errors. • Create first drafts of documentation like emails, FAQs, and policies.
Content summarization	Staff will spend less time manually categorizing, assessing, and drawing conclusions on large data sets.	• Summarizing survey results by common theme. • Summarizing content found within long-form text.
Data analysis	Researchers will be able to quickly identify and classify attributes and make recommendations to the state. Compliance inspectors will be able to quickly assess information for compliance.	• Wildlife and species classification. • Boat identification and analysis for commercial fishing.
Coding assistance	IT staff will not have to spend time manually reviewing their code for syntax errors. They will be able to quickly generate code review and documentation for disaster recovery needs.	• Legacy code interpretation and/or conversion. • Sample code creation within a specific syntax. • Automated code review and results output.
AI chatbot	Customers can ask specific questions and receive immediate responses without waiting in a call queue. Customer service staff can re-focus their time on complex calls that cannot be served by a chatbot.	• Call center interactive voice response (IVR). • Chatbots on an agency website.

Gen AI Use Case	Benefits	Practical uses
Language translation	People who interact with state agencies regardless of their language preference can get the information they need with no intervention or delay.	• Real-time inquiry responses for limited English proficiency (LEP) customers. • Auto-translation of agency communications and information.
Content Summarization	Reduces the time it takes to create content for internal and external materials. Trainings, marketing, and communication can be developed and issued rapidly.	• Create content for communications and marketing. • Create content for presentations. • Create content for webinars and trainings.
Audio generation	Audio files can be created that are more accessible by providing real-time translation into other languages and providing adaptive audio for those with disabilities.	• Create audio tracks for webinars and trainings. • Create audio tracks for marketing and communications. • Create non-English audio tracks. • Create adaptive audio content.

Table 1: Description and examples of common generative AI use cases

3.0 Challenges & feasibility of adopting Generative AI

State agencies looking to adopt generative AI technology must consider the challenges and feasibility of its implementation. To better understand what will foster adoption, it is first important to understand the perceived barriers that prevent state agencies from feasibly implementing generative AI. This section focuses on the unique challenges generative AI poses to the public sector and the principles, programs, and policies that are currently in place at WaTech to assist agencies with responsible adoption.

3.1 Public sector challenges in adopting GenAI

Generative AI has the potential to transform the way we do business as a state. However, the benefits of generative AI technologies can only be realized if there is a proper accounting for the unique public sector challenges and strategies in place to address them. Table 2 describes the top known challenges and potential mitigation strategies WaTech recommends.

Challenge	Mitigation strategies
Content accuracy Generative AI technology might create content that is based on hallucinated and/or inaccurate information. Without intervention, there is a risk of state agencies conveying incorrect and potentially harmful information to the public.	• Align responsible AI training with use of generative AI technology. • Conduct thorough testing of outputs created by new generative AI technology. • Conduct QA on all generative AI created content.
Staff adoption Staff may not naturally adopt generative AI. Staff will need training to be able to use this technology effectively to mitigate risks of misuse and promote alignment with data privacy principles and statewide IT policies.	• Create a statewide workforce strategy and training plan. • Invest in training and upskilling of staff that are impacted by generative AI technology. • Ensure adoption of generative AI technology is in alignment with statewide principles and policies.
Customer adoption Customers may not be quick to adopt AI-enabled technology like website chatbots and automated language translation because they don't trust that it will convey their concerns or provide them with accurate information. There is a risk of customer service staff spending more time than usual re-answering questions or assisting customers as they navigate these new systems.	• Recommend that agencies conduct organizational change management activities for internal staff and external customers as they adopt new generative AI technology. • Ensure all public-facing generative AI technology clearly align with <u>Washington State Agency Privacy Principles</u>.
Data maturity Successful adoption of generative AI technology relies on having mature, accurate, and available data sets. Many agencies depend on aging legacy systems that must be modernized to be able to leverage their data more effectively.	• Align generative AI-related initiatives to modernization and/or data management activities. • Leverage existing technology evaluation and adoption processes for all generative AI solutions.
Financial costs The costing model of generative AI technologies and large language models can be different than what	• Maximize the development and adoption of statewide generative AI capabilities.

