

GovAI-HITL-Assistant: A Human-in-the-Loop Path to a Unified Service Experience

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Executive Summary

GovAI-HITL-Assistant is a human-in-the-loop artificial intelligence system designed to transform how citizens interact with government services. It provides a single, conversational interface to access information and services across multiple departments, **blending AI efficiency with human oversight** to ensure accuracy and trust. By unifying

previously siloed channels, it promises faster service 24/7, more consistent guidance, and reduced burdens on public servants. Key opportunities include expanding access (particularly for remote users and those needing after-hours or accessible support), improving the quality and consistency of service delivery, easing workforce constraints by automating routine tasks, and ensuring **equitable service in both official languages and for diverse needs**. To realise these benefits, government must invest in digital competencies for staff, foster an enabling ecosystem of policies and partnerships, and carefully manage implementation through strong governance. This report outlines current service delivery challenges and maps out opportunities and a roadmap for developing the talent and infrastructure needed to support such a system in the public sector.

Introduction

Governments around the world face the dual challenge of **rising citizen expectations and constrained resources** in service delivery. Canadians today enjoy seamless, on-demand services in the private sector—from instant online banking to 24/7 shopping apps—while their experiences with public services often involve complex procedures, long wait times, and fragmented channels. This gap has led to widespread frustration: citizens struggle to navigate siloed departments and processes, and public servants within those silos face burnout and inefficiency as they try to help users across antiquated systems. Recent crises, such as the COVID-19 pandemic, have underscored these issues by dramatically increasing service demand and forcing rapid shifts to digital channels.

Four core problem areas hinder progress in improving government services:

- **Siloed, journey-blind processes:** Agencies tend to optimise individual touchpoints (e.g. processing an application form) rather than the citizen’s end-to-end journey (e.g. obtaining a benefit that involves multiple steps across offices). This results in citizens being bounced between departments, repeatedly providing the same information, and losing track of case status. From the citizen’s perspective, government appears disjointed; from the inside, valuable information often falls through the cracks at jurisdictional or departmental boundaries.
- **Persistent data challenges and limited feedback:** Although government does use data to improve services, significant structural gaps remain. Weak data governance and poor system integration hinder coordination across departments and jurisdictions, while limited data literacy and capacity reduce the effectiveness of data that is collected. Strict barriers to sharing information across federal, provincial, and territorial levels—driven by differing policies and legislation—further fragment the system. These issues are compounded by the absence of consistent metrics and consolidated feedback loops. Public sector leaders generally recognise that service satisfaction is low, but lack granular insights into specific pain points. Without clarity on where issues lie, it is difficult to identify which services or steps cause the most

frustration, quantify the impact of improvements, or ensure accountability for change—slowing investment in modernisation.

- **Traditional performance focus:** Governments historically measure success by compliance, outputs, or budget adherence (e.g. number of applications processed, errors avoided) rather than user experience quality. Culturally, this has made it challenging to champion reforms aimed at less tangible outcomes like “citizen satisfaction” or “ease of use,” even though those factors greatly influence whether programmes achieve their desired impact (for example, if an application process is too burdensome, eligible citizens may give up and not receive benefits). As a result, internal incentives often prioritise status quo efficiency over innovation in service delivery.
- **Inadequate accessibility and language inclusion:** Many existing service channels are **not fully accessible or bilingual by design**. Canadians who require services in French or need accommodations for disabilities often face delays or inferior service while waiting for specialised support. For instance, a user might have to wait longer to speak to a French-speaking agent, or a person with a visual impairment might struggle to use an online form that isn’t optimised for screen readers. These gaps mean services are not equitable across the population. They undermine the government’s obligation to serve citizens in both official languages and to provide accessible service to all, regardless of physical ability or digital literacy.

In this context, **human-in-the-loop AI assistants** represent a promising solution to transform service delivery. By combining artificial intelligence with human oversight, such systems offer a way to bridge silos and deliver unified, personalised assistance to citizens at scale—without sacrificing accountability or compliance. The idea is to have an AI-driven virtual assistant (available through chat, voice, or other interfaces) that can answer questions, guide users through processes, and even initiate transactions across multiple departments—all while flagging complex or sensitive cases for a human officer to review. This approach aims to deliver the best of both worlds: the speed and convenience of automation plus the judgement, empathy, and legal authority of human employees when it really counts.

The Government of Canada (GoC) has identified AI-driven solutions of this kind as key to its digital transformation agenda. They align with federal priorities to provide more **client-centric, digitally enabled services** and to improve internal efficiency at a time of wave retirements, tight budgets, and increased service demand. Other countries and jurisdictions are exploring similar concepts under various names (virtual assistants, cognitive platforms, etc.), all stemming from the same principle: *put the citizen first by reorganising service delivery around their needs*, enabled by technology and data, rather than forcing the citizen to navigate the government’s organisational chart to find the right information or contact.

