Prepared for:

State of Maryland — Department of Information Technology

3-1-1 and Artificial Intelligence Feasibility Study

February 14, 2025
Engagement Number: 660005525 | Version 1
Solicitation Number: F50P56

Gartner®

Table of Contents

Gartner

1.0 Executive Summary

1.1 Purpose & Goals

This study evaluates the feasibility and potential challenges, risks, and benefits of implementing a statewide (consolidated) 3-1-1 portal with Artificial Intelligence (AI) integration to offer Maryland residents non-emergency government services, resources, and information. The scope of this study is limited to discovery, with determinations regarding the adoption of its findings and recommendations to be subsequently evaluated by the Maryland Department of Information Technology (DoIT) and other key legislative & operational stakeholders.

Goals of this study include:

- Understanding national and market trends related to 3-1-1 municipal operations and vendors.
- Documenting challenges faced by existing 3-1-1 operations across Maryland.
- Assessing the feasibility, benefits, and risks of establishing a statewide 3-1-1 portal to address these challenges.
- Understanding applicable approaches and potential impacts of leveraging AI in creating or implementing a statewide portal.

The findings and recommendations of this study reflect data available at the time and within the discovery approach as conducted, which includes:

- Interviews with executive and operational leadership across Maryland Emergency Management (MDEM) and 3-1-1 county and city operations.
- Detailed review of related Maryland legislative reports (e.g., *2021 NG9-1-1 Commission Annual Report, Appendix E*) and prior state bills (e.g., *2023 SB30, 2022 SB749*).
- Data analysis of publicly reported ticket-level 3-1-1 data within Maryland and comparable municipalities across the United States.
- Peer analysis of nine national peer municipalities, their operational models, and their 3-1-1 service offerings.
- Market analysis of various technology vendors offering 3-1-1 solutions, focusing on reported, generally available AI capabilities.

1.2 Key Findings

Characteristics of 3-1-1 Services

- The nature and scope of 3-1-1 services are contingent on highly local factors (e.g., local governance structures, demographics, geography) and may materially differ at the county, city, and even district levels.
- The responsibility for resolving 3-1-1 issues often resides at a similarly local level and may include electoral accountability at that level.
- 3-1-1 services differ from 9-1-1 services in the proportion of issues requiring the execution of a multi-stage, multi-jurisdictional service workflow for resolution vs. an acute, mono-jurisdictional response. In that regard, 3-1-1 services are inherently less scalable than other government services.

- 3-1-1 operations often serve as a “front door” for services offered by departments, agencies, and businesses at the county, city, district, state, and commercial levels. A statewide system would involve integrating and maintaining networks with these systems across the state of Maryland, in addition to developing and implementing a consolidated 3-1-1 portal.
- 3-1-1 lacks a common, detailed set of standards to guide operational and technology development, leading each municipality to generate its own data classification, service delivery, and resource allocation approaches. This presents challenges to both consolidating or accurately comparing across municipalities.

Peer Analysis

- No documented instances of statewide consolidated 3-1-1 operations in the U.S. were discovered; Maryland would be the first to implement such a system.
- Comparable municipalities across the U.S. operate core 3-1-1 services through a dedicated 3-1-1 Office call center, web portal, and mobile application.
- Most offer an out-of-jurisdiction or hearing-impaired specialty number and a non-emergency police number.
- Services mediated through self-serve conversational interfaces (e.g., chatbots, “smart” Interactive Voice Response) are not yet widespread and, where present, provide only basic functionality or are still in testing.
- No universal operational model was observed across peer municipalities with each differing by characteristics such as interaction channels, top services offered, ratio of information requests to service requests, and degrees of integration with emergency services.

Maryland 3-1-1

- The presence of a 3-1-1 operation is highly correlated with population. The five most populous jurisdictions offer 3-1-1 services, covering approximately 58% of Maryland residents.
- MD 3-1-1 operations align operationally with peer municipalities across the U.S. and share common operational and business challenges, including:
  - The independent development and maintenance of complex and brittle integrations between 3-1-1 operations and those of county, city, state, federal, and commercial systems.
  - The independent development and maintenance of Geographic Information System (GIS) platforms to facilitate accurate jurisdictional routing.
  - Historical investments in 3-1-1 people, processes, and technology in these municipalities are commonly viewed as sunk costs, complicating the potential benefits of a statewide system for the majority of the state’s population.
  - Lack of public awareness of 3-1-1, services offered, and distinctions between related public services (e.g., 2-1-1, 9-8-8, non-emergency police).
  - Turnover, retention, and recruitment issues among 3-1-1 Specialists.

1.3 Recommendations

Feasibility Criteria

This study considered the following criteria in evaluating the feasibility of a statewide 3-1-1 portal:

1. **Data Integrity:** The standardization, completeness, and availability of data across 3-1-1 operations to facilitate accurate and reliable information exchange.
2. **Operational Scalability:** The adaptability and interoperability of 3-1-1 operations and processes, impact of technology solutions on key business and operational problems, existence and adoption of shared standards, and marginal benefits to scale.
3. **Governance and Accountability**: Mechanisms available for establishing decision rights, authority, responsibilities, and accountability to guide and oversee the implementation and ongoing operation of the system.
4. **Implementation Complexity:** Effort required to establish favorable preconditions for rollout, effective coordination mechanisms, shared requirements, and degree of coordination required with implementation partners to manage the intricacies of system deployment.

Based on these criteria, the evidence examined by this study suggests a **low feasibility** of implementing a statewide 3-1-1 portal in Maryland at this time.

Path Forward

This study identified meaningful opportunities for Maryland to enhance 3-1-1 services across the state by developing shared solutions and making them available to existing 3-1-1 operations or municipalities without 3-1-1 capabilities who might provide 3-1-1 services given the resources. These potential solutions include:

- **Integration Platform:** Source and offer a statewide integration layer to facilitate resilient connections and data flows between systems related to 3-1-1.
- **GIS Location Tracking:** Develop an extensible GIS platform for adoption by municipalities without GIS access and to maintain critical GIS data for existing 3-1-1 operations.
- **Conversational Interfaces:** Provide statewide self-service conversational interfaces to make information available in natural language interactions via digital channels and/or conversational IVR and to increase the accessibility of 3-1-1 services.
- **Channel Support:** Offer tooling to support a broad range of intake channels, including those unavailable to existing 3-1-1 operations, and to support service-level standardization across channels.
- **Standard Development:** Develop statewide definitions and standards for issue categorization, operational processes, service levels, and training, including a statewide non-emergency 9-1-1 equivalent option.
- **Public Outreach:** Facilitate and implement broad public awareness campaigns for 3-1-1 and other non-emergency services, including support for local community outreach organizations.
- **Adoption Models:** Develop interim hybrid adoption models with clear decision rights and accountability structures (e.g., what the State is accountable for vs. the municipality).

The successful implementation of these solutions may increase the future feasibility of a statewide 3-1-1 portal; however, adopting these recommendations is not a guarantee of feasibility. Depending upon which recommendations are adopted, the nature of the implementations, and the effects on

operational performance and business outcomes, the feasibility of a consolidated 3-1-1 portal may increase based on the criteria outlined above. Alternatively, successful implementation of these solutions may produce many of the expected benefits of a potential consolidated, statewide solution, rendering the further development of such a portal unnecessary.

2.0 Introduction

2.1 Overview of 3-1-1

A 3-1-1 operation is a non-emergency platform that directs residents to government services and handles general information and inquiries such as trash pickup, snow removal, noise complaints, or permit requests. Unlike 9-1-1 or 9-8-8, there are no robust, widely adopted standards for 3-1-1, meaning that each 3-1-1 operation tends to arise from and reflect local community needs and priorities. As a result, 3-1-1 operations vary in complexity and service offerings according to local factors like governance structures, demographics, geography, and available funding. Simple 3-1-1 operations may only support a general 3-1-1 phone number. In contrast, more sophisticated programs may also host a call center with IVR support, a website, a mobile app, and complex integrations with jurisdictional entities.

An effective 3-1-1 operation provides a single point of entry for residents to access and receive information on a wide range of municipal services without needing to navigate multiple phone numbers and departments. A typical resident engagement begins with a request made through a website, IVR, or contact center. If the request requires a service response, it is routed to the appropriate department without navigating through additional portals or channels. Additionally, the resident is informed of the request's status to reduce the need for follow-up calls. Some 3-1-1 operations provide residents visibility on the status of other service requests made within a specified time frame. For example, suppose there is flooding on a particular street or a noise complaint has been filed. In that case, residents with access to a portal (mobile app, website, etc.) may be informed of requests already logged for that issue and the resolution status to reduce the need for the resident to contact 3-1-1 with an additional inquiry or engage the police for resolution. While this offering is not provided within all 3-1-1 operations, it underscores the role of a 3-1-1 operation in providing a reliable, single-source platform for residents to engage with their local government to inquire about non-emergency issues.

As a result, 3-1-1 services encourage the diversion of non-emergency calls away from 9-1-1 emergency lines. The existence of a reliable non-emergency number allows residents to direct calls that may require a response (e.g., downed power line) while keeping emergency channels clear in case of an actual emergency (e.g., fire, car accident). Rerouting non-emergency calls allows 9-1-1 dispatchers to focus on responding to genuine emergent incidents, enabling faster emergency response times and better public safety.

2.2 Legislative Background

2024 Maryland Senate Bill 1068 (SB1068) [1]is intended to evaluate the feasibility of creating a 3-1-1 portal utilizing artificial intelligence and prioritize the creation of the portal if feasible. Such a portal aims to consolidate county and statewide systems to improve efficiency and accessibility for residents. As originally written, the legislation aims to enhance Maryland's nonemergency information and referral infrastructure, with the potential to integrate both community services (2-1-1) and local government services (3-1-1).

Legislative activity predated SB1068. In chronological context, the Maryland Next Generation 9-1-1 (NG9-1-1) Commission first considered a statewide approach to 3-1-1. The 2021 NG9-1-1 Commission report [2] considered many implementation questions and two different models: a

statewide 3-1-1 operation and county-operated 3-1-1 operations within a state ecosystem that would establish technology, cybersecurity, and training standards.

Before SB 1068, two Senate bills addressed 3-1-1: SB0749 [3]in 2022 and SB0030 [4] in 2023. SB0749 was introduced in the 2022 session by Senators Kagan and Reilly. SB0749 proposed the creation of a statewide 3-1-1 board in the Maryland Department of Emergency Management. It directed the board to establish a statewide 3-1-1 operation and create requirements, procedures, and standards for that system and the county 3-1-1 operations. The bill largely followed the approach described in the appendix of the 2021 NG9-1-1 Commission report. The bill did not pass out of committee. SB0749 was cross-filed with HB1003 in the House

SB0030 was introduced in the 2023 session, cross-filed with HB0138. This bill directed the Department of Legislative Services to conduct a study regarding a statewide 3-1-1 operation and set out some questions for the study to answer regarding cost, staffing levels, call volumes, and the possibility of merging 3-1-1 with the existing state 2-2-1 system. These bills both crossed over to the other chamber but did not pass.

SB1068 was introduced in the 2024 session, cross-filed with HB1141, and passed with amendments. The resulting bill directs the Maryland Department of Information Technology (DoIT) to evaluate the feasibility of creating a state 3-1-1 portal and to investigate how artificial intelligence might be utilized in that portal, if feasible.

2.3 Scope of Work

DoIT issued a task order to undertake this feasibility study to include the following content:

- Interviews and user research with relevant constituents, 3-1-1 operators, relevant state and county officials, governing boards, and other stakeholders critical to understanding:
- a) the problems with the current systems, and
- b) the feasibility, desirability, pros, and cons of establishing a state-wide 3-1-1 portal to solve those problems.
- Approaches to leveraging AI in developing a state-wide 3-1-1 portal, efficiencies to be gained by doing so, and anticipated impact on 3-1-1 operations.
- Implications to city/county-level 3-1-1 operations if a state-wide system is established.
- Cost predictions for creating a state-wide 3-1-1 portal vs. a “business as usual” scenario.
- Comparative analysis, market research, data analytics, and literature review to understand:
  - National trends in 3-1-1 operations
  - Current and anticipated uses of AI in these systems and their opportunities, potential impacts, and attendant risks (in particular weighed against the AI principles established in a 2024 Maryland AI executive order)
  - Case studies on previous attempts to create state-level 3-1-1 operations, with outcomes, lessons learned, and implications for Maryland

The AI executive order mentioned in the scope is the EO titled “*Catalyzing the Responsible and Productive Use of Artificial Intelligence in Maryland State Government*,” [5] signed on Jan. 8, 2024. The principles described in the order are:

- Fairness and Equity
- Innovation
- Privacy

- Safety, Security, and Resiliency
- Validity and Reliability
- Transparency, Accountability, and Explainability

2.4 Structure of the Study

The remainder of the study is organized into the following sections:

- **Section 3** is a current state analysis, describing the six 3-1-1 operations currently in operation in Maryland, some identified challenges (both current and related to consolidation), and stakeholder insights.
- **Section 4** describes national trends in 3-1-1 operations with a peer analysis of nine 3-1-1 operations outside of Maryland, a market scan of vendors selling 3-1-1 solutions, a discussion of AI use cases in contact center environments, and reviews examples of other studies related to 3-1-1 consolidation.
- **Section 5** is an overview of AI contact center technologies, real world benefits, risks, and opportunities in 3-1-1 (or equivalent environments), and analysis at the use case level.
- **Section 6** covers different consolidation models that were considered for this study and implications for Maryland.
- **Section 7** presents criteria used by this study to assess feasibility and summarizes recommendations.
- **Section 8** discusses cost considerations for Maryland in the absence of other consolidation examples.
- **Section 9** contains appendices and cites references used in the creation of this study.

3.0 Comparative Analysis and Case Studies

3.1 National Trends

As of 2024, nearly 100 U.S. metro areas have implemented 3-1-1 operations [6]. Since 2010, the adoption of online portals and mobile apps for 3-1-1 services has become standard practice. These systems now offer multichannel access, allowing residents to interact via email, SMS, mobile apps, and social media, making the services more accessible. Over the past decade, there has been a notable shift toward cloud-based 3-1-1 services [7]. The rise of artificial intelligence and automation has enhanced the handling of routine informational inquiries and service requests, with chatbots and virtual assistants providing instant responses and freeing human operators to address more complex issues. Additionally, there is increased interagency collaboration, with 3-1-1 operations facilitating better coordination among city departments and agencies to ensure efficient resolution of service requests [8].

Despite their growing prevalence for non-emergency services, several factors influence the adoption of 3-1-1 operations. Budget constraints can impact the implementation and expansion of these systems, particularly for municipalities. Larger cities often have more complex 3-1-1 operations to manage denser populations. Furthermore, local policy and regulation can drive the adoption of 3-1-1 technologies.

The operational development of 3-1-1 operations also faces challenges. Cities often struggle to integrate new 3-1-1 platforms with existing legacy systems. Ensuring adequate training for both

employees and residents can be difficult. Additionally, as urban centers grow, scaling the 3-1-1 operation to meet increasing demands poses another challenge.

Overall, the 3-1-1 solutions market in the USA is rapidly evolving, driven by technological advancements and changing public expectations. Municipalities are increasingly seeking solutions that offer flexibility, integration capabilities, and robust data analytics to enhance service delivery and citizen engagement.

To further understand these trends, this study benchmarked nine other 3-1-1 operations outside of Maryland by visiting their web portals, reviewing budget documents and local news articles about modernization efforts, and where publicly reported, analyzing service request data for the trailing twelve months (Jan 2024 through Dec 2024).