staff are used to. Without proper analysis and transparency into the different costs, agencies could be surprised by larger than expected bills. In addition, there is a risk of inequitable usage of tools as smaller agencies may not have the budget to adopt generative AI tools in the same way medium and large agencies can.	• Update procurement guidelines and contract terms and templates with generative AI controls.
Integration requirements Generative AI technology is often intended to integrate with existing technology solutions. Integrated solutions can be more complex than a stand-alone solution and may require longer periods of time for architecture and/or security reviews.	• Provide a publicly available set of resources and information for agencies to utilize when planning for a new generative AI technology. • Collaborate with agencies prior to the SDR process to identify potential integration issues and requirements quickly. • Approve and publish common "patterns" leveraging generative AI technology to accelerate the adoption process.

Table 2: Public Sector Challenges and Mitigation Strategies for Generative AI Technology

3.2 State principles for responsible GenAI use

Understanding the feasibility of adopting GenAI technology starts with assessing it against the state's responsible AI principles adapted from the Washington State Agency Privacy Principles and NIST AI Risk Management Framework:

- **Safe, secure, and resilient:** AI should be used with safety and security in mind, minimizing potential harm and ensuring that systems are reliable, resilient, and controllable by humans. AI technology used by state agencies should not endanger human life, health, property, or the environment.
- **Valid and reliable:** Agencies should ensure AI use produces accurate and valid outputs and demonstrates the reliability of system performance.
- **Fairness, inclusion, and non-discrimination:** AI applications must be developed and utilized to support and uplift communities, particularly those historically marginalized. Fairness in AI includes concerns for equality and equity by addressing issues such as harmful bias and discrimination.
- **Privacy and data protection:** AI use should respect user privacy, ensure data protection, and comply with relevant privacy regulations and standards. Privacy values such as anonymity, confidentiality, and control generally should guide choices for AI system design, development, and deployment. Privacy-enhancing AI should safeguard human autonomy and identity where appropriate.

- **Accountability and responsibility:** As public stewards, agencies should use AI responsibly and be held accountable for the performance, impact, and consequences of its use in agency work.
- **Transparency and auditability:** Acting transparently and creating a record of AI processes can build trust and foster collective learning. Transparency reflects the extent to which information about an AI system and its outputs is available to the individuals interacting with the system. Transparency answers "what happened" in the system.
- **Explainable and interpretable:** Agencies should ensure AI use in the system can be explained, meaning that "how" a decision was made by the system can be understood. Interpretability of a system means an agency can answer the "why" for a decision made by the system, and its meaning or context to the user.
- **Public purpose and social benefit:** The use of AI should support the state's work in delivering better and more equitable services and outcomes to its residents.

When a GenAI technology has been successfully analyzed and is ready to be tested, state agencies should follow the guidance outlined in the Interim Guidelines for Purposeful and Responsible Use of Generative Artificial Intelligence (AI) in Washington State Government:

- Review and fact-check all content generated by AI to verify that it does not contain inaccurate or outdated information and potentially biased, harmful, or offensive material.
- When using AI-generated content in an official state capacity, make sure it is properly disclosed and attributed. Include information on the review and editing process that describes how the material was reviewed, edited, and by whom.
- Conduct due diligence to ensure that no copyrighted material was published with proper attribution or acquisition of necessary rights.

3.3 Governance considerations for generative AI adoption

WaTech will use existing technology governance processes to address the safe and responsible incorporation of generative AI into state services. These processes include our technology policy adoption, security design review, and privacy assessment processes.

WaTech is the steward for statewide technology policies. While all policies should be considered regarding the use of generative AI, three require special consideration:

- EA-01-02-S: Interim Guidelines for Purposeful and Responsible Use of Generative AI: This policy provides interim guidance on the best practices for implementing generative AI solutions and are meant to "encourage purposeful and responsible use of generative AI to foster public trust, support business outcomes, and ensure the ethical, transparent, accountable, and responsible implementation of this technology."
- SEC-01: Securing Information Technology Assets: This set of policies and standards outlines requirements for keeping systems and networks secure while ensuring data

integrity and confidentiality. These guidelines should be followed to make sure generative AI solutions are implemented safely and securely. They also play a key role in the Security Design Review process, helping state agencies ensure their use of technology, including generative AI, aligns with these established policies and standards.