This report examines how the **GovAI-HITL-Assistant** can help achieve that vision. **Section I** defines what a human-in-the-loop AI assistant is in the public sector context and outlines

four major opportunity areas it can unlock (unified access, improved quality, efficiency, and inclusivity). A brief case study illustrates these benefits in action. **Section II** examines the human dimension of AI integration, identifying the necessary skill transformations for public servants and adaptations to organisational roles in an AI-augmented service model.

Section III describes the workforce and ecosystem required to implement and sustain GovAI-HITL-Assistant, from the composition of interdisciplinary teams within government to collaboration with industry partners. **Section IV** discusses strategies to develop the required talent and enabling conditions – including education, training, recruitment, partnerships, and governance measures – to ensure the system’s success over the long term. We conclude with recommendations and considerations for moving from concept to scaled reality, followed by appendices detailing our research methodology and a transformation roadmap.

Section I: What Is a Human-in-the-Loop AI Assistant?

At its core, **GovAI-HITL-Assistant** (Government AI – Human-in-the-Loop Assistant) is an orchestrated system of AI modules that works across government services to provide unified, interactive support to users, **with public servants overseeing critical points**. The solution operates as an AI-powered “*virtual concierge*” for citizens and businesses when they engage with public services. It eliminates the need for users to identify specific departmental contacts or submit duplicate information by utilising a common knowledge base and unified back-end connectors to streamline interactions.

When someone asks a question (for example, “*How do I renew my health card and also update my address for pension services?*”), the AI assistant determines what they need, retrieves the relevant information from appropriate systems, and composes a helpful answer. If the question is straightforward and the assistant is confident the answer is correct, it responds immediately – often sharing the relevant rules or sources for transparency. If the question is complex or the assistant isn’t fully sure – such as an unusual situation or something sensitive like confirming eligibility for a benefit – it seamlessly hands the request off to a human operator or offers the user the option to connect with a human for further help. Every step the AI takes is recorded and explainable, and every final answer is either strictly in line with established policy or explicitly confirmed by a human. In effect, the assistant works as a “*virtual civil servant*” that can address routine matters and triage more complex ones, while always deferring to human judgement for novel or high-stakes decisions.

This human-in-the-loop design distinguishes GovAI-HITL-Assistant from generic chatbots or fully automated decision systems. It is **not about replacing public servants, but about augmenting them**: handling the repetitive enquiries, data retrieval, form-filling and initial guidance so that staff can focus on resolving exceptions and providing personal service

where it's truly needed. Meanwhile, citizens experience government as a more cohesive and responsive entity. Ideally, users wouldn't need to know which programme is federal or provincial, or which form to complete first; the assistant would guide them through their entire journey (e.g. "I'm moving to a new province" or "I want to start a business") in a conversational manner, tapping into all necessary services behind the scenes.

The opportunities this approach unlocks can be grouped into four broad categories:

Opportunity #1: Unified Access to Services

One of the most immediate benefits of a multi-service AI assistant is **vastly expanded and simplified access** to government services. Instead of juggling multiple websites, phone numbers, or in-person visits, citizens have a *single window* for all government interactions. Key aspects include:

- **24/7 availability:** The assistant can handle inquiries and transactions any time of day, any day of the week. This is particularly beneficial for people who work irregular hours or need help outside of the typical 9–5 schedule when government offices are open. It also means services remain available during emergencies or office closures (as proved critical during pandemic lockdowns). Citizens no longer have to wait until "business hours" for basic assistance – they can get help at midnight, on weekends, or whenever the need arises.
- **One-stop, multi-department service:** Citizens often have needs that cut across departmental lines (for example, starting a new job might involve federal tax forms, provincial health insurance, and updating a municipal address record). With a unified assistant, users do not need to figure out which agency to contact first or navigate separate processes for each – they begin with one conversation, and the assistant internally coordinates across departments. This *journey-based* approach reduces confusion: the citizen presents their problem once, and the system takes on the responsibility of moving through government systems on their behalf. For example, if a new parent asks about parental leave, the assistant can provide information on **federal** Employment Insurance maternity/parental benefits and **provincial** birth registration in one interaction. It can even initiate processes – perhaps pre-filling forms with information the user already provided during the chat, sparing them redundant paperwork. This unified front door means a citizen no longer has to authenticate their identity separately for every department or learn the structure of government to get something done.
- **End-to-end guidance:** Instead of merely telling a citizen which department to contact for "Part B" of their task, the assistant performs intelligent hand-offs behind the scenes. From the user's perspective, they are dealing with one helpful guide that can bring in multiple services. For instance, if someone says, "*I've moved, what do I need to update?*", the assistant can walk them through changing their address across Revenue Canada (for taxes), Service Canada (for federal benefits and pensions),