Table 1: Publicly Reported 3-1-1 Operation Data for Nine Major U.S. Municipalities

City/County	Population	311 Office	311 Portal	Mobile App	311 Phone Number	Chatbot
Austin	980K	Yes	Yes	Yes	Yes	No
Houston	2.31M	Yes	Yes	Yes	Yes	No
Denver	716K	Yes	Yes	No - Website is Mobile Friendly	Yes	Yes
Washington, DC	679K	Yes	Yes	Yes	Yes	No
Boston	654K	Yes	Yes	Yes	Yes	No
Los Angeles	3.82M	Yes	Yes	Yes - MyLA311	Yes	Yes
Atlanta	511K	Yes	Yes	Yes - ATL311	Yes	Yes
New York City	8.26M	Yes	Yes	Yes	Yes	No
San Diego	1.39M	Yes	Yes	Yes	No	No

3.2 Peer Observations

Performance Metrics and Key Performance Indicators — Examining the peer set and corresponding budget documents, this study observed no consistent set of measures for 3-1-1 performance. Measures documented across the peer set include:

- Customer satisfaction score
- Time to answer — either as a percentage of calls answered within a target (e.g.,60-seconds) or a median or mean time to answer
- Number of calls — statistics such as calls queued, handled, and abandoned
- Average handling time of a call
- Number of service requests created
- Cost per customer contact

Overview of Contact Channels — Typical channels for contacting a 3-1-1 operation include voice, text, and requests generated by internal government or commercial entities. The 3-1-1 phone number was utilized in eight out of nine jurisdictions (with the city of San Diego being the outlier). Most of the operations also offered an alternate phone number for callers outside of the region (for

example, someone commuting to a job located outside of the jurisdiction). Additionally, some offered a dedicated interaction point for the hearing impaired.

Text-based channels represented a variety of technologies, with web portals, mobile applications, and chatbots being the most common. Other channels like text messaging, email, and social media are supported by several 3-1-1 operations in the peer set, though the volumes appear to be minimal. In some of the datasets examined by this study, there was a material (5% to 10% of requests) proportion of service requests generated by employees or city/county contractors and labeled as "Internal." Finally, there were operations which allowed service requests to be submitted by channels such as fax or in person interactions.

Table 2 shows representative distributions from two 3-1-1 operations in the peer set and two 3-1-1 operations in Maryland, Baltimore City [9] and Montgomery County [10]. These numbers were derived from a 12-month sample of service request data in each jurisdiction. Boston is an outlier in the data, with just 31% of its requests coming in via voice [11].

Table 2: Comparison of 3-1-1 Interactions by Channel

311 Center	Voice	Web + App	Internal	Other	In-Person	Mail	Fax
Boston	30.60%	57.10%	12.20%	--	--	--	--
Denver	73.00%	13.00%	10.80%	2.10%	0.20%	--	0.90%
Baltimore City	58.39%	36.73%	4.14%	0.01%	--	0.73%	--
Mongomery County	76.64%	17.87%	5.20%	0.00%	0.28%	--	--

Variances in Mobile App Volume — 3-1-1 operations commonly support a mobile application on both the Android and iOS platforms. CRM systems examined by this study often shared the same Application Programming Interface (API) for web and mobile applications, meaning that there was no way to determine the specific channels (e.g., a mobile app) using the API. Of the three 3-1-1 operations in the peer set where that data was available, the variance was substantial: 1.36% of contacts in Austin; 12.65% of contacts in Denver; and a surprising 55.7% of contacts in Boston. Boston first launched their mobile app in 2009 and reported that in 2010 mobile was responsible for 6% of service requests and by 2014 the mobile channel had grown to 28% [12]. One Maryland 3-1-1 director interviewed by this study maintained that, in their experience, a robust public awareness campaign to accompany a technology rollout is required to drive successful adoption of mobile applications.

Chatbots and Use of Conversational AI — Four out of nine 3-1-1 operations in the peer set provided a chatbot as an optional interaction channel. Half of the chatbots offered utilized generative AI technology (Atlanta's *Ava* and Denver's *Sunny*) as opposed to systems powered by retrieval from logic trees. In Maryland, the Montgomery County 3-1-1 operation is currently utilizing a generative AI powered chat interface (Monty) to respond to basic information requests, but it does not yet execute service workflows. For reasons mentioned in the Overview of Contact Channels, it is difficult to determine how much traffic these chatbots are handling. One Maryland 3-1-1 director interviewed by this study reported roughly 1% of interaction volume coming in via chatbot. This study directly tested these available chatbots and found that none of them will directly create a service request, though they will redirect the user to a web form for creating a request.

Non-Emergency Police Phone Number — Six out of nine of the peer jurisdictions offered a non-emergency police phone number. hese numbers are used to report police matters that don't require an immediate dispatch (e.g., an overnight vehicle break-in or an abandoned vehicle). One Maryland Emergency Management director interviewed by this study noted a substantial impact on lowering non-emergency volume into 9-1-1 in municipalities with this option. Within its scope, this study did not uncover sufficient data to determine impacts to 3-1-1 volumes but identified this as an

opportunity for further research as these volumes may potentially impact the current-state understanding of 3-1-1 demand across the state if fielded by certain 3-1-1 operations in municipalities without this option.

Hours of Operation — Five out of nine jurisdictions operated a 24/7 call center. The others operated with extended hours longer than local city or county office hours – typically between 12 and 17 hours on weekdays, with shorter weekend hours.

Publishing Service Request Data — Eight of the nine jurisdictions in the peer group made their 3-1-1 service request data publicly available. Seven utilized the Open311 protocol [13], and one published a data dashboard to allow the public to query the 3-1-1 dataset. Open311 is an evolving initiative to develop a decentralized, open-source protocol for location-based collaborative issue tracking, but this study found that it lacked the robustness, stability, and adoption to be considered an equivalent standard to those set by state government or widely recognized standards bodies (e.g. NIST).

Taxonomy of Requests — This study found no common service request taxonomy across observed 3-1-1 operations, with each center choosing to organize in a way that makes sense for them based on local factors. The 3-1-1 datasets typically include a field such as *Case Title*, *Type*, or *Source* indicating the nature of the issue. When filtering those fields for unique issue categories, the number of categories typically varies between 100 and 300 types of interactions. Common categories include abandoned vehicles, lost animals, noise disturbances, potholes, billing complaints, parking complaints, trash pickup, sidewalk repair, and streetlight issues. Additional variance in 3-1-1 operations occurs when they further decompose those categories into tiers of sub-categories. The data often showed between twenty and thirty different sub-categories of service requests around trash pickup alone. Variance is also driven by the specifics of the jurisdiction. For example, parking enforcement is the top issue for Boston, with over 22% of the contacts, while in Denver, illegal parking ranks below forty other issues, with only 0.52% of the contacts.

Requests for Information vs. Service Fulfillment Requests — A notable observation across 3-1-1 operations is the proportion of the contacts requesting basic information, but the data is confounded by only certain 3-1-1 operations delineating service requests (SR) from informational requests (IR). This volume represents the potential for rapidly developing conversational interfaces (e.g. chatbots, advanced IVR) to help resolve these issues, though the nature of 3-1-1 services largely consists of compound, multi-jurisdictional issues requiring the execution of complex workflows.

Table 3: Comparison of Informational Requests to Service Requests

311 Operation	Information Requests (IR)	Service Requests (SR)	Ratio of IR vs. SR
Denver	212,302	452,430	46.9%
Baltimore City	307,677	1,024,624	30.0%
Montgomery County	281,057	533,425	52.7%

Language Assistance and Translation — Integrating AI-driven translation services into 3-1-1 web portals is a common practice. Some 3-1-1 call centers provide bilingual staff or translators, primarily for Spanish-speaking residents. Enabling greater accessibility through more robust language services represents an opportunity for the enhancement of 3-1-1 services across municipalities.

Technology — All nine peer municipalities evaluated in this study use a Customer Relationship Management (CRM) system to receive and track service requests. A deeper overview of 3-1-1 technology is discussed in the Vendor Market section of this study and the technology used in the peer set was consistent with that market scan.

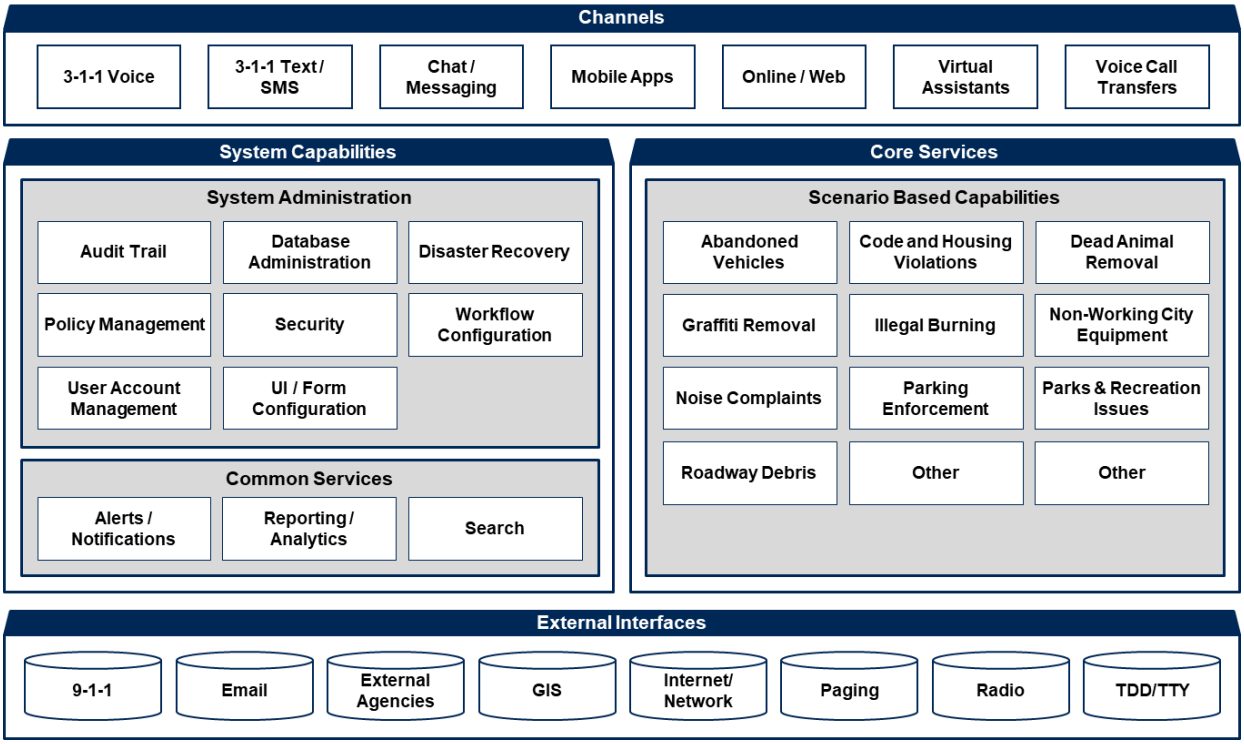
GIS Mapping — An effective 3-1-1 operation requires robust and well-maintained GIS data to determine jurisdiction, identify where specific services are offered, and route agency or commercial workers as needed. One Maryland 3-1-1 director estimated that two-thirds of their calls involved the need to track services to a specific location. Municipalities in the peer set also relied on the development and maintenance of their GIS systems to fulfill requests.

3.3 Vendor Market

To evaluate the technology market, this study examines a cohort of twelve prominent 3-1-1 vendors and their respective solutions. This sample group leverages Gartner research on the CRM, CIM, 9-1-1 and 3-1-1 vendor market in addition to publicly available information and subject matter expert experience of vendor solutions. This study selected a cross section of the market to include both established legacy vendors and newer entrants with demonstrated technology deployments The vendors considered in the sample group for this study were: Accela, Catalis, CivicPlus, Comcate, Granicus, Motorola, Nebulogic, Oracle, Salesforce, Trimble, Tyler Technologies and Verint. Vendors were selected to represent a representative cross-section of the market, and this list should not be considered exhaustive.

Findings from the vendor market scan are presented with respect to two models. The first is Gartner's *3-1-1 Solution Capabilities Model* (Figure 1) which describes the core functional capabilities and services required by a typical 3-1-1 solution and highlights functionality which represent differentiating capabilities for the vendors (Figure 3). Vendors included in this market scan provide solutions consistent with this capability model.

Figure 1: Gartner 3-1-1 Solution Capability Model (or 'Reference Framework')



Since the inception of the 3-1-1 operational concept in the 1990s and subsequent proliferation of 3-1-1-1 operations across the U.S., the 3-1-1 vendor market has grown and matured in parallel. Some vendors have been operating in the 3-1-1 market for less than decade – many for much longer.

The marketplace is primarily composed of vendors from other service domains such as 9-1-1, Asset Management, and CRM. This study finds this to be a representative cross-section in terms of the duration of their 3-1-1 solutions in the market, the scope of functionality offered, and the relative age of the core technical platforms and architectures of the solutions themselves. Newer entrants may benefit from more contemporary architectures which provide critical flexibility among other technical advantages, while traditional solution architectures ma benefit from maturit (considered 'proven') while simultaneously contending with the risks of legacy technologies in the marketplace.

Differentiation between vendors from these differing backgrounds is evident primarily in their solution architecture for delivering key functionality or addressing common 3-1-1 issues. Contemporary architectures prioritize agility and scalability, often at the cost of increased complexity, while traditional architectures prioritize stability and familiarity, potentially lacking in flexibility for rapidly evolving technology environments and dynamic customer needs.

In this context, contemporary solution architectures are considered those leveraging some or all of the following attributes:

- Cloud-Native: Something created to optimally leverage or implement cloud characteristics. Those cloud characteristics are part of the original definition of cloud computing, and include capabilities delivered as a service. Cloud computing characteristics also include scalable and elastic, shared, metered by use, service-based, and ubiquitous by means of internet technologies.
- AI-Enabled: Core systems which have been designed from the beginning to leverage a broad range of Artificial Intelligence capabilities, rather than simpl "bolt-on" or augment those capabilities with AI later on.
- Edge Computing: Part of a distributed computing topology where information processing is located close to the "edge" (e.g., on device such as mobile phones), at the endpoints where other systems and people produce or consume that information
- Event-Driven: A design paradigm in which a software component executes in response to receiving one or more event notifications. EDA is more loosely coupled than the client/server paradigm because the component that sends the notification doesn't kno the identit of the receiving components at the time of compiling
- Domain-Driven: Systems designed to support and operate people and processes necessary to solve business problems specific to a particular industry or sub-industry.

Table 4: Solution Architecture Considerations

	Advantages	Challenges
Contemporary Architectures	**Scalability:** Easily scale up or down based on demand using cloud-based services, enabling efficient resource allocation. **Agility:** Quick development cycles and rapid deployment of new features due to modular design and automation. **Flexibility:** Ability to integrate diverse technologies and adapt to changing business needs through microservices and APIs. **Cost-efficiency:** Pay-as-you-go cloud model can reduce infrastructure costs by only utilizing needed resources. **Innovation:** Leverage cutting-edge technologies like AI, machine learning, and big data analytics.	**Complexity:** Managing distributed systems with multiple components can be challenging. **Vendor lock-in:** Reliance on specific cloud providers can limit flexibility and portability. **Security concerns:** Increased attack surface due to distributed nature and reliance on cloud services. **Learning curve:** Requires expertise in new technologies and development practices.
Traditional Architectures	**Stability:** Proven design patterns and technologies with a strong track record of reliability. **Maintainability:** Familiar codebases and well-documented processes can simplify maintenance. **Legacy integration:** Easier integration with existing systems and databases. **Security maturity:** Established security practices and controls often well-defined.	**Limited scalability:** Difficulty in scaling to meet rapidly changing demands without significant re-architecture. **Slow development cycles:** Longer time to market due to rigid design patterns and complex deployment processes. **Inflexibility:** Difficulty adapting to new technologies and business requirements. **Potential for high cost:** Maintaining legacy infrastructure can be expensive

The second presents this study's perspective of the 3-1-1 Vendor Market using a sample group of vendors plotted against Gartner's dimensions of perceived quality of Products and Services offerings and the overall Company Maturity and Vision, displayed in **Figure 2.**

"Products and Services" describes the solutions provided to the 3-1-1 market and considers three categorizations these solutions: 1) Foundational; 2) Differentiating and Proven and 3) Transforming & Strategic.