- DATA-03: Privacy and Data Protection Policy: This policy provides guidance and instruction on how to incorporate Washington State Agency Privacy Principles into data-related practices like data sharing agreements, data governance, data management, data classification, etc. Successful adoption of generative AI requires strong data privacy practices. This policy also outlines the requirement for the Privacy Threshold Analysis and Privacy Impact Analysis, which focus on the intersection of personal information and technology, including generative AI.
- Technology Procurement Guidelines: WaTech, in partnership with the Department of Enterprise Services, also publishes guidelines for technology procurements of specific types. This includes WaTech's Automated Decision Systems Procurement and Use Guidance and the Generative AI procurement guidelines required by Executive Order 24-01.

3.4 Cross-agency collaboration that supports Generative AI adoption and use

State agencies are encouraged to collaborate with one another to enhance the feasibility of adopting different generative AI technologies. WaTech has established an AI Community of Practice (CoP), open to all state, tribal, and local governments, higher ed institutions, and other public sector entities to foster cross-agency collaboration and co-development of statewide policies, principles, and best practices around GenAI technology. Several sub-groups have formed from the CoP to address enterprise needs including the development of a statewide AI policy, creating an inventory of AI-related use cases, and establishing tool kits and guidance on pragmatic adoption of generative AI.

WaTech has recently established two programs that have a unique opportunity to offer support to state agencies as they look to leverage GenAI technology: WaTech's Innovation and Modernization Program and Emerging Technologies Program. These programs are intended to provide agencies with guidance, consultation, and support as they look to modernize and supplement their technology with generative AI.

Innovation and Modernization (IM) Program: The IM Program is aimed at creating an innovative culture that solves critical business problems with enabling technology and accelerates legacy systems modernization for Washington state agencies. Authorized by the Washington state Legislature in 2023, the IM Program provides dedicated funding to agencies for rapid modernization efforts and innovative technology solutions, thereby enhancing service delivery and operational efficiency. One of the goals is to fund short-term, high value innovative technology projects, many of which contain generative AI technology.

Generative AI in action: DSHS Field Specialist Chatbot

In 2024, DSHS approached the IT Innovation and Modernization program with a pilot project proposal to create a chatbot for field staff in the Developmental Disabilities Administration (DDA) to quickly find answers to questions without needing to ask a specialist. WaTech provided the department with funds to build out a large language model and chatbot that would provide answers and connect staff to training materials, resources, and contacts. The pilot project successfully launched not one, but two test environments and was so successful that DSHS is looking to expand its use to the rest of DDA and eventually across the entire enterprise. In addition, DSHS was able to identify areas in which DDA business processes, such as keeping instructional documents up to date, can be improved upon operationally through managing a chatbot environment.

Emerging technologies program: Intended to transform public service and drive statewide adoption of emerging technologies by publishing policies, frameworks, use cases, and guidance on the safe, responsible, and effective use of emerging technologies like generative AI. Develops and drives an approach to leverage emerging technology in partnership with public and private entities.

4.0 Plan and timeline for GenAI enterprise services

WaTech will serve as the broker of generative AI technology across the enterprise, leading the state's efforts to adopt and integrate generative AI into our state operations. By expanding its portfolio to include generative AI technology, WaTech will ensure state agencies have access to the resources necessary to drive innovation and efficiency in their operations. WaTech's approach will focus on maximizing existing technology governance processes, aligning GenAI technology with existing service strategies, and building a community through collaboration and enterprise programs.

4.1 WaTech's sandbox for GenAI: What to expect

WaTech services:

WaTech's role as the manager of statewide technology programs and services is central to Washington state's approach to integrating GenAI services. WaTech provides a carefully designed selection of IT services, including cloud computing, cybersecurity, and network management. By offering these essential tools, WaTech supports state agencies in improving their operations and service delivery, ensuring they are well-prepared to incorporate GenAI while continuing to focus on their core missions.

Sandbox:

A key component of this offering is the provision of a secure sandbox environment, which will enable users to experiment with and test AI capabilities without affecting live systems. This controlled environment will foster innovation by allowing users to explore AI functionalities safely and effectively.