provincial driver's licensing, health cards, and even municipal property records – all in one coherent session. It may ask a series of contextual questions and then lead the user through each step, potentially executing some updates directly (with the user's consent). By handling the orchestration, the AI prevents the user from having to determine the correct sequence or provide the same information repeatedly to different offices.

In sum, GovAI-HITL-Assistant can act as “**one front door**” to the government. By meeting citizens where they already are (on their phone or computer, at any hour) and by *guiding them through their needs rather than just single transactions*, it has the potential to greatly increase convenience and uptake of digital services. Early evidence suggests that when offered such convenience, citizens respond positively: uptake of online services rises, and misdirected calls or letters decrease because people can get what they need on the first try. For instance, jurisdictions that introduced basic virtual assistants during COVID-19 saw **millions of common questions answered automatically**, diverting simple queries away from overburdened call centres and freeing human agents to handle more complex or urgent cases. GovAI-HITL-Assistant builds on this success by not only answering FAQs but truly integrating service delivery across silos.

Opportunity #2: Improved Service Quality and Consistency

Beyond convenience, a human-in-the-loop AI assistant can materially improve the **quality, continuity, and consistency** of government services:

- **Faster, more accurate responses:** The assistant draws on a central, authoritative knowledge repository of up-to-date information (legislation, policies, program guidelines, status of individual applications, etc.). This means citizens get answers that are not only fast, but also **accurate and consistent across channels**. Today, it's not uncommon for a person to receive different answers from different offices or have to wait days for an email reply that contains generic information. With a unified assistant, the same vetted answer (with identical wording and even citations of source documents when appropriate) is given to anyone who asks a particular question, which builds trust in the information. And if the answer requires looking up personal data (e.g. “What is the status of my application?”), the assistant fetches it in real time instead of the person waiting on hold while a clerk does the same query. In many cases, the AI can resolve issues instantaneously that used to take multiple contacts—improving metrics like first-contact resolution and reducing the frustrating back-and-forth that citizens experience with complex cases.
- **Continuity across life events:** A major advantage of an integrated system is improved continuity across what would otherwise be separate processes. In healthcare, continuity of care (ensuring a patient's information isn't lost between a family doctor and a specialist, for example) can be life-saving. Analogously, in government services, continuity means that if a citizen's situation involves multiple

programmes (which is common), nothing falls through the cracks. The assistant can “remember” context from one part of an interaction and apply it in another. For example, if someone is applying for unemployment benefits and during that process mentions they have moved to a new address, the system can proactively offer to update the address on other services (tax, driver’s licence, pension, etc.) with the user’s consent – closing the loop on a commonly neglected task. This reduces error rates (e.g. payments or correspondence going to an old address) and improves client experience. Currently, a lack of continuity often results in avoidable failures. A poignant example from the healthcare sector is the case of Greg Price in Alberta, who died after a paper referral to an oncologist was never acted upon, illustrating how critical information can be lost at transition points. In government services, while lives are usually not on the line, livelihoods and well-being can be: consider a low-income senior who misses a benefit renewal because a form was never forwarded when departments didn’t communicate. A unified digital assistant that maintains context can prevent such gaps by ensuring **no part of a citizen’s service journey is orphaned or forgotten**.

- **Reduced errors and duplication:** When agencies operate in silos, citizens often must submit the same information multiple times, and officials manually re-enter data from one system into another. This is inefficient and introduces opportunities for mistakes. GovAI-HITL-Assistant can serve as a **data bridge** – once a citizen provides a piece of information to it (say a new phone number, or an uploaded identity document), it can propagate that data securely to all systems that need it (subject to privacy rules and user consent). This not only spares the citizen redundant effort, but also prevents transcription mistakes and ensures all departments are working off the same updated data. Likewise, for rule-based determinations (like calculating a fee or checking eligibility), the AI uses **standardised rules** and algorithms, reducing variability in how different offices might interpret or apply rules. Over time, as the system learns from more cases, it may even catch common human errors and prompt corrections proactively. For example, if 90% of people submitting a certain application usually attach Document X, and a user forgets to, the assistant can prompt them: *“It looks like you may have missed adding Document X, which is typically required; do you have it?”* By catching omissions early, the assistant improves the quality of submissions and reduces the need for follow-up.
- **Transparent and accountable service:** A side-benefit of having an AI assistant handle interactions is that it can automatically log every query, action, and response, along with the rationale or source of information used. This creates a rich **audit trail** that can be invaluable for both citizens and managers. Citizens can be given reference numbers or transcripts of their chats, improving transparency (“the assistant told me X at 10:35 AM, here is the record”). Internally, these logs give service managers a new lens on performance – for example, highlighting that a significant share of questions on Programme Y relate to confusing instructions on a form (which can