"Company Maturity and Vision" describes a vendor's position in the market over time as it relates to their solution offerings in the 3-1-1 market and considers them as 1) Legacy and Stagnant 2) Stable and Mature or 3) Visionary and Innovator.

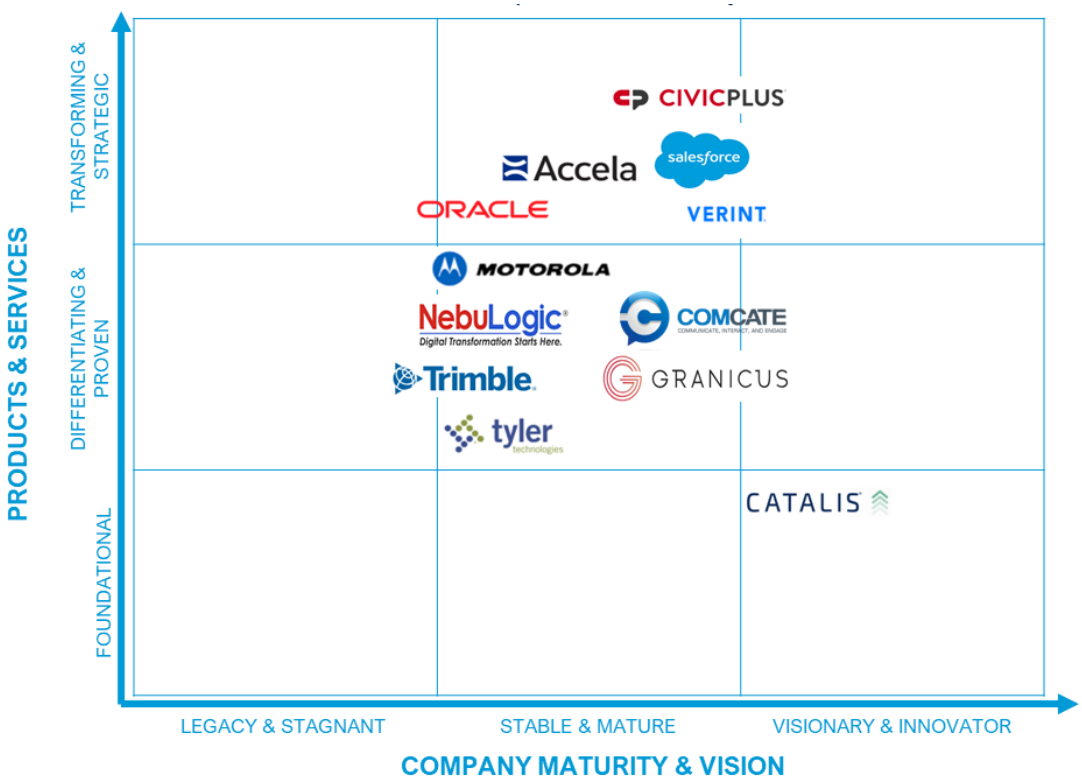
Most vendors are perceived to be Stable and Mature, with distinctions between Differentiating and Proven and Transforming and Strategic products and services.

- Vendors that are considered to be ' ifferentiating and Proven' have solutions ith no n reliability and offer a subset of unique features that contribute to business value.
- Vendors considered to be 'Transforming and trategic' provide business value hile advancing the growth of the industry by investing in emerging capabilities to address future

needs. These vendors place a larger emphasis on AI and IoT technology within their solution approach.

- The sole vendor ithin the ‘Visionary and Innovator, Foundational’ segment received this placement due to its’ recent entr into the marketplace and its’ focus on providing a broad range of citizen engagement capabilities to address municipal business needs.

Figure 2: 3-1-1 Vendor Market Comparison (Sample Group)

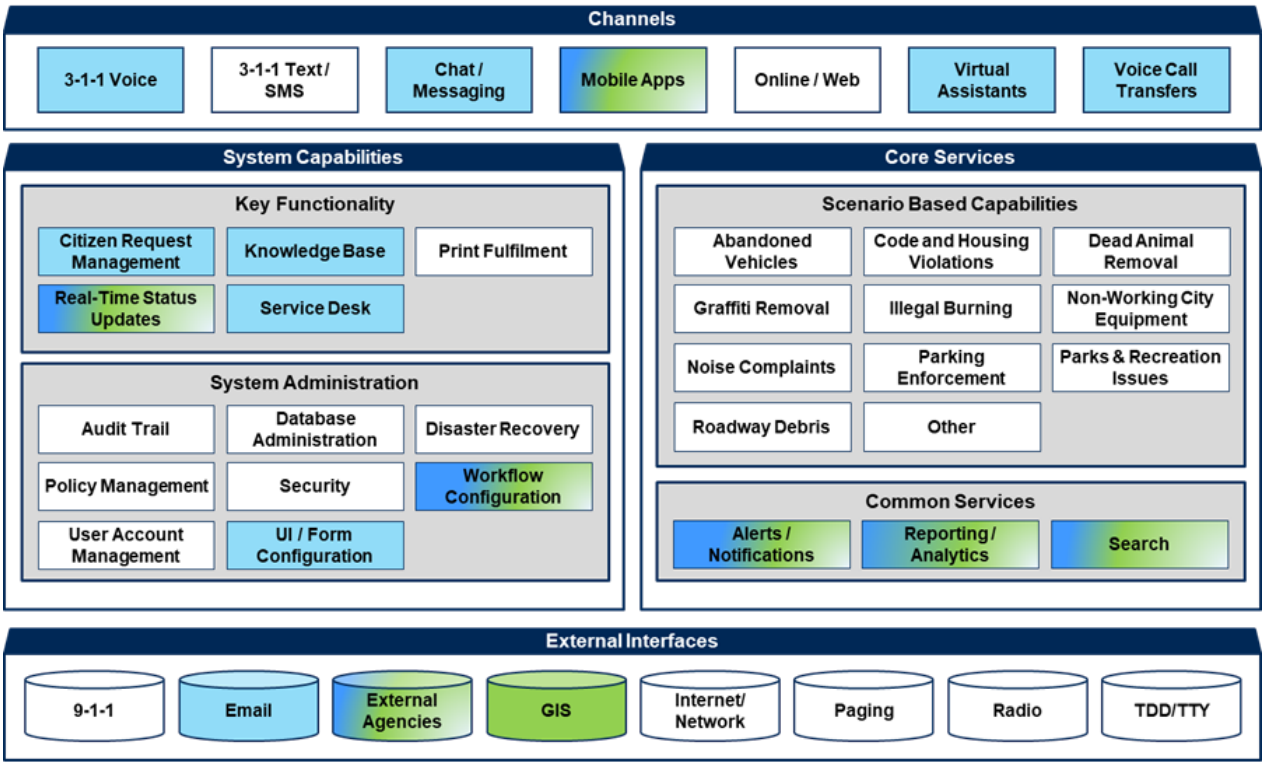


Vendors with roots in asset management address 3-1- operations ith an ‘asset first’ approach, excelling in optimizing the workflow so service requests are received, recorded and dispatched accurately for fast resolution times. Differentiators within this space are automated workflows, dispatching, GIS integration, geo-tagging and predictive maintenance.

Vendors with a historical specialization in CRM are focused on the overall customer experience. Their differentiating capabilities in 3-1-1 tend to be Chatbot integration, omni-channel communication, real-time alerts/notifications, various agent assist tools, Call Transcription/Summary creation, Knowledge Base Management and automated call routing.

Selecting a 3-1- solution requires aligning the organization’s needs ith the vendor’s strengths and capabilit offerings. Understanding the core focus of the solution and its’ architectural frame or is essential to choose a vendor that aligns with operational priorities and long-term strategic goals.

Figure 3: Gartner 3-1-1 Solution Capability Model, Differentiating Capabilities



3.4 Review of Prior 3-1-1 Consolidation Studies

While statewide 9-1-1 operations exist, there make it is primarily governing bodies for strategy, standards, funding and providers of the backbone statewide 9-1-1 telephony and IP networks. There is still local control and autonomy at the municipal level, at the 9-1- center level (or 'Public afet Answering Point – PSAP). For example, the State 9-1-1 board is often responsible for providing the statewide 9-1-1 telephony (legacy) and IP (Next Generation / NG9-1-1) networks to the various municipal and regional 9-1-1 centers, but each 9-1-1 center is largely locally funded, and locally owned and operated. In some examples, the state might provide a common 9-1-1 call taking system that the local 9-1-1 centers can opt in to use, or they can procure their own. For the dispatching solution (or Computer Aided Dispatch – CAD), the local PSAPs often have full control on the vendor solution they wish to procure. In essence, the state level provides overall governance, some degree of centralized funding and provision of the backbone. The 9-1-1 centers are all in control of their own destinies beyond that. Similarly, there are no examples of statewide 3-1-1 operations however the State of MD could consider a centralized function like the State 9-1-1 board that could be responsible for overall 3-1-1 strategy, governance, standards, some degree of centralized funding and potentially a consolidated IT team of subject matter experts, vendor contract managers and other IT support personnel.

The primary issue does not appear to be scale – the New York City 3-1-1 operation serves over eight million citizens, larger that many states. Rather, it appears that 3-1-1 operations are intertwined with local government problems and operations, and combining 3-1-1 operations brings sufficient added complexity and integrations to offset potential economies of scale.

The National Center for Public Performance E-Governance Institute at Rutgers-Newark published a statewide 3-1- feasibilit study in 007 titled "*Developing a Statewide 311 System in New Jersey*" [14]. The study concluded that a statewide 311 system, which would service all municipalities, counties and state agencies in New Jersey, was feasible. The study considered three implementation options: building the 3-1-1 operation on the existing 2-1-1 platform; an entirely new 3-1-1 operation; developing a Newark based 3-1-1 and then adding other cities, counties, and state agencies.

The study surveyed 14 existing 3-1-1 operations: Chattanooga, TN; Hampton, VA; Louisville, KY; Austin, TX; Orlando, FL; Somerville, MA; Rochester, NY; Riverside, CA; San Jose, CA; Akron, OH; Minneapolis, MN; Houston, TX; San Antonio, TX; and Birmingham, AL. At the time of the study, New Jersey did not have any existing 3-1-1 operations; the City of Newark considered developing one.

The study provides a market scan of existing vendors, and an analysis of the 14 centers surveyed using four categories of system performance: usability, service, operations, and system measures (metrics). This as used to determine " hat good looks like" and establish functional requirements for a statewide implementation. The study also lays out criteria for a successful implementation across usability (seven criteria), system measures (13 criteria), and leadership (seven criteria).

The budget estimate was built using budget data and 3-1-1 call volumes to determine an average 3-1-1 call volume (calls per capita, per month) and the average per capita annual cost share. The study estimated that (in 2007) start-up costs would range from $1 to $12 million depending on whether it is implemented statewide or in the City of Newark, and the annual operating expenses would be $26 million, or about $3 per resident. Ultimately, no statewide 3-1-1 operation was developed or implemented in New Jersey.

A 2008 report by the Director of Process Improvement for DeKalb County, GA titled "*Call Routing for 311: The Issues and Solutions*" [15] highlighted barriers to effective routing of 3-1-1 calls across the state of Georgia, inhibiting statewide initiatives. Notable issues with jurisdictional routing, lack of practical funding models, and geopolitical complications lead to the conclusion that, "connecting residents to their call center sometimes requires more forethought" than existing processes allowed.

The International City/County Management Association (ICMA) published an instructive 2017 report titled "*Customer Service and 311 Technology in Local Governments: Lessons on Connecting with Citizens*" [16] which surveyed 2,287 local governments on the nature and maturity of their 3-1-1 operations. The survey found momentum toward consolidation of services 3-1-1 offered by local municipalities to the city or county level but did not mention statewide consolidation examples.

The lack of documented instances of other statewide 3-1-1 consolidations indicates that the perceived benefits of such a consolidation (e.g., improved service, more efficient resource allocation) have not been determined to outweigh the costs of surmounting the extensive operational, technological, and governance barriers. Maryland would be the first state to develop and implement such a system in the United States.

4.0 Current State Analysis

4.1 Overview of Existing Systems

Six 3-1-1s were identified across Maryland's 23 counties and one independent city. Those municipalities with existing 3-1-1 operations are Baltimore City, Prince George's County. Montgomery County, Anne Arundel County, and Baltimore County, and St. Mary's County. Table 8 lists comparable attributes of these centers.

Table 8: Maryland 3-1-1 Operation Summary*

City/County	Population	311 Office	311 Portal	Mobile App	311 Phone Number	Chatbot?	Budget	Headcount	Annual Call Volume
Baltimore City	565K	Yes	Yes	Yes	Yes	No	$5,767,825	61	561,672
Prince George's County	947K	Yes	Yes	Yes	Yes	No	$2,326,500	31	322,000*
Montgomery County	1.058M	Yes	Yes	No	Yes	Yes	$5,092,414	43.7	258,000*
Anne Arundel County	594K	No	Yes	Yes	Yes	No	N/A	N/A	46,800*
Baltimore County	845K	No	Yes	Yes	Yes	No	$688,968	---	83,576*
St. Mary's County	115K	No	Yes	No	No	No	N/A	N/A	N/A

**Note: Rather than Annual Call Volume directly, some municipalities track different measures of volume (e.g., calls answered, requests generated)*

This study also considers three Maryland Counties that do not have 3-1-1 services to determine how uniform the citizen experience would be. Howard County, with a 2023 Census estimate population of 336,000, does not have a 3-1-1 service but does have a common services portal. There is no central phone number – rather oward publishes a phone directory and a " ell oCo" app on its website. Washington County, with a population of 155,000, has a central phone number and a consolidated list of services on its website. The services utilize a mix of different technology. Worcester County, with a population of 54,000, does not have a common services portal; it does have a central phone number and extensive information on the website. This study found that even if a county does not have a dedicated 3-1-1 operation, it still might possess attributes of a 3-1-1 jurisdiction.

Maryland 3-1-1 operations do not receive regular state or federal funding. Examining the 2025 budgets for each of these municipalities, the 3-1-1 operation is either operating as an agency/office or, in some cases, embedded in the county's IT function.

The existence of a 3-1-1 operation is highly correlated with population. Five of the six Maryland 3-1-1 operations are in the five most populous municipalities: ontgomery ounty, Prince George's ounty, altimore ounty, nne rundel ounty, and altimore ity. he one outlier as t. ary's County. Those six counties/city cover of aryland's population [17].