Key components to the sandbox:

- **Patterned GenAI environments**: "Sandboxed" environments will leverage existing technology to enable agencies to experiment with GenAI technologies within a framework that WaTech has configured with known controls, governance, and guidelines. This setup ensures that all sandbox activities adhere to state policies while fostering creativity and innovation.
- **Modularity and flexibility**: The sandbox will offer the ability for individual agencies to establish their own environments, allowing them to test and refine generative GenAI technology independently. This flexibility represents a modular approach, enabling agencies to tailor their GenAI explorations to their specific needs while still operating within the secure and governed environment provided by WaTech.
- **Use-Case driven and iterative**: Initial sandbox environments will be aligned based on use cases, technology readiness, and agency readiness. Based on consultations with WaTech staff, agencies will be guided to the appropriate enabling service teams. WaTech will continuously evaluate demand for new environments or generative AI capabilities based on agency demand and evolving industry capabilities.

Timeline for availability:

WaTech has outlined a phased implementation timeline (see chart on page 16) to ensure a structured and efficient rollout of generative AI technology. The pace of deploying these advanced capabilities and the breadth of impact is dependent on available resources and expertise.

Phase 1

First 6 months
Oct-March 2025

- Define WaTech's role in our statewide approach to GenAI adoption.
- Define WaTech's role as a broker of generative AI technology for state agencies.
- WaTech will deploy a phased, iterative approach to deploying statewide generative AI technologies
- Expand on key initiatives: Governance, shared services and resources, and support.

Phase 2

6 Months

- Identify use cases for GenAI services through our Emerging Technology and Innovation and Modernization Programs.
- Build GenAI into existing statewide services.
- Collaborate with state agencies that have expressed interest in piloting GenAI services.
- Test and deploy the secure sandbox environment to ensure a controlled and safe setting for GenAI service trials.

Phase 3

6-12 Months

- Expand the availability of our GenAI projects through our Innovation and Modernization program.
- Use the Emerging Technologies Program to establish continuous support and feedback mechanisms.
- Leverage the Emerging Technologies Program to scale up service support, accommodating increased usage and ensuring robust performance as AI tools are widely adopted across state agencies.

Long-term Vision

1-2 Years

- Continuous Improvement: Through these programs, we will regularly update and enhance AI tools, incorporating the latest technological advancements and best practices into our service catalog.
- Adapting to Evolving Needs: We will leverage both programs to refine AI solutions, ensuring they meet the changing needs and objectives of state agencies, and remain relevant and effective in supporting agency missions.
- Fostering Innovation: These programs will also promote innovation and experimentation, utilizing our secure sandbox environment and ongoing support to cultivate a culture of continuous improvement and technological advancement.

Contacts

For questions about this report, please contact Angela Kleis, WaTech Director of Policy & External Affairs: angela.kleis@watech.wa.gov.

AI Disclosure: *GenAI was used to help simplify certain technical concepts in this report to make the material more accessible and understandable to a broad audience.*

Appendix i: Glossary of Terms

WaTech maintains a glossary of technology terms on its website. Below are terms uniquely defined for this report.

Artificial intelligence: A technology module or service that is built, integrated, or implemented in order to assist with or fully determine predictions, recommendations or decisions.

Deep learning: A form of machine learning that uses neural networks with several layers of "neurons": simple interconnected processing units that interact. The word "deep" refers to the fact that the circuits are typically organized into many layers, which means that computational paths from inputs to outputs have many steps. (Source: NIST AIRC - Glossary)

Generative Artificial Intelligence: A machine-based technology that can create content, including text, images, audio, or video, when prompted by a user. Generative AI technologies learn patterns and relationships from large amounts of data, which enables systems to generate new content that may be similar, but not identical, to the underlying training data.

Large language model: A specialized type of artificial intelligence (AI) that has been trained on vast amounts of text to understand existing content and generate original content. (Source: California Department of General Services)

Machine learning: A set of techniques that can be used to train AI algorithms to improve performance at a task based on data. (Source: California Department of General Services)

Neural networks: A model that, taking inspiration from the brain, is composed of layers (at least one of which is hidden) consisting of simple connected units or neurons followed by nonlinearities. (Source: NIST AIRC - Glossary)

Sandbox environment: A system that allows an untrusted application to run in a highly controlled environment where the application's permissions are restricted to an essential set of computer permissions. (Source: Sandbox - Glossary | CSRC (nist.gov))