then be clarified in the system's knowledge base or even prompt a form redesign). In this way, the assistant helps shift the culture toward **data-driven service improvement**. Continuous measurement of user satisfaction and common pain points becomes easier when thousands of interactions are handled in a consistent format that can be analysed for patterns. Moreover, if a dispute arises – say a citizen complains they were misinformed – the recorded interaction can be reviewed to quickly resolve what was said. This level of record-keeping and analysis is hard to achieve with phone calls or in-person visits, but becomes standard with a digital assistant.

In essence, the assistant “*de-risks*” service delivery in many areas: faster responses mean fewer people are left in limbo; consistent information means fairer treatment; integrated steps mean fewer dropped balls. The continuity and accuracy that the system enforces can literally be life-changing for some users, and more broadly, they increase the public’s confidence that government services are reliable and even-handed. By automatically checking its work and flagging uncertainties for human review, the assistant ensures that quality is maintained or improved even as volume grows.

Opportunity #3: Easing Workforce Pressures and Enhancing Efficiency

Public sector organisations worldwide face **labour shortages and budget pressures**, and this is especially evident in service delivery roles. Canada’s federal workforce is ageing – roughly one-quarter of public servants will be eligible to retire by 2028, creating a risk of significant knowledge loss and staffing gaps. At the same time, demand for services is rising (due to demographic changes like an ageing population requiring more health and pension services, as well as crises that spike needs). A human-in-the-loop AI assistant provides a tool to alleviate some of these workforce and efficiency challenges:

- **Automating routine tasks:** A large proportion of enquiries government offices receive are **simple, repetitive questions** – FAQs, status checks (“Has my application been processed yet?”), or basic transactions (changing an address, booking an appointment). Automating responses to these through the assistant can save thousands of person-hours. For example, Employment and Social Development Canada (ESDC) reported that its 1-800 call centres field millions of calls annually, but a significant share are basic queries that could be answered by self-service if available. By handling those front-line questions, the AI frees up human agents to deal with complex cases that truly require empathy, critical thinking, or discretionary judgement. This not only improves efficiency but also job satisfaction – staff can devote their time to problems that utilise their training and experience, rather than answering the same question 50 times a day. Repetitive tasks can lead to human error (boredom, fatigue) and burnout; automating them helps reduce both. Crucially, this automation **does not eliminate the human role** but elevates it: public servants become problem-solvers and advisors rather than information clerks.

- **Force-multiplying each employee:** Even when an enquiry does eventually end up with a human officer (the “loop” in human-in-the-loop), the assistant will have already done a lot of the groundwork. It gathers relevant information, fills out draft forms or case notes, and can check multiple databases in the background. The employee essentially gets a head start or a digital research assistant that has prepared materials for them. This means each employee can handle more cases per day because they spend less time doing tedious preparatory work or cross-checking facts. For instance, suppose a benefits officer receives a complex claim escalated by the assistant: the AI might present the officer with a summary of the claimant’s information pulled from various systems (income records, prior claims, relevant family data) and highlight a few potential issues (perhaps an income figure exceeds a threshold, or a supporting document is missing). The officer can rapidly verify those points and make a decision, rather than starting from scratch to compile the case file. In effect, the assistant acts as a **junior caseworker** or support clerk for every staff member, boosting throughput without sacrificing diligence. By embracing this co-working model (AI as colleague), the public service could significantly increase productivity and reduce backlogs.
- **Tackling backlogs and wait times:** Many government agencies contend with backlogs – whether it’s immigration applications, veterans’ benefit appeals, or tax rulings. By triaging enquiries and even completing portions of processing work, the assistant helps prevent new backlogs from forming and can also be pointed at existing ones. For example, if there is a queue of thousands of older applications awaiting review, the AI might be employed in an offline mode to pre-scan those files and prioritise them for officers (flagging cases that appear straightforward approvals versus ones likely needing detailed scrutiny). It might generate preliminary recommendations or identify missing data, enabling human reviewers to work much faster. This kind of AI-assisted **prioritisation and pre-processing** can cut through backlogs more strategically. Overall, faster resolution and fewer touchpoints will reduce average handling times, thus shortening wait times for citizens – addressing one of the biggest pain points reflected in low satisfaction scores (citizens consistently rate government poorly on speed and simplicity of service). The knock-on effect is better outcomes: when people get what they need sooner, the intended policy goals of programmes (like providing financial support or permits for business) are achieved more effectively.
- **Scalability and surge capacity:** An AI assistant can scale up to handle surges in demand far more readily than a traditional workforce. During peak periods (for example, tax filing season, or during an emergency when information hotlines are flooded), the AI can absorb a huge volume of routine enquiries simultaneously, while human supervisors focus on ensuring quality for edge cases. This flexibility means the government can maintain service performance without as much need for hiring temporary staff or paying overtime – a significant efficiency gain and a hedge against