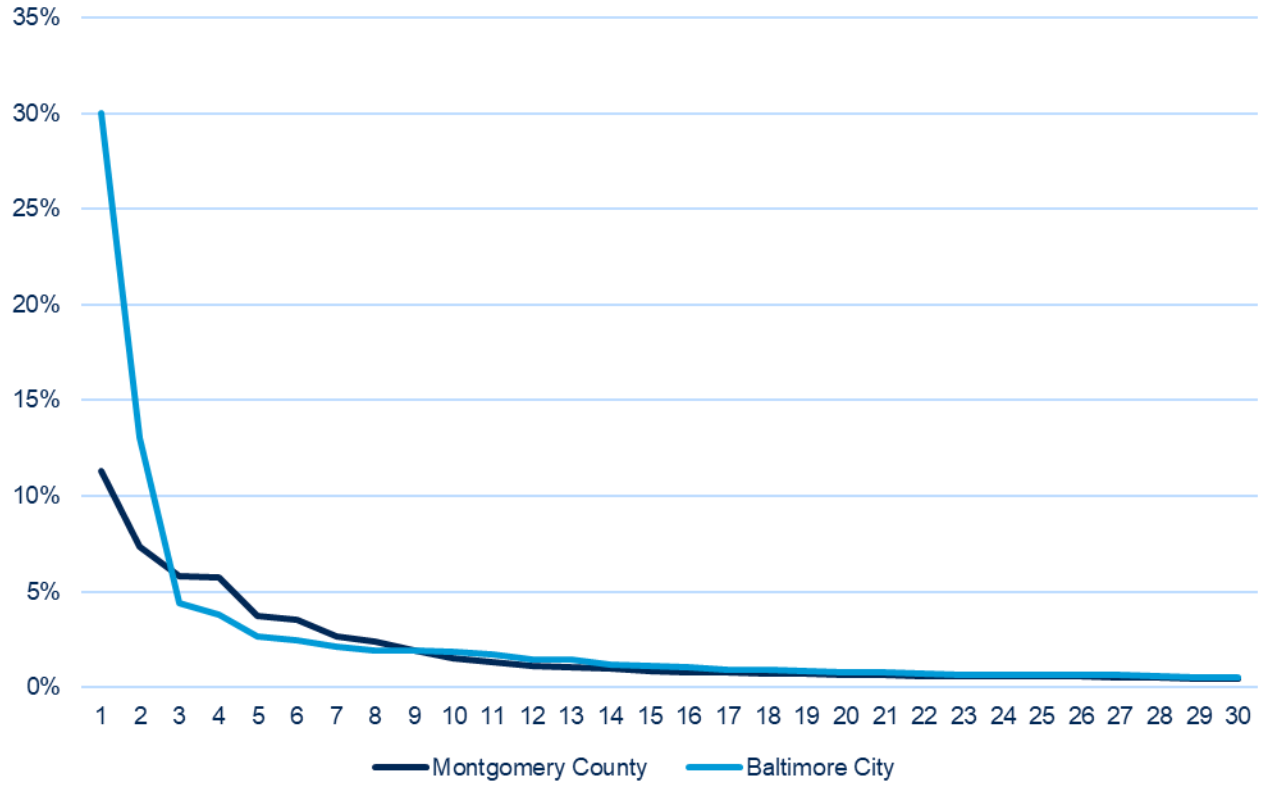
Montgomery County and Baltimore City both publish their 3-1-1 service request data publicly. This study analyzed service requests for Baltimore City covering calendar year 2023 (Jan 1 through Dec 31) and requests for Montgomery County for the 12-month period from Dec. 1, 2023, through Nov. 30, 2024. Details of how the service requests are distributed by channel are highlighted in Table 2.

Of note is that both 3-1-1 operations receive the majority of their requests by voice (phone call): 76.7% for Montgomery County and 58.4% for Baltimore City. Both centers generated nearly 4% of their requests from internal sources (e.g., city/county employees and contractors). The conclusion is that the CRM systems for both centers are tightly integrated with agency systems and requests are moving in both directions. This tight integration complicates potential consolidation approaches, as the alternative to breaking the integrations is to build out new integrations and maintain them.

As was found with the peer group 3-1-1 operations, a large portion of the requests were for basic information. For Montgomery County, 52.7% of the requests in the data set were identified as information requests; for Baltimore City, 30% of requests were informational. Information requests are good candidates for a consolidation approach, as they can potentially be resolved through self-service. Challenges include maintaining the hundreds or thousands of knowledge base articles that might support a single locality and that even basic informational requests might require location tracking via GIS map in order to resolve.

Another commonality with the peer group 3-1-1 operations was the diversity of distinct service request types. Baltimore City maintains 289 unique service request types in its CRM system; Montgomery County maintains 330 unique service request types. The Open311 data protocol does not provide a clear taxonomy of service request types. Both data sets had long tails of infrequently requested services. This study sampled the 30 most frequent requests from Baltimore and Montgomery to determine commonality. Both data sets had long tails of infrequently requested services, as shown in Figure 4. Comparing the specific service requests in the top thirty samples did not yield a discernable pattern. Solid waste (trash) occurred frequently in both jurisdictions top 30 but the specific service requests varied in both frequency and detail. Some requests appearing on one list did not appear to have an equivalent on the other list. The conclusion is that there is no canonical list of 3-1-1 services which applies across multiple jurisdictions; there are many similar services, but the specifics of the service will be unique to each jurisdiction (e.g., process of ordering a new trashcan).

Figure 4: Frequency of Most Common Service Requests*



**Note: This figure charts the frequency of the 30 most common service types in publicly reported 3-1-1 data. For example, the most frequently occurring service request in Baltimore City (1) makes up ~30% of all service requests, the second most frequent (2) makes up ~13%, and the third most frequent (3) makes up ~4%. This visual illustrates the long tail of different service requests found in the data.*

4.2 Identified Challenges

3-1-1 operations require the active engagement and coordination of multiple local departments and service providers to be responsive to their constituency. Given that 3-1-1 operations are governed locally, each program is distinct and may face unique challenges.

This study conducted a series of interviews with executive and operational leadership across Maryland Emergency Management (MDEM) and 3-1-1 operations at both the county and city level to

gain a direct understanding of the state of aryland's 3-1-1 operations. Throughout these interviews, this study assembled a list of common challenges faced across the state.

Call Intake and Citizen Engagement

U.S. residents have several three-digit numbers available to them; 9-1-1 is the best known and other common services that may overlap with both 9-1-1 and 3-1-1 include 2-1-1 and 9-8-8. Many jurisdictions also operate a non-emergency police phone number.

9-1-1 service was implemented in the U.S. in the late 1960s [18] and is supported at the federal level by the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC) [19]. At the state level, models vary from strong statewide governance and funding of 9-1-1 systems to federated 9-1-1 coordination with locals across the state or region. The most common model is the state having 9-1-1 authority for planning, coordination, and funding with local jurisdictions. This is the model adopted by Maryland, with 9-1-1 systems in all 24 counties and independent cities [20].

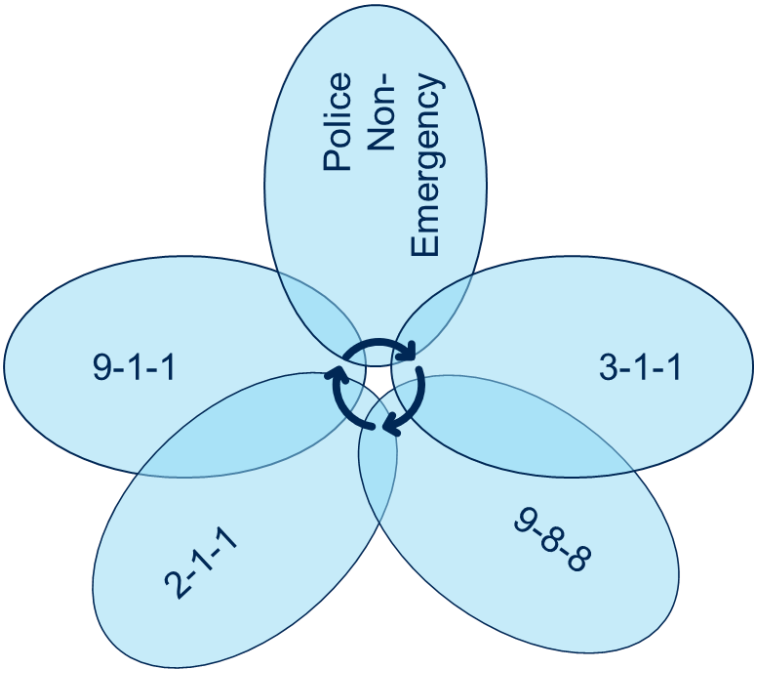
3-1-1 is a more recent, specialize number to provide access to non-emergency city or county services. The first 3-1-1 operation was implemented in Baltimore, Maryland in 1996. 3-1-1 does not have the same kind of support structure as 9-1-1; rather, it is all locally governed and funded. Six 3-1-1 operations operate in Maryland across its 24 counties and independent cities.

2-1-1 is a number for connecting with community and human services. Originating at a similar time to 3-1-1, the first 2-1-1 system was implemented by the United Way of Metropolitan Atlanta in 1997. It quickly grew into a national service with roughly 200 local agencies across the country responding to 21 million requests each year [21]. In Maryland, 2-1-1 is operated as a statewide service by the Maryland Information Network, a 501(c)(3) nonprofit.

9-8-8 is a number for suicide prevention called the *9-8-8 Suicide & Crisis Lifeline*. 9-8-8 was launched in 2022. Since launching, 9-8-8 centers have received over 6.4 million calls, 1.4 million chats, and 1.6 million texts [22]. The Maryland Department of Health is tasked with managing the 9-8-8 program and administering a trust fund for the program.

The overall question of " ho should I call?" can be further complicated by non-emergency police lines intended for police matters not requiring an immediate dispatch, such as reporting an overnight car break-in. The overlap between these services is represented by the graphic in Figure 5.

Figure 5: Common Government Service Numbers



The individual services have clearly defined scopes. One slogan used to represent this is "*Burning building? Call 9-1-1. Burning question? Call 311*". However, not every situation is clearly defined. In interviews conducted by this study, Maryland 9-1-1 directors described high volumes of calls to the 9-1-1 service that were not emergencies. One director speculated that the call volume was in part driven by the reliability of connecting to a person when contacting 9-1-1. The inverse problem was also noted – calls or emails to 3-1-1 for emergent issues that should have gone to 9-1-1 for an immediate response.

3-1-1 specialists understand the need to refer calls to other services and either advise the caller on whom to call or will facilitate a warm transfer to the correct service. This relies on the 3-1-1 specialist having a sound understanding of when to refer those calls and where to send them, as well as the tools to do so effectively.

This study attempted to measure the overlap of 3-1-1 calls with the other three-digit services, especially 9-1-1 – calls that same into 3-1-1 there were then referred to other services. The 3-1-1 data sets don't have standardization of service request types; two of them included referrals to 9-1-1 or non-emergency police. The numbers here are included as an indicator of how significant this problem might be. The City of Denver dataset included 38 variations of a 9-1-1 referral which accounted for 11.69% of the 3-1-1 calls. The City of Denver also tracked 2-1-1 referrals, which accounted for just a fraction of one percent – 69 referrals out of 452,430 service requests. The City of Austin dataset tracks non-emergency referrals to the Austin Police Department, accounting for 16.85% of the service requests. Austin and Denver both have dedicated police non-emergency numbers.

Jurisdiction (Private Property, Federal, State, Commercial)

3-1-1 service requests are often tied to a location – even requests for information might need an exact location (e.g., what day of the week is my trash pickup?). The location is also important for determining what entity has responsibility for the issue/request or whether a particular service is even offered at that address. This requires a detailed GIS map that will be specific to a city or county and may not exist. In interviews, 3-1-1 directors explained that this is a different map layer than what is used for 9-1-1 and an existing 9-1- GI map isn't interchangeable with a 3-1-1 map. A consolidation requirement would have, as a prerequisite, a GIS project in each county to determine what GIS data already existed and what gap there might be between existing maps and what effort would be required to bridge that gap.

Integration with County/City Systems

In interviews with 3-1-1 directors, a common technical architecture was to use a center CRM system to do the initial request intake and then pass the service request to the office or department that

would fulfill the request. Those recipients were either using the CRM system itself to work the request or the request was passed into a department-specific system to be worked, and then passed back to the CRM system. Both of these scenarios create challenges for a consolidated model. In the case of employees working requests inside of the CRM, the county would still need a CRM system and then would need to integrate it with the consolidated system (assuming the consolidated system is creating service requests). In the case of employees working requests inside a line of business system, an integration would also need to be created to pass tickets with the consolidated system. These integrations can be complex even inside a single county; one of the counties interviewed was running a project to implement an enterprise service bus to better manage all of their existing integrations. In either case, the resulting system would have more potential points of failure than a county specific system.

Police Non-Emergency Lines

A special case of the integrations described above is the potential existence of a dedicated line for police non-emergencies. Examples of types of issues that might go to a non-emergency line include reporting burglary or vandalism where the suspect is not present; nuisance complaints like barking dogs or noise complaints; and administrative matters like requesting a report for an insurance claim. There is no standard criteria for which types of calls should go to a police non-emergency line and not every jurisdiction has a non-emergency line. In a consolidation scenario, there could potentially be a mix of counties with and without non-emergency lines, and with different sets of requests that would be handled by the non-emergency line. In at least one of the 3-1-1 datasets this analysis looked at, the non-emergency line/service was integrated and able to accept service requests that originated in the 3-1-1 center.

Governance, Responsibility, and Accountability

Currently, 3-1-1 operations are managed at a local level. A consolidated model would require another level of governance above the county level to coordinate decision making. Maryland has a robust 9-1-1 governance structure that could be a model for setting this up. This was considered in the 3-1-1 discussion in Appendix E of the 2021 NG9-1-1 Commission Annual Report [23].

Funding Models

3-1-1 operations are also funded at a local level. A consolidated model would require an additional funding stream, perhaps appropriated at the state level. For reasons described below, there are unlikely to be material savings at the county level for existing 3-1-1 centers, so a consolidated model should not anticipate being funded out of existing county 3-1-1 spend.

Investments in Existing 3-1-1 Centers

For counties with an existing 3-1-1 center, as described above, tight integrations with departments would require that most or all of the infrastructure remain supported and in production.

Public Awareness and Education

This study was unable to quantify the impact of 3-1-1 marketing campaigns on usage of the service through public data. Anecdotally, 3-1-1 directors stated that public awareness campaigns were an important part of driving adoption of the service and making the public aware of other channels, such as mobile applications, and produced a high return on investment when conducted. In a consolidated model, this would be doubly important as the state would be creating a new model for delivering 3-1-1.

5.0 AI Integration Opportunities

5.1 AI In the Contact Center

Evolution of Contact Center Technologies

Among competing communication methods in the 1930s, advances in voice communication represented the leading edge of technology innovations when Homer Dudley, researcher at Bell Laboratories, debuted his Voder machine at the World's Fair. An electronic device controlled by a human operator, the Voder was the first device capable of mimicking the human voice to create a recognizable form of synthetic speech [24].

Too coarse to integrate into telephony systems, Bell Laboratories built on udley's creation to develop other methods of making voice communication more efficient, including the first dual-tone multi-frequency (DTMF) system with the familiar four-column keypad we use today, supplanting rotary dials [25]. Launched publicly in 1963 under the trademark *Touch-Tone*, DTMF allowed callers to interact with automated response systems by cycling through a menu of options and making selections using their phone's keypad, the precursor to what would become early rule-based voice recognition known as Interactive Voice Response (IVR) in the 1970s.

Also in the 1960s, advances in Natural Language Processing led to the release of ELIZA in 1966, a rules-based chatbot developed by Joseph Weizenbaum at MIT and widely regarded at the first computer program capable of conducting a human-like, text-based conversation. ELIZA generated some controversy, as several researchers in the field regarded it as the first technology capable of passing the "Turing est", a measure of whether or not a human user could correctly determine if they were interacting with a machine or another person [26].

By the 1970s, early database systems, such as those developed by Oracle, were commonly used by organizations to digitize customer information and manage contacts. Tom Siebel left Oracle in 1993 to found Sibel Systems and develop his own Sales Force Automation (SFA) product, which lead a host of upstart competitors aiming to serve the growing e-commerce market into developing what would become known as Customer Relationship Management (CRM) systems [27].

Innovations like DECIHPER, developed at the Stanford Research Institute, offered users the option of basic voice interactions with a computerized system via products such as Nuance Speech Recognition, adopted by Charles Schwab & Co. in 1996 to allow customers to receive stock quotes [28].

The new millennium saw the development and proliferation of transformative technologies such as cloud computing, allowing for the digitization and cost-effective hosting of information at an unprecedented scale. Likewise, advances in semiconductor technology allowed for efficient processing of that data on a similarly unprecedented scale, enabling breakthroughs in machine learning research such as Long Short-Term Memory (LSTM) [29], which introduced a new era of machine translation, sentiment analysis, text generation, and natural language understanding.

Contemporary contact center systems represent the convergence of these technologies into unified solutions available via varying commercial models and degrees of functionality and customization, enabling sophisticated text-based conversational interactions, advanced voice features, highly capable contact management, and even end-to-end workflow automation in a single product.

Real World Benefits

The first major study in the present decade on the effects of contemporary AI systems in a customer service environment, *Measuring the Productivity Impact of Generative AI*, was published by The

National Bureau of Economic Research (NBER), where researchers Erik Brynjolfsson, Danielle Li, and Lindsey R. Raymond studied its effects on customer service outcomes across nearly 5,000 agents at a Fortune 500 company between November 2020 and February 2021 [30]. The AI tool was intended to support the work of human customer support agents, offering them potential responses to customer queries. The agents in the treatment group could choose to take those suggestions or ignore them and enter their own responses.

Among the many insights, the study found that, "*agents using an AI tool to guide their conversations saw a nearly 14 percent increase in productivity, with 35 percent improvements for the lowest skilled and least experienced workers, and zero or small negative effects on the most experienced/most able workers*" and that, "*agents utilizing the AI tool increased the number of customer issues resolved per hour by 13.8 percent*." The researchers attribute the increase to three factors: agents, who could participate in multiple chats at once, spent about 9 percent less time per chat, handled about 14 percent more chats per hour, and successfully resolved about 1.3 percent more chats overall. Measures of customer satisfaction showed no significant change, suggesting that the productivity improvements did not come at the expense of interaction quality.

The researchers also noticed that customers were more likely to express positive sentiments, and less likely to request help from a supervisor, when interacting with agents using AI assistance than when interacting with those who were not. Perhaps reflecting the improved tenor of the exchanges, attrition rates among agents with access to the AI tool were 8.6 percent lower than the comparable rates for agents without such access [31].

The conclusions are that there are real benefits to both end-users (residents in the case of 3-1-1) *and employees* (3-1-1 Specialists) from the effective implementation of contemporary AI tools in a contact-center context.

In what has become a canonical study of real-world outcomes from applied AI, *Navigating the Jagged Technological Frontier: Field Experimental Evidence of the Effects of AI on Knowledge Worker Productivity and Quality* [32], researchers from Harvard Business School and the Wharton School at the University of Pennsylvania studied the outcomes of access to advanced AI tools on 758 management consultants performing 18 realistic consulting tasks related to so-called "kno ledge ork", focusing on tasks involving skills such as creative problem solving and quantitative analysis.

Researchers found that those, "*using AI were significantly more productive (they completed 12.2% more tasks on average, and completed task 25.1% more quickly), and produced significantly higher quality results (more than 40% higher quality compared to a control group).*" Similarly to the NBER study, the study found that users, "*across the skills distribution benefited significantly from having AI augmentation, with those below the average performance threshold increasing by 43% and those above increasing by 17%,*" compared to an established baseline.

The conclusions are that there are also benefits across a range of work tasks outside of the context-center context and that Maryland should consider enhancements both to resident-facing interactions *and* to internal ways-of-working as an important outcome to target from the application of AI to 3-1-1.

Since these studies, thousands of AI deployments have occurred by commercial organizations as well as state and local governments. Two recent examples from New York supported the modernization of aging technology infrastructure at the Department of Motor Vehicles [33], involving the synthesis of disparate and poor-quality datasets and consolidation of a wide range of integrated legacy technology systems, and enhanced citizen interactions with a ounty lerk's office to better understand what information residents are seeking and how to provide that information as quickly and automatically as possible, involving only two county employees and resulting in a decrease in incoming calls of nearly two-thirds within four months of launching the tool [34]. Other examples across state and local government are published frequently, demonstrating that well executed AI deployments can lead to myriad tangible and intangible benefits such as (but not limited to)

increased accessibility of government services (e.g., 24x7x365 availability, adaptable modalities), enhanced quality of outputs, and step-function improvements in resident satisfaction with government services.

The conclusions are that it is possible for a state government to deploy both local and statewide AI solutions in a safe and effective manner, involving some of the same complications and goals of a statewide 3-1-1 portal, if barriers are effectively identified and addressed. According to Gartner's *2025 CIO Agenda* survey of 3,186 Chief Information Officers and IT Directors including 136 State and Provincial Government IT executives, 52% of State and Provincial respondents expect to have AI deployments in production in 2025 (including Generative AI), with those planning AI deployments by 2027 rising to 93% of respondents [35], underscoring the commitment of State and Provincial leaders to invest in overcoming these challenges to improve government services.

Substantial Risks

Deploying AI solutions, especially those used to interact with residents, involves the identification and robust mitigation of a wide range of risks. The demand for Generative AI solutions in the contact center context, leveraging Large Language Models (LLMs), introduces unique risks made all the more challenging by the rapid development of Generative AI technologies.

Unlike Descriptive machine learning models that specialize in performing specific tasks on existing data (e.g., classification, prediction), Generative AI is designed to generate new data applicable to a wide range of tasks and use cases. Generative models do so probabilistically, iteratively determining the highest-likelihood word in a sequence (next-token prediction) given what it has learned from its training data (pretraining) and the words provided to the model to "prompt" a response (context).

The probabilistic nature of Generative AI means that these models rely heavily on common, predictable words or patterns that they have seen frequently in their training data, leading to a lower probability of accurately sampling the correct information in cases where that information represents a small proportion of their training data or is absent altogether. In the absence of sufficient data, Generative models are more likely to produce a response that does not align with the goals or content of the prompt, leading to what have been colloquiall referred to as "hallucinations."

It is important to note that Generative AI differs from traditional software in that it does not reliably produce exactly the same responses every time by retrieving and delivering information word-for-word. Rather, the fact that Generative AI *generates* a net-new response every time it is prompted for one means that there will *always* be a possibility that the model could produce an inaccurate response, particularly in instances of out-of-sample or missing data. In the context of 3-1-1, this study found that publicly reported 3-1-1 data exhibits a long tail of infrequent and widely dispersed issue types (Section 4.1, Table 4), highlighting the acuity of this issue in the 3-1-1 domain.

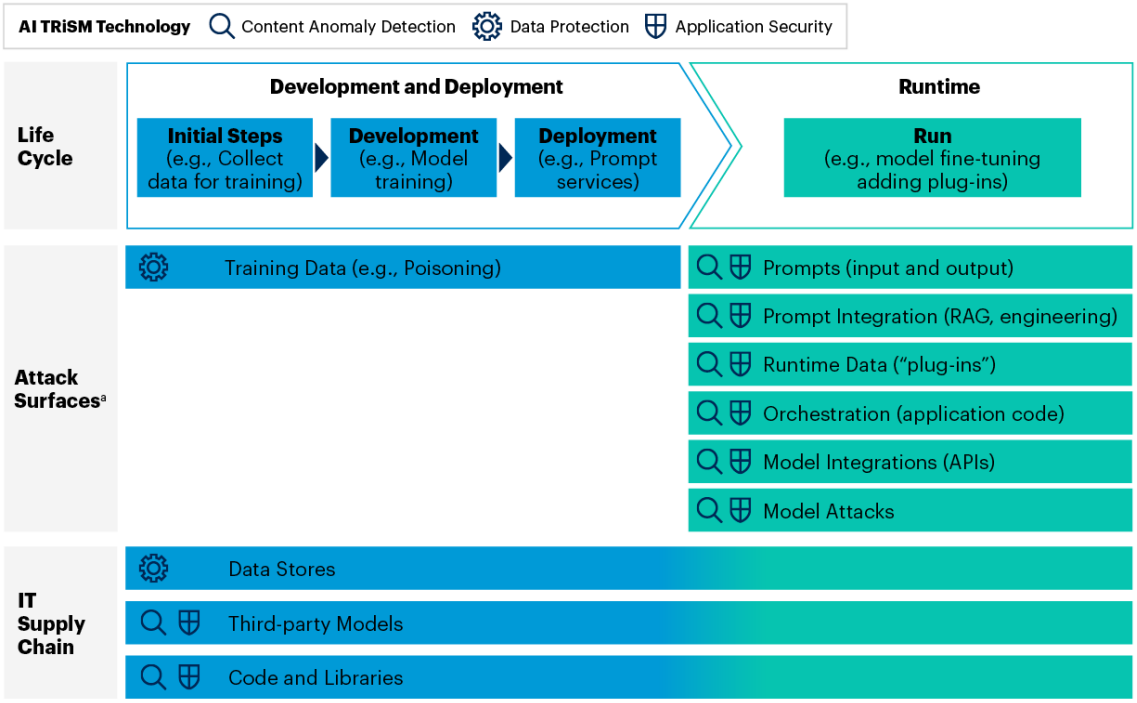
Techniques used to increase the accuracy of Generative model outputs by "grounding" its responses in specific information include experimentation with different prompting strategies, where additional context is given (typically by the user) in the prompt to guide the model, Retrieval Augmented Generation (RAG), where proprietary organizational information is provided to the model from a database to enhance the fidelity of its output, and Fine Tuning (FT), which enhances the model by further training it on high-quality, organization-specific information that updates the model's weights to perform better on specific tasks. It is the experience of subject matter experts involved in this study that most successful Generative AI deployments utilize a combination of these techniques to achieve desired performance levels, but each involves a high degree of technical expertise and domain knowledge to implement well.

There are many other substantial risks involved in AI adoption and deployment, including:

- **Security**: New and evolving attack vectors for cyber security incursions.
- **Ethics**: Risks to users and organizations from improper use of AI technologies.

  - Privacy: Risk of exposure of personal or proprietary organizational information.
  - Data: Risk of inadvertent use of copyrighted, illicit, or harmful information hidden in a model's training data.
  - Trust: Reputational risk from a suboptimal deployment of an AI tool.
- **User**: Risks from users blindly accepting model outputs without critical evaluation or actively applying sound judgement.
- **Governance**: Risks from inadequate oversight of AI deployments or ongoing operations.
- **Maintenance**: Risks from failing to account for sufficient resources needed to properly maintain and operate AI deployments on an ongoing basis (e.g., AIOps), including internal knowledge bases.
- **Third-Party**: Risks from actions or failures by third-party vendors such as implementation partners in the deployment and maintenance of AI solutions.

Generative AI Attack Surfaces Across the AI Life Cycle



Source: Gartner
[a] Main sample attack surfaces only; others not shown
796422_C

Though this is far from an exhaustive list of potential risks, resources such as Gartner's Trust, Risk, and Security Management (TRiSM) framework help organizations to identify and mitigate these risks in order to safely and effectively deploy AI tools [36]. Additionally, resources such as *MIT's AI Risk Repository* of over 1000 AI risks and corresponding mitigations [37] and the *National Institute of Standards and Technology's AI Risk Management Framework* (NIST AI RMF) [38] are helpful inputs in designing and enhancing effective risk mechanisms.

5.2 AI Adoption in Maryland

The state of Maryland has taken important steps to support the adoption of AI technologies. In January 2024, Governor Wes Moore issued an executive order titled *Catalyzing the Responsible and Productive Use of Artificial Intelligence in Maryland State Government*, to promote the adoption of I hile, "*respecting individuals, employees, and civil rights, as AI technologies are developed and evolve*" [39].

This executive order establishes the following principles for AI deployment in Maryland:

- Fairness and Equity
- Innovation
- Privacy
- Safety, Security, and Resiliency
- Validity and Reliability
- Transparency, Accountability, and Explainability

The order also establishes an AI Subcabinet tasked with ensuring that AI adoption by the state aligns with these principles and develops an AI Action Plan to implement them statewide.

In January 2025, the AI Subcabinet released the memo *2025 Maryland AI Enablement Strategy & AI Study Roadmap* [40], outlining concrete actions the state will take to "*build momentum*", "*clarify operating models*", and "*increase the pace of experimentation, iteration, and adoption*" of I within the state.

The Study Topics and 2025 Roadmap outlined in the memo includes topics such as Critical Infrastructure and Public Safety, both relevant to the domain of 3-1-1. Consistent with these study topics, AI applications in the 3-1-1 domain covered in this study must align with the operating models, procurement standards, risk management processes, and other findings from related studies and the AI Subcommittee.

5.3 Potential AI Applications in 3-1-1 Operations

Nationwide, 3-1-1 operations vary significantly by jurisdiction. Some programs include a mix of a call center, website, social media accounts and phone numbers with IVR trees, while others may offer just one 3-1-1 option, such as a dedicated 3-1-1 phone line.

Regardless of the offerings, the primary role of a 3-1-1 operation is to handle non-emergency calls, provide resident resolutions to inquiries, route calls to appropriate agencies, and create and ensure the completion of service work orders. These capabilities require strong coordination with other agencies and departments, encouraging the 3-1-1 operation to stay proactive about changes and trends within the jurisdiction to remain responsive to resident needs. Effective internal and external communication is essential for a successful 3-1-1 operation, both to address immediate needs and enhance the municipality's long term operational effectiveness.

AI is increasingly utilized to address the challenges of managing a 3-1-1 operation, with its adoption growing across the marketplace due to its ability to improve efficiency and responsiveness. This study groups potential uses of AI in the 3-1-1 space into the following categories, highlighting the most prevalent, industry-leading solutions from Gartner research in the following categories [41]:

- Customer Relationship Management (CRM) & Customer Experience (CX) Enhancements
- Call & Contact Center Optimization
- Operational Enhancements

5.3.1 Customer Relationship Management (CRM) & Customer Experience (CX) Enhancements

Use cases within this category focus on AI applications that assist residents prior to engaging with a live 3-1-1 specialist. These use cases promote self-service for questions and resolution of information requests to reduce call volume. In addition, these offerings promote accessibility by providing support to residents 24/7 during hours when call centers or service departments are unavailable.

Table 5: CRM & CX Enhancement Use Cases

Use Case	Description	Value
Chatbot for Self-Service	Virtual agent, available on web, text or mobile applications that allow customers to ask routine questions about government services. Responses derive directly from government content. Add-ons available to enhance user experience (e.g., such as translation services, service request handling, etc.)	**Mission impact:** Enhances government accessibility due to 24/7 availability. Users can navigate to one source to resolve most questions. **Efficiency:** Reduces the number of calls/emails contact center or government department receives. **Risk management:** The chatbot is trained solely on government approved content and is adaptable to adjust to growing agency needs. **Non-financial:** Promotes government accessibility, transparency and community participation.
Steps by Steps Services	Provides a guide for users to complete various government tasks such as completing forms or detailing different procedures. This can also be paired with translation services to provide guidance to non-native speakers. Can be offered in replacement of a digital form, used as a set of instructions for a digital or physical form and serve as a QA check prior to document submission.	**Mission impact:** Increases clarity on government processes and procedures. Allows more accurate processing of information. **Efficiency:** Reduces citizen errors in filling out forms, reduces call volume and administrative back-end processing. **Risk management:** It reduces the risk of form incompletion and reprocessing. It reduces contact center wait times, lines at administrative offices and paperwork processing. **Non-financial:** Improved customer experience in completing government forms and improved form quality.
Smart Escalation	The ability for a chatbot or IVR solution to know when a situation needs to be escalated directly to a live agent and accurately route the call. In cases of emergency, the call can be routed to the 9-1-1 line.	**Mission impact:** This may have marginal mission impact as most users are more likely to contact 9-1-1 for emergencies than 3-1-1. The amount of emergency calls that are received by 3-1-1 operations should be determined before implementing solution to determine cost-benefit. **Efficiency:** May provide for a better customer experience, however, if other AI tools are not well implemented, can result in users

Use Case	Description	Value
		manipulating feature to reach a live agent faster. **Risk management:** Emergency calls will promptly be routed to the 9-1-1 service line. When paired with transcript/post-call summary, can provide 9-1-1 agent enough context to provide a faster dispatch and response time. **Non-financial:** Emergency calls will be routed to the correct jurisdiction.
Interactive Voice	A virtual agent that can service calls and derive context through natural language. The virtual agent is capable of understanding intent and acknowledge customer context to direct the customer to the appropriate channel.	**Mission impact:** Promotes self-service technology, engagement and accessibility while reducing the need for live agent support and IVR usage. **Efficiency:** Can provide a more tailored experience for customer, serving as an enhanced “search” feature through conversation to directly identify need without listening to IVR call menus, searching various websites or talking to a live agent. **Risk management:** More accessible customer service feature. **Non-financial:** Promotes self-service technology for information-related questions to be answered without routing to a AGENT or utilizing IVR. Capable of being paired with translation services to provide additional self-service support for non-native speakers.

5.3.2 Call & Contact Center Optimization

Use cases within this category focus on improving the contact center experience for callers in addition to 3-1-1 specialists. These use cases focus on simplifying the interaction between the resident and agent, facilitating efficient and effective call handling, standardizing processes, and improving workflow through the elimination of arduous tasks and the incorporation of process automation.

Table 6: Call & Contact Center Optimization Use Cases

Use Case	Description	Value
IVR – Call Transcript and Summary Creation	The generation of a transcript and summary after a customer leaves a self-service platform such as Chatbot Voice or IVR to provide insights for a live agent.	**Mission impact:** Supports live agent in understanding context of calls prior to engaging with customer, providing a faster and more seamless customer experience. Reduces call time as it limits the amount of repeat information the customer will need to provide. Agent will be able to provide more efficient and tailored support for customer.

Use Case	Description	Value
		Risk management: Quality assurance processes must be enabled to sample transcripts for accuracy, errors or other quality issues or liabilities. **Non-financial:** Agent will have opportunity to research answers to unknown questions prior to customer engagement and have the opportunity to route calls accordingly.
Translation Services	AI can be used to provide real-time translation for customer service representatives, improving support for non-native language speakers.	**Mission impact:** Improves service delivery to marginalized communities. **Efficiency:** Reduces handoff of calls with language issues. **Risk management:** Performance on out-of-sample languages may be sub-standard relative to human translation. **Non-financial:** Improves accessibility of services for non-native language speakers.
Real-Time Agent Advisor	A tool that processes live calls and provides recommendation or suggestions to the agent. This can include providing information such as contact details and department hours as well as insightful data to be aware of (road closures, traffic conditions, etc.)	**Mission impact:** Increases serviceability and integration across platforms. Data provided by AI tool can ensure accurate data is being shared to callers as it relates to recent changes that may be difficult for the agent to access. **Efficiency:** Provides additional support for live agent, enabling accurate information to be shared with the caller in addition to faster issue resolution time and call times. **Risk management:** While the AI tool will improve with time, errors can still occur. Quality control of AI responses and training of system is required to determine which suggested information requires human validation. Similarly, agent must be trained to discern and validate what is appropriate to share with caller. **Non-financial:** Improves customer experience by providing accurate real-time responses. Enhances workforce support and training for agent.
Emotion Detection	Uses effective computing to analyze the emotional state of a customer via computer vision, audio/voice input, sensors and/or logic.	**Mission Impact:** Offers minimal impact for the mission of a 3-1-1 operation but provides insight on user satisfaction and potential. **Efficiency:** No short-term efficiencies to highlight but continuous feedback may result in

Use Case	Description	Value
		long-term process changes that can make the 3-1-1 operation more efficient. **Risk management:** Can be utilized to determine user satisfaction and highlight potential internal process improvements or training opportunities/support for customer service agent. **Non-financial:** Provides real-time feedback from customer.
Live Calls — Post Call/Conversation	A tool that provides notes at the end of the call for a record of the conversation.	**Mission Impact:** Supports back-end administrative process of maintaining accurate call records. **Efficiency:** Reallocates the time a live agent spends writing notes after a call. **Risk management:** Provides a more accurate record for calls. Logs are recorded in standardized English, reducing spelling and grammar errors and increasing the quality of all call notes. **Non-financial:** Provides additional support to live agent, potentially increasing workplace satisfaction as mundane tasks are optimized.
Agent Training Feedback	AI can be used to develop training plans and materials based on real-world simulations based upon previous customer behavior.	**Mission impact:** Training and AI-generated feedback utilizing real-world scenarios will enhance employee training and onboarding process, improving customer service and supporting workforce. **Efficiency:** Improves efficiency and service quality of staff in training. **Risk management:** Training scenarios will be updated more frequently, allowing for more realistic contextualization based on changes in the community. **Non-financial:** The experience of training will be improved by regular updates that prevent content from becoming dated or stale.

5.3.3 Operational Enhancements

Use cases within this category focus on improving the operational systems that support a 3-1-1 operation. These use cases primarily identify opportunities related to the service request life cycle, programmatic workflows, and program communications to make a 3-1-1 successful and effective.

Table 7: Operational Enhancement Use Cases

Use Case	Description	Value
Ticket Status	An AI agent can look up and provide a status of a previously issued service request. Upon call generation, a note is added to previous ticket to alert responding agency of request.	**Mission Impact:** Increase transparency within organization on response times for service requests. Tool can be used to provide update to public on status of request and/or to increase inter-governmental collaboration. **Efficiency:** Increases oversight and awareness on status requests without the need to contact a live person. May reduce call volume. **Risk management:** Allows governing agency to run reports and assess if serviceability performance metrics are being met. **Non-financial:** Success depends on a high adoption rate. Agencies must be responsive to updating status of orders. There may be resistance as implementation may be seen as invasive of individual county or departmental autonomy.
Service Request Handling	The ability for a service request to be generated and submitted to the appropriate agency. The service request is compiled either through the self-service platform (Chatbot or IVR) or drafted after call resolution with a customer service representative and sent upon live agent confirmation.	**Mission impact:** Enables non-emergency requests to be documented and submitted without human intervention 24/7. **Efficiency:** Reduces the number of non-emergency calls to 9-1-1 emergency line due to afterhours service requests. Limits the back-end processing for agent and agency staff as no callbacks are necessary and agent have less documentation to fill out. **Risk management:** Controls will need to be instituted to ensure service requests are routed to the appropriate agency and are received. If executed well, faster processing of service requests is expected. **Non-financial:** Users can make requests outside of normal business hours and may opt to submit requests via self-service, allowing resources to be allocate to higher priorities. Responding agencies will be more responsive to community needs due to faster processing times.

Use Case	Description	Value
Call Routing	Uses predictive methods to determine and route the customer to the best department resource to service their request.	**Mission Impact:** Allows customers to reach the correct agency or agent for quicker problem resolution. **Efficiency:** Both the agency and customer save time as the right people are connecting. **Risk management:** When linked to a shared HCM system/platform, information can be kept current without manual intervention. However, if non-existent, frequent oversight is required to ensure data is kept current so calls are appropriately routed. **Non-financial:** Builds community trust and reduces confusion and frustration associated with attempting to contact the appropriate department.
FOI Requests	AI can be used to draft freedom of information (FOI) responses, to confirm that correct and current data is being provided.	**Mission impact:** Assists in meeting transparency obligations within diligent response times. **Efficiency:** Reduces administrative effort in delivering FOI responses. **Risk management:** Reduced risk in failing to meet regulatory requirements for timely response to FOI requests. **Non-financial:** Improved response times.
Suggest updates/notifications and messaging to external facing platforms and websites	AI can be used to create draft multimedia and social media content for announcements and community awareness on public facing platforms.	**Mission Impact:** When connected to agency systems (CRM, CAD, etc.) can streamline governmental communications by automatically generating draft communications for finalization. **Efficiency:** System can be trained to follow specific formats and rules, enhancing consistency, compliance, reducing spelling errors, time spent and expedite the approval process. **Risk management:** Relevant and important updates will be communicated more efficiently, increasing public awareness. **Non-financial:** Will bolster governmental responsiveness and citizen awareness of

Use Case	Description	Value
		important issues without the need to directly engage with 3-1-1 operation.
Predictive Maintenance and Analytics	Use predictive measures to identify potential service needs or process improvements.	**Mission Impact:** Provide suggestions and proactive support among the governmental agencies to protect, notify or service impacted governmental infrastructure or the public prior to an escalated event. **Efficiency:** Utilizes data from ticketing data, work orders, prior calls and other sources to identify potential service needs prior to occurrences. Can strengthen budget forecasting, response times, service costs, and reduce future service calls. **Risk management:** Assists in the prevention of escalated service requests and increases government response times. **Non-financial:** Assists in the oversight and management of future needs

6.0 Consolidation and Integration

There are two primary concepts to consider for the consolidation and/or integration of 3-1-1 capabilities — operational and technical – that support the ultimate objectives of providing the best possible 3-1- service to the citizen (or 'customer'). These concepts are important to providing some degree of Statewide 3-1-1 capabilities and functionality as well as realizing efficiency gains and other tangible benefits.

The operational and technical approaches explored in this section are not mutually exclusive, instead, each approach can be paired in various combinations to create a tailored solution that is most effective and sustainable for the State. Some operational consolidation approaches described in this section may require some degree of technical consolidation, integration or other form of rationalization. Each concept presents a range of approaches to consider across a spectrum from collaborative policies and procedures to some degree of technical integration to full consolidation of operations and/or supporting technologies.

The terms 'consolidation' and 'integration' have discrete differences to note. The term 'consolidation' generally refers to two or more discrete entities (such as 3-1-1 operations, or 3-1-1 operations) merging or replacing one another, such as two centers consolidating into one center. The term 'integration' here refers to two or more discrete entities (typically IT / technology systems) creating some form of link or bridge between one another for the purposes of achieving a specific outcome, such as data sharing. These approaches, together with relevant planning considerations and other related insights, are discussed in this section.

6.1 Operational Approaches

Operational approaches to achieving greater Statewide 3-1-1 standardization and overall improvements are primarily concerned with introducing changes to the 3-1-1 operation (people, process and organizational elements) without necessarily making significant changes to the application functionality, systems and underlying IT capabilities that supports those operations.

While technological improvements may be necessary to support certain operational changes, typically, these initiatives focus less on the technological solutions that are being offered and are prioritizing the 'ho ' the services are being delivered. At the highest level, the Operational approaches considered to achieving Statewide improvements to its 3-1-1 capabilities are via collaborative models and consolidated models.

6.1.1 Collaborative Operational Approaches

A collaborative approach is when the State tries to promote and increase standardization across the various 3-1-1 operations. These approaches mandate a greater level of statewide consistency without making any fundamental changes to the existing 3-1-1 operations, data facilities or technologies.

Below are potential avenues the State could explore in a collaborative model:

- **Standardize Definitions and Protocols**
  - The State can review and mandate the standardization of terms relating to a 3-1-1 operation, notabl identifying hat is 'non-emergency' and delineate when 3-1-1, 988, 211 or 9-1-1 should be utilized. Creating business standards will help build collective understanding within existing programs, enabling easier cross-training and development of performance standards.
- **Marketing and Outreach / Public Education**
  - Currently the responsibility of marketing the different 3-1-1 operations is the responsibility of the jurisdictions. Under this model, in coordination with the jurisdictions, the State would sponsor the outreach of the 3-1-1 operations to local communities and provide education materials for the public to understand the 3-1-1 resources available to them.
  - This campaign would inform the public of the definitions 3-1-1, 9-1-1, 988, 211 or the non-emergency number and the appropriate use cases of when to utilize each platform. For this effort to be successful, the State will need to work closely with local jurisdictions to standardize the definitions and use cases of a 3-1-1 service.
- **Process and Workflow (e.g. Scripts and Prompts for Operators)**
  - Working with current 3-1-1 operations, the State could standardize the scripts and prompts for operators who service the call centers.
  - Consistent prompts will assist in training efforts while providing a consistent user experience for all residents.
- **Branding (e.g. Look and Feel)**
  - The State could lead the 3-1-1 marketing effort for public awareness by creating a general 3-1-1 image that is agnostic to the jurisdiction.

6.1.2 Operational Consolidation Approaches

For over two decades, consolidation efforts were a prevalent trend within the 9-1-1 space across the country. While 9-1-1 and 3-1-1 serves distinct purposes, observing the strategies within the 9-1-1

space can provide value insights and best practices that can inform the development and consideration of potential 3-1-1 integration strategies.

Historically, 9-1-1 consolidation has primarily occurred at the municipal level. As discussed earlier in this document, statewide 9-1-1 models have proven to be largely governing bodies, custodians of some level of centralized funding and in some cases, offering 9-1-1 centers / PSAPs with a common 9-1-1 call taking solution the PSAPs can opt-in or opt-out of. For example, California provides a statewide 9-1-1 call handling solution but allows each PSAP the option to participate or utilize their own system. Whereas in Indiana, all PSAPS are required to use the statewide 9-1-1 call handling solution. However, in both cases, the State allows each PSAP to procure their own Computer-Aided Dispatch (CAD) system.

Other operational models focus on *co-location* of operational services. For example, New York City houses their 9-1-1 operations for the police and fire department within the same building, enabling shared call handling and dispatch abilities while continuing to utilize separate technologies and networks. Additional co-location models, such as in Aurora, Colorado and Calgary, Alberta have similarly integrated their police and fire call operations and dispatching while also shifting their resource model so civilian personnel monitors the operation so sworn officers can be utilized on the field.

Another common consolidation approach seen within the 9-1-1 space is for a large PSAP to provide call-handing and dispatch services for smaller jurisdictions, while allowing the smaller jurisdictions to maintain operational control, often referred to as *regional 9-1-1 consolidation.*

Although the scale and operational requirements of a 3-1-1 operation differs from 9-1-1, the consolidation use cases shown within the 9-1-1 space provide relevant considerations for considering a more integrated 3-1-1 operation for the State.

Leveraging the trends seen within 9-1-1, potential 3-1-1 operational consolidation models could be:

- **Regional 3-1-1 Expansion of Call Center Services**
  - Similar to the 9-1-1 scenario, the State of Maryland would potentially stand up a 3-1-1 call center solution with the option for jurisdictions to opt-in, procure their own solution or encourage the larger jurisdictions, such as Montgomery County or The City of Baltimore, to provide 3-1-1 call center and dispatch services for the smaller neighboring cities.
- **Consolidation of Physical Locations**
  - This model focuses on the co-location of physical spaces that support the various 3-1-1 operations within the State. Locations such as call centers, training facilities or data centers are consolidated and housed within the same building(s) but the technological solutions and networks for the individual programs remains separate.
- **Consolidation and Reconciliation of Staffing/Personnel/Roles**
  - In this model, the State would centralize IT support and be responsible for maintaining the various Systems and portals.

Operational consolidation could also just consider the consolidation and reconciliation of the IT capabilities (resources, staffing, roles) across the State whereby the 3-1-1 operations themselves remain operational but are serviced and maintained by a central State 3-1-1 IT function.

Operational consolidation would require a level of technical consolidation or integration with the front-end (software, channels, applications) and back-end (hardware, technical facilities) systems. Depending on the approach, these integrations may vary in terms of solutions required, work effort (development, operational, physical), and ongoing maintenance which can impact consolidation cost.

Planning Considerations

Operational integration/consolidation approaches can provide several advantages for a state-supported 3-1-1 operation, such as:

Cost: Among the primary benefits is the potential for cost efficiencies as consolidating operational personnel, IT functions, or physical facilities could lead to reduced expenses for individual 3-1-1 operations.

Customer Service and Operational Improvements: By establishing a consistent 3-1-1 operation across the state through uniform policies, practices, branding and communication, there will be improvements in the resident service quality and experience interacting with any 3-1-1 center. This may also improve personnel training and reduce misdirected calls to 9-1-1 or other service lines due to greater public awareness and understanding.

Improved Reporting: Standardized processes and workflows would enable improved reporting, allowing the State to monitor performance, set expectations through established Key Performance Indicators, and make data-driven decisions.

Extend Service Offerings: Many of the integration strategies could increase 3-1-1 coverage across Maryland due to the State covering the costs for additional capabilities. Operational integrations/ consolidation approaches also present challenges that must be kept in mind for implementation success, such as:

- **Governance:** Many of the integration strategies necessitates the creation of an effective framework for decision-making, policy development, planning, responsibility allocation and ongoing maintenance. Counties will need to collaborate on how data will be owned, managed and maintained. Additional coordination will also be required with state stakeholders, a workflow process which was previously unnecessary.
- **Near-Term Customer Service Impacts:** Transitioning to a new operating model may temporarily disrupt service levels for existing 3-1-1 operations. This may place an additional strain on present resources as well as external stakeholders like 9-1-1, 9-8-8 and 2-1-1. To reduce impact, the State must develop and execute an organizational change management strategy plan, ensuring all stakeholders are informed of any operational changes and potential impacts.
- **Operational Continuity:** Significant operational changes will require a re-evaluation and update to any business continuity plans to ensure that the operation remains uninterrupted and effected throughout and beyond the transition period.
- **Cost:** Some of the integration/consolidation approaches involve significant upfront implementation costs for necessary technology solutions, which may require the use of capital funds and increase state operating costs.

6.2 Technical Approaches

Technical strategies focus on additive features and new capabilities that the State could employ to support the multiple 3-1-1 operations that exist. Potential 3-1-1 technical approaches that can be considered are as follows:

- **Statewide 3-1-1 Portal**
  - Integration between local 3-1-1 operations and a new Statewide 3-1-1 portal would provide a common, consistent customer facing 3-1-1 portal.

  - The portal could function as a means of directing citizens to their relevant 3-1-1 operation or other relevant government agency or could provide more advanced capabilities as discussed below (such as a Unified Chatbot or an AI Virtual Assistant).
  - The 3-1-1 portal could be supported by an existing domain / website (e.g. MD311.gov), that links to the existing 3-1-1 operations within Maryland. The scale of this solution is flexible, ranging from a single website that serves as a routing function,

- **Statewide 3-1-1 IVR**
  - Similar in concept the statewide 3-1-1 portal, a statewide 3-1-1 interactive voice response (IVR) solution would provide a common, consistent customer facing 3-1-1 portal and could function simple as a means of directing citizens to their relevant 3-1-1 operation or other relevant government agency.
  - A statewide 3-1-1 IVR or could provide more advanced capabilities with voice recognition technology as discussed below (such as a Unified Chatbot or an AI Virtual Assistant).
- **Unified Chatbot**
  - The State can offer a unified Chatbot solution that all jurisdictions can opt into, whether they have a formal 3-1-1 operation. A chatbot designed to work across jurisdictions can answer general questions, provide basic information and direct users to primary sources such as phone numbers and websites when it cannot resolve an inquiry.
  - Integrating chatbot with GIS would further enhance its functionality by recognizing jurisdictional boundaries. For example, they can inform a resident that their inquiry is a state or federal matter rather than a local one and provide the appropriate contact information. This solution would encourage residents to rely on the chatbot instead of navigating through webpages or calling multiple numbers to find the right point of contact.
  - A well-designed chatbot that accurately routes questions and requests will help residents efficiently navigate their needs, expands public accessibility to government services and reduces the need for live interaction, which saves time for both the public and public workers.
- **AI Virtual Assistant**
  - A virtual AI Assistant could significantly enhance the efficiency and effectiveness of a 3-1-1 center. By leveraging AI, the 3-1-1 operation can provide faster responses to citizens and improve citizen satisfaction.
  - The AI Assistant could be integrated into a 3-1-1 portal (such as the statewide option described above) to support functionality such as automating routine inquiries or provide updates on service requests / tickets logged previously.
  - Integration into the telephony system could also aid reducing call waiting times and support effective call routing, all increasing citizen satisfaction through efficiency gains and customer experience improvements.
  - The AI Assistant could also be integrated to support the IVR scenario described above, recognizing speech and providing intelligent responses to verbal inquiries.

Technical Consolidation

This involves reducing the technological footprint of the different 3-1-1 operations within the State. The approach has several sub-options, specifically:

Statewide 3-1-1 Solution with a Single Vendor

- The State procures and maintains a 3-1-1 solution and mandates that all existing 3-1-1 operations within the State utilize the solution to run their operations.
- This approach could allow the individual 3-1-1 operations to continue operating their own call centers if they are utilizing the state-provided back-end system.
- This model would require each 3-1-1 operation to migrate to a common application that controls some or all of their 3-1-1 channels (call center, website, phones) but each center maintains jurisdictional control over the 3-1-1 operation itself.
- Like the 9-1-1 comparison, the State would need to determine if the single 3-1-1 solution would be mandatory, or if an opt-in / opt-out model is preferred.

Data Center Centralization / Rationalization

- This effort would centralize all hardware and infrastructure supporting one or more 3-1-1 operations, across the tate's -1-1 operations.
- The State would define the current 3-1-1 technical landscape, conduct an inventory assessment, develop a target architecture and facilities design then execute a phased migration plan. After successful consolidation of target assets, a period of monitoring and optimization would be followed by decommissioning of old equipment and facilities no longer needed.

Application Rationalization

- This concept would assess all the applications supporting the 3-1-1 operations and determine which could be retained, consolidated, modernized, decommissioned or replaced.
- In the 3-1-1 environment, the State could host a variety of applications under a single licensing agreement. This effort may reduce operational costs for an individual jurisdiction, consolidate contract management oversight and promote integrations and interoperability between the various 3-1-1 operations. Additionally, the State would have oversight of the applications being used within the State, supporting strategic initiatives as it relates to the future of aryland's IT environment.
- Potential applications that would be assessed are email platforms, helpdesk support, contact management, training vehicles/portals and CRM tools.

Payment Methods and Payment Portals

- Consolidating 3-1-1 payment options provided across the State into a single payment platform / gateway.
- This could have many benefits ranging from improved customer experience through a consistent user experience across all payment types and points of business/transactions across the state through to the potential for cost savings via elimination of duplicate payment functionality, consolidation of payment contracts and service fees.
- This could be implemented in parallel to any 3-1-1 consolidation initiatives or on its own with the existing 3-1-1 operational landscape.

Planning Considerations

Technical integration/consolidation of a statewide 3-1-1 system offers several advantages that can enhance the tate's efficiency and flexibility. ome of the ey benefits are:

- **Cost:** One of the key benefits in undergoing technical integration/consolidation is the potential cost savings through application rationalization. Identifying, streamlining and consolidating the IT applications used throughout State can significantly reduce the total statewide cost of running a 3-1-1 operation.
- **Flexibility:** Through the adoption of a more unified and standardized IT framework, established systems will be more enabled to adapt to the changing needs of the State and capable of integrating new features and technologies.
- **Enhanced Data Sharing:** A standardized framework can enhance data interoperability and data sharing between jurisdictions, promoting better facilitation and more transparency on statewide 3-1-1 trends and needs. The exchange of data will promote data-driven decisions on a state level, support benchmarking efforts and increase collaboration between jurisdictions.

Technical integrations/consolidation approaches also present challenges that must be kept in mind for implementation success, such as:

- **Cost:** While technical integration/consolidation can lead to long-term cost savings, the effort to consolidate disparate systems requires a significant upfront investment. Additionally, the State may reduce the overall IT infrastructure statewide, which would lower the operating costs for local jurisdictions, but the unified model may lead to higher ongoing operational expenses at the state level. *Table 8* below highlights the relative cost for each proposed technical approach.
- **Disaster Recovery:** When undergoing any technical approach, investment is required in ensuring there are strategies and systems in place to restore the functionality and access to data centers in case of disruption or emergency. This would require identifying redundant systems, conducting regular tests and ensuring there is a robust disaster recovery plan in place to address potential threats and vulnerabilities.
- **Cybersecurity:** In any technical consolidation effort, there is an increased risk of system vulnerability. To prevent the risk of a cybersecurity attack, robust security measures must be implemented, such as encryption, access controls and system monitoring.
- **Integration Challenges:** Undergoing any technical approach will require collaboration amongst the different jurisdictions to understand their business rules and needs. The identified solution must be interoperable with the different systems and technologies of each 3-1-1 operation.

6.3 Approach Comparisons

The table below provides a high-level comparison between the consolidation and integration options presented earlier in this section.

Table 8. Comparison Between Potential 3-1-1 Improvement Approaches

	Planning Implications / Impact				Relative Assessment		
Approaches	**People**	**Process**	**IT**	**Org.**	**Complexity**	**Cost**	**Benefit Potential**
Standardize Definitions & Protocols	High	Medium	Low	Medium	Low	$	Low
Marketing, Public Outreach & Education	High	Medium	Low	Low	Low	$	Medium
Process and Workflow	Medium	High	Medium	Medium	Medium	$$	Medium
Branding, Look and Feel	Low	Low	Low	Low	Low	$	Medium
Regional 3-1-1 Expansion of Call Center Services	High	High	High	High	Medium	$$$	High
Consolidation of Physical Locations	Medium	Medium	High	Medium	High	$$$$$	High
Consolidation of 3-1-1 IT Support Personnel	High	Medium	Low	Medium	Medium	$$$	Medium
Statewide 3-1-1 Portal	Medium	Medium	High	Medium	Medium	$$$$	Low-Medium
Statewide 3-1-1 IVR	High	High	High	High	High	$$$$	Medium
Unified Chatbot	Medium	Medium	High	Medium	High	$$$	Medium
Virtual AI Assistant	Low	High	Medium	Low	High	$$$	Medium-High
Single 3-1-1 Solution	High	Low	High	Medium	Medium	$$$$$	Medium-High
Data Center / IT Consolidation	Low	Medium	High	Low	High	$$$$$	High
Payment Methods and Payment Portals	Low	Medium	High	Medium	High	$$$$$	Medium-High

Legend for Ratings and Sample Indicators					
	Low		**Medium**		**High**
People	No or minor changes to existing roles / duties		Role changes, impacts to working routines and work environment		Hiring, attrition, retention issues, changes to job structures, union involvement
Process	Memo or instructional change needed		Augmentation to existing working practices		Major / wholesale new working practices
IT	Limited end user impact		System upgrades or functional changes		Major systems migrations and/or replacements
Organization	Minor changes to daily roles / routines		Some organizational realignment		Major structural changes and/or hiring required
Complexity	Work that can assumed within ongoing daily operations		Project oriented, multiple work streams, requires staffing, vendor procurement, etc.		Program oriented, larger scale.
Cost	$ Operational or sunk costs Time / FTE	$$ Capital funded study or initiative X < $1m	$$$ Capital funded project $1m - $5m	$$$$ Capital funded project $5m – $10m	$$$$$ Capital funded project $10+
Benefits	Intangible e.g. Qualitative user / customer satisfaction		Tangible e.g. Quantitative process efficiencies		Tangible e.g. Quantitative cost efficiencies

6.3.1 Existing 3-1-1 Operations

There are several ways existing 3-1-1 operations would benefit if some level of integration and/or consolidation was done. One of the primary benefits for integration/consolidation for existing 3-1-1 operations is the potential for the State to absorb some of the costs associated with operating and maintaining 3-1-1 services, freeing up funds for local municipalities. Additionally, integration/ consolidation efforts may offer the opportunity to leverage the latest technologies to expand on new capabilities and drive efficiencies in resource allocation, process and workflow and IT Support. In turn, this can expand 3-1-1 service response times and improve the customer experience as it relates to availability, service reliability and portal usability.

Existing 3-1-1 operations will serve as a critical stakeholder to voice to the State what integration/consolidation strategies would be most advantageous to the State and can serve as primary stakeholders in establishing benchmarking and operational best practices.

However, any integration or consolidation effort will be met with a few challenges. One challenge is the need to adjust for additional coordination with state stakeholders. Jurisdictions will need to determine new business rules and governance models as it relates to data ownership, management and maintenance and clearly define ownership roles and responsibilities.

Another potential challenge is the notion that statewide integration/consolidation efforts may result in a risk of “losing local no ledge”, hich can have a direct impact on front line personnel and indirect impact on the public. This risk is largely debated within the 9-1-1 space but can be mitigated by ensuring the involvement and participation of 3-1-1 operation stakeholders throughout the decision-making process.

With time, 9-1-1 consolidation has proven to be advantageous from an operational and technical perspective, primarily in terms of resource efficiencies and the associated cost efficiencies across IT,

vendor management and facilities. Leveraging some of the best practices from that space to help guide potential approaches for 3-1-1 may prove advantageous and reap similar results.

6.3.2 Counties Without 3-1-1 Operations

Jurisdictions that currently do not have a formal 3-1-1 operation would benefit significantly if the State explored potential integrated/consolidated 3-1-1 model. While the distinct benefits would vary depending on the solution approach, benefits would typically be 1) Improved Customer Experience of Existing Services 2) Expansion of Capabilities 3) Opportunity to Create a 311 Program.

Some of the proposed strategies would immediately improve the service capacity on the local level. For example, a statewide ‘ 1’ ebsite or Chatbot would assist the public in being routed to the correct local jurisdiction to request assistance or place a service request. A statewide 3-1-1 public awareness campaigns would help inform the public about 3-1-1, the different resources available to them and informing them when to call the 3-1-1 hotline versus 9-1-1. Additionally, standardizing the definition of an ‘emergency’ and require standardized reporting allo s all local jurisdictions to use the same definitions for public transparency. These improvements may result in higher serviceability on the local level and an improved resident experience without significant local investment or operational change.

Additionally, many of the strategies, if implemented, would by default expand the capabilities of all localities regardless of whether they have a formal 3-1-1 operation. Local jurisdictions could leverage state-provided platforms, such as a centralized 3-1-1 website, chatbot and branding, without the need to develop, maintain or fund their own systems. Jurisdictions could utilize the branding to direct inquiries to either the chatbot or website with no additional investment in new technology or infrastructure required to maintain a standalone 3-1-1 operation.

Furthermore, statewide integration and consolidation may provide local jurisdictions without 3-1-1 operations the support needed to either establish their own program or join a larger jurisdiction for a shared 3-1-1 service model. This support can be the State providing the capital investment, IT Support or the technology to make the solution feasible. In turn, the local jurisdiction will have the choice to leverage the statewide solution to expand their 3-1-1 service capabilities.

However, some of the proposed statewide solutions would require a robust governance model to be effective. A clear governance model will provide a level of accountability, ensure stakeholder collaboration and increase user adoption to the new solution. These factors are important to reduce the risk of redundancies and siloes, inefficiencies and non-compliance.

7.0 Conclusion & Recommendations

7.1 Conclusions of this Study

Feasibility Criteria

To determine feasibility of a 3-1-1 solution/approach, criteria must first be established against which the evidence for a determination can be examined and conclusions can be drawn. Grounded in research from Gartner and the experience of subject matter experts involved in the creation of this study, the following criteria were developed for evaluating the feasibility of a statewide 3-1-1 portal.

Data Integrity

This criterion refers to the standardization, completeness, and availability of data across 3-1-1 operations to facilitate accurate and reliable information exchange. As noted above, analysis of publicly available 3-1-1 data and insights from interviews show vastly differing issue taxonomies and

lack of access to data in municipalities lacking robust data aggregation, analysis, and reporting capabilities. Additionally, large volumes of potential 3-1-1 related actions are not reported in the case where issues originate with 9-1-1 and are responded to by emergency personnel but turn out not to be emergencies, challenging the completeness of current views as to the true nature and scope of 3-1-1 issues across the state. Improvements in data integrity are an essential success factor for a future statewide portal.

Operational Scalability

This criterion refers to the adaptability and interoperability of 3-1-1 systems and processes as well as the degree to which the application of technology solutions to key business and operational problems might lead to the increased volumes of issues being able to be solved with the same or fewer resources (marginal benefits to scale). 3-1-1 involves a substantial proportion of service requests that must be resolved at the local level and include complex interrelations between 3-1-1 systems and those of state, county, city, and commercial entities across multiple jurisdictions, making 3-1-1 inherently less scalable than other government services where issues can be mediated and resolved at the state level. Another key aspect of this criterion is the existence, or lack, of clear standards and definitions to coordinate and efficiently execute processes at scale, which, as of the creation of this study, do not currently exist in Maryland or any other state.

Governance and Accountability

This criterion examines mechanisms available for establishing decision rights, authority, responsibilities, and accountability across municipalities and jurisdictions to guide and oversee the implementation and ongoing operation of a statewide system. Shared standards and definitions define the “rules of the road” and facilitate the creation of clear roles and responsibilities for all entities involved in executing 3-1-1 operations. This study identified no governing board responsible for organizing, developing, and aligning the numerous municipalities and jurisdictional entities required to implement and operate a statewide 3-1-1 system.

Implementation Complexity

This criterion examines evidence about the effort required to establish favorable preconditions for rollout, including effective coordination mechanisms, the development of shared requirements, and degree the of coordination required with implementation partners (e.g. vendors, system integrators, state and local IT departments) to manage the intricacies of system development and deployment. As noted elsewhere in this study, interviews revealed an exponential increase in implementation complexity of a statewide 3-1-1 system when accounting for the vast number of state, county, city, and commercial databases, CRMs, workflow platforms, payment systems, GIS platforms, and telephony platforms across the state into which a consolidated 3-1-1 system would need to integrate, including the maintenance of those integrations.

Study Conclusion

Based on these criteria, the evidence examined by this study suggests a **low feasibility** of implementing a statewide 3-1-1 portal in Maryland at this time.

7.2 Strategic Recommendations

This study identified meaningful opportunities for Maryland to enhance 3-1-1 services across the state by developing shared solutions and making them available to existing 3-1-1 operations or municipalities without 3-1-1 capabilities who might provide 3-1-1 services given the resources. These potential solutions include:

Integration Platform

A key operational challenge of any sized 3-1-1 system is the development and maintenance of integration between core 3-1-1 systems (e.g., telephony, CRM) and those related to delivering the range of services offered. Both municipalities with existing 3-1-1 operations and those without would benefit from a robust integration layer (e.g. Boomi, Mulesoft) to capture, manage, and effectively use data and metadata within resilient connections and data flows between systems.

GIS Location Tracking

Detailed location determination and tracking is involved in the vast majority of 3-1-1 service requests and even many basic information inquiries. Each municipality currently must develop and maintain its own GIS location tracking platform, with some municipalities lacking this capability altogether. The provision and maintenance of an extensible GIS platform for adoption by municipalities would relieve a key operational burden and make this critical capability available to municipalities as a key value-added resource from the state.

Conversational Interfaces

Self-service, natural language tools (e.g. chatbots, “smart” IVR voice assistants) are not yet widely adopted for use in the context of 3-1-1 service delivery to address informational inquiries or assist 3-1-1 specialists. Operations across the state would benefit from the availability of self-service conversational interfaces to make information available in natural language interactions via digital channels. These tools also have the potential to increase accessibility of 3-1-1 services for residents of different abilities, with primary languages other than English, and outside of standard operating hours. Additionally, these tools have been demonstrated to aid support agents (3-1-1 specialists, in this case), increasing job satisfaction, improving training outcomes, and aiding in recruitment, retention, and decreased turnover.

Channel Support

Residents engage 3-1-1 services from a wide range of intake channels, including phone, web portal, mobile application, texting, social media, fax, mail, and in-person interactions. Interviews conducted by this study revealed that not all 3-1-1 operations are able to support more than a few of these channels and that service levels vary across each. Provision of a tool to improve service-level standardization across the variety of ways residents wish to engage with 3-1-1 would benefit both existing and future 3-1-1 operations across the state.

Standard Development

There are currently no international, national, statewide, or regional standards or widely adopted definitions available to 3-1-1 operations for elements like data/issue categorization, service levels, training, operational processes, or information sharing. One example is the inconsistent availability of a 9-1-1 non-emergency police channel. Developing and sharing standards across these topics would provide material coordination benefits such as shared technical and operational requirements.

Public Outreach

Municipalities research by this study are highly attuned and responsive to their local communities – a great strength of 3-1-1 operations across the state. However, limited budgets and technology resources don’t al ays allow for local community outreach organizations (e.g. Office of Public Relations) to conduct the broad public awareness campaigns necessary to educate residents about the nature of available non-emergency services and may contribute to non-emergency volume appropriate for 3-1-1 being instead directed to 9-1-1, 2-1-1, 9-8-8, and other origination points.

Greater support for such public awareness would benefit both 3-1-1 operations and residents and have shown high returns on investment when conducted.

Adoption Models

A key barrier to consolidation of 3-1-1 services across municipalities is the lack of clear adoption models to define responsibility, accountability, and decision rights, particularly given that 3-1-1 service requests are fulfilled at a local level and local governments have direct electoral accountability to their constituents. Clear models specifying viable hybrid approaches to state/local 3-1-1 collaboration, including what the state will be responsible for vs. the municipality would increase the practicality of more centralized direction of 3-1-1 services.

The successful implementation of these solutions may increase the future feasibility of a statewide 3-1-1 portal; however, the adoption of these recommendations is not a guarantee of feasibility. Depending upon which recommendations are adopted, the nature of the implementations, and the resulting effects on operational performance and business outcomes, the feasibility of a consolidated 3-1-1 portal may increase based on the criteria outlined above. Alternatively, successful implementation of these solutions may produce many of the expected benefits of a potential consolidated, statewide solution, rendering the further development of such a portal unnecessary.

8.0 Cost Considerations

The scope of this report is meant to include cost considerations and present a cost-benefit analysis of a statewide 3-1-1 portal, *if feasible*, as well as cost impacts from the use of AI in creating and operating the statewide 3-1-1 portal. Given the conclusions of this study and the low feasibility of a statewide 3-1-1 portal as determined, the recommendations focus on other ways that state efforts can contribute to supporting 3-1-1 service delivery across Maryland, including hybrid (opt-in) adoption models for existing 3-1-1 operations. Section 6 discusses potential operational and technical approaches and provides high-level cost guidance based on complexity, however, establishing credible cost estimates for options other than a statewide 3-1-1 portal is both outside the scope of this study and contingent on a number of unknowable factors such as:

- How the state chooses to fund and implement any recommendations made by this study, including budgets, operating models, build vs. buy decisions, state licensing agreements, procurements & vendor selection, and governance agreements with county, city, and local jurisdictions.
- The number of existing 3-1-1 operations (e.g., Montgomery County, Baltimore County) choosing to adopt and use technical or operational services provided by the state and to what degree they might utilize those services by type
- Outcomes from other in-flight studies described in aryland’s tud Topics and Roadmap to the AI Subcommittee

This study recommends further investigation on credible cost estimates by a committee or taskforce formed to take appropriate action on the evidence and recommendations of this study.

9.0 Appendices

9.1 Interview Summary

Interviews conducted by this study included representatives from the following organizations:

Position Title	Organization
Legislative Director	MD Department of Information Technology
Chief of Staff	MD Department of Information Technology
Senior AI Advisor	MD Department of Information Technology
MDEM 911 Board Exec. Director	MD Emergency Management
Chief Development Officer	MD Emergency Management
MDEM 911 Board Co-Chair	MD Emergency Management
MDEM 911 Board Deputy Director	MD Emergency Management
Senator	Maryland State Senate
Director of 311	Baltimore City 311
Director of 311	Baltimore County 311
Assistant Chief Admin. Officer	Montgomery County Emergency Management
Director of 311	Prince George's County 311

9.2 References

[1] SB1068/HB1141 - Department of Information Technology - Evaluation and Development of a 3-1-1 Portal Using Artificial Intelligence, 2024 Regular Session, https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/SB1068?ys=2024rs

[2] Maryland NG9-1-1 ommission, ear Four Report “Preparing for the Future of G -1-1 in aryland,” ecember , https://cherylkagan.org/ng9-1-1/

[3] SB0749/HB1003 - Public Safety - 3-1-1 Systems - Nonemergency Information, 2022 Regular Session, https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/SB0749?ys=2022rs,

[4] SB0030/HB0138 - Study on Statewide 2-1-1 and 3-1-1 Systems, 2023 Regular Session, https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/SB0030?ys=2023RS, 2023 regular session

[5] " atalyzing the Responsible and Productive Use of rtificial Intelligence in aryland tate Government", Exec. Order o. 1. 1. 4.0 , (d.), https://governor.maryland.gov/Lists/ExecutiveOrders/Attachments/31/EO%2001.01.2024.02%20Catalyzing%20the%20Responsible%20and%20Productive%20Use%20of%20Artificial%20Intelligence%20in%20Maryland%20State%20Government_Accessible.pdf

[6] "9-1-1 tats & ata." 9-1-1.gov, Feb. 21, 2023.https://www.9-1-1.gov/issues/9-1-1-stats-and-data/

[7] " ities ove ystems to the loud and Improve itizen ervices." StateTech, Jan. 11, 2019, https://statetechmagazine.com/article/2019/01/cities-move-311-systems-cloud-and-improve-citizen-services

[8] "Trends in / R stems." ICMA, Jun. 7, 2017, https://icma.org/blog-posts/trends-311crm-systems

[9] "311 Customer ervice Requests 4." Open Baltimore, https://data.baltimorecity.gov/datasets/311-customer-service-requests-2024

[10] " ervice Requests." dataMontgomery, https://data.montgomerycountymd.gov/Government/MC3-1-1-Service-Requests/xtyh-brr2/data

[11] "311 Service Requests." nalyze oston, https://data.boston.gov/dataset/311-service-requests

[12] "BOS:311 App." it of oston, ov. 3, , https://www.boston.gov/civic-engagement/bos311-app

[13] " collaborative model and open standard for civic issue tracking." Open311, June 21, 2015, www.open311.org

[14] National Center for Public Performance E-Governance Institute. " eveloping a tatewide ystem in ew Jersey." Rutgers University, ewark, eptember .

[15] " all Routing for : The Issues and olutions." Kristin M. Howlett and Tyler P. Reinagel, Aug. 2008, https://azmag.gov/Portals/0/Documents/311_2011-11-29_Call-Routing-for-311-The-Issues-and-Solutions.pdf

[16] "Customer ervice and 1/CRM echnology in Local Governments: Lessons on Connecting with Citizens." ICMA, https://icma.org/sites/default/files/09-082%20311%20Final%20Report%2012-2-08.pdf

[17] "Mar land at a Glance." aryland Manual On-Line, Oct. 15, 2024, https://msa.maryland.gov/msa/mdmanual/01glance/html/pop.html

[18] "9-1- Origin & istory." E , https://www.nena.org/page/9-1-1overviewfacts

[19] "Federal Agencies & 9-1-1: Who's Who in Federal 9-1-1 Support." 9-1-1.gov, Feb. 2016, https://www.9-1-1.gov/newsletters/issue-1/federal-agencies-and-9-1-1-who-s-who-in-federal-9-1-1-support/

[20] " E TERRITOR 9-1-1 U ORI RU URE ." 9-1-1.gov, Aug. 2020, https://www.9-1-1.gov/assets/State-and-Territory-9-1-1-Authority-Structures-Aug-2020.pdf

[21] " bout 1." 1, https://www.211.org/about-us

[22] "988 Suicide & Crisis Lifeline: Two Years After Launch." F, Jul 9, , https://www.kff.org/mental-health/issue-brief/988-suicide-crisis-lifeline-two-years-after-launch/

[23] Maryland NG9-1-1 ommission, ear Four Report "Preparing for the Future of G -1-1 in aryland," ecember , https://cherylkagan.org/ng9-1-1/

[24] Bell, Sarah. Vox ex Machina: A Cultural History of Talking Machines. The MIT Press, 2024.

[25] " F." i ipedia, Wikimedia Foundation, Jan. 26, 2025, https://en.wikipedia.org/wiki/DTMF

[26] Weizenbaum, Joseph. "E IZA – A Computer Program For the Study of Natural Language Communication etween an and achine." Communications of the ACM, vol. 9, no. 1, 1966.

[27] "The Complete History of CRM." Salesforce, https://www.salesforce.com/crm/what-is-crm/history/

[28] "75 Years of Innovation: Speech Recognition." RI, https://www.sri.com/75-years-of-innovation/75-years-of-innovation-speech-recognition/

[29] "The 2010s: Our Decade of Deep Learning / Outlook on the 2020s." Schmidhuber, Jurgen, Feb. 20, 2020, https://people.idsia.ch/~juergen/2010s-our-decade-of-deep-learning.html#Sec.%203

[30] "Measuring the Productivity Impact of Generative AI." National Bureau of Economic Research, Jun. 1, 2023, https://www.nber.org/digest/20236/measuring-productivity-impact-generative-ai

[31] "Measuring the Productivity Impact of Generative AI." National ureau of Economic Research, Jun. , 2023, https://www.nber.org/digest/20236/measuring-productivity-impact-generative-ai

[32] Harvard Business School, "Navigating the Jagged echnological Frontier: Field Experimental Evidence of the Effects of l on nowledge orker Productivity and Quality." Harvard Business School Technology & Operations Mgt. Unit Working Paper No. 24-013, Sep.27, 2023, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4573321

[33] "New York governor announces statewide DMV modernization project." StateScoop, Apr. 3, 2024, https://statescoop.com/new-york-statewide-dmv-upgrade-hochul/

[34] "Sullivan County Highlighted at Google AI Conference." Hudson Valley Press, Mar. , , https://hudsonvalleypress.com/2024/03/06/sullivan-county-highlighted-at-google-ai-conference/

[35] "2025 CIO Agenda: Top Priorities and Technology Plans for State and Provincial Governments." Gartner, Oct. 28, 2024, G00821851, https://www.gartner.com/document-reader/document/5873011

[36] "Innovation Guide for Generative I in Trust, Ris and Security Management." Gartner, Sep. 17, 2024, G00799579, https://www.gartner.com/document-reader/document/4751831

[37] "What are the risks from Artificial Intelligence?" MI I Ris Repository, https://airisk.mit.edu/

[38] "AI Risk Management Framework." NIST, https://www.nist.gov/itl/ai-risk-management-framework

[39] " atalyzing the Responsible and Productive Use of rtificial Intelligence in aryland tate Government", Exec. Order o. 1. 1. 4.0 , (d.), https://governor.maryland.gov/Lists/ExecutiveOrders/Attachments/31/EO%2001.01.2024.02%20Catalyzing%20the%20Responsible%20and%20Productive%20Use%20of%20Artificial%20Intelligence%20in%20Maryland%20State%20Government_Accessible.pdf

[40] "2025 Maryland AI Enablement Strategy & AI Study Roadmap." Maryland Dept. of Information Technology, https://doit.maryland.gov/SiteAssets/Pages/default/2025%20Maryland%20AI%20Enablement%20Strategy%20and%20AI%20Study%20Roadmap.pdf

[41] "Use-Case Prism: Artificial Intelligence for Customer Service." Gartner, Mar. 2 , , G00775170, https://www.gartner.com/document-reader/document/4190699

v