labour shortages. It also means that in scenarios of sudden policy changes (e.g. the launch of a new benefit programme or changes to travel rules), the assistant can be updated overnight with the new information and immediately start fielding questions, absorbing the initial unpredictable wave of public queries that might otherwise overwhelm call centres. Essentially, the AI provides a buffer and a fail-safe for capacity planning, smoothing out the peaks and troughs of demand.

Notably, these efficiency improvements do **not** come at the expense of service quality – in fact, they complement quality. When simple cases are handled by AI, human experts have more time and attention for complex or sensitive situations – meaning vulnerable or exceptional cases actually get *more* care than before. The human-in-the-loop model explicitly avoids the pitfall of fully automated decisions that could be unaccountable or lacking in empathy; instead, it channels human effort to where it's most needed and valuable. From a staffing perspective, public servants can be redeployed to higher-value work, and the strain of boring, repetitive tasks is reduced. Many governments face morale issues when staff are stuck doing manual data entry or answering the same FAQ endlessly; the assistant changes that equation, ideally making public service roles more rewarding and focused on problem-solving and client service. Over time, the introduction of such technology can also make government careers more attractive to digitally-skilled talent, seeing that modern tools are in place.

Opportunity #4: Addressing Accessibility, Language, and Equity Gaps

A critical promise of GovAI-HITL-Assistant is to make services more inclusive – ensuring that all citizens can benefit from digital government, including those with language needs, disabilities, or other barriers. By design, the assistant can help **bridge longstanding accessibility and language gaps** in service delivery:

- **Bilingual service by default:** Canada's Official Languages requirements mandate equal service in English and French, but in practice, accessing services in the minority language often means delays (waiting for a bilingual agent) or limited information. GovAI-HITL-Assistant is built to be **fully bilingual**: it can operate in English or French with equal proficiency and consistency. A user can choose their preferred language at the start (or even switch mid-conversation), and the assistant will provide answers drawn from the corresponding language knowledge base, which is kept on par in terms of content and clarity. This means a Francophone citizen using the assistant at 11 PM gets the same detailed answer that an Anglophone would – without waiting for daytime hours or a specialist. Over time, the platform could be extended to provide basic support in other languages common in Canada (such as offering guided help in Indigenous languages or newcomers' languages, where feasible), further lowering language barriers. At launch, however, ensuring robust English–French parity is a major achievement that improves fairness and compliance with Canadian law.

- **Accessible and inclusive design:** The assistant is designed to meet high accessibility standards (such as WCAG 2.1 AA). For users with visual impairments, it can integrate with screen readers or even be used via voice (speech-to-text and text-to-speech capabilities), allowing a blind user to “talk” to the government and listen to responses. For those with hearing impairments or who prefer text, the chat interface provides a purely textual mode. The system’s interface can offer a **simplified language mode** for individuals with cognitive disabilities or lower literacy, presenting information in plain, easy-to-understand terms. By being conversational and user-driven, it can adjust the pace and style of interaction to the individual – repeating or rephrasing explanations on request, for example. All these features mean that many users who struggle with traditional bureaucratic forms or dense websites can interact more naturally and get the information they need without special assistance. Moreover, because the assistant’s channels are digital, users who cannot easily travel to an office (due to mobility issues or distance) still receive comprehensive service remotely. In essence, the AI becomes a personalised service agent that is available to every citizen, including those who historically faced accessibility barriers.
- **Geographic and digital equity:** Canada’s vast geography has led to service disparities between urban centres and remote or rural communities. An AI assistant, especially if optimised for **low-bandwidth use and telephone access**, can dramatically improve access for those in rural or Northern areas. For example, while not everyone has high-speed internet, many people have access to a basic phone line – the assistant could be reachable through a simple phone menu or even SMS text messaging, enabling people in areas with spotty broadband to still use it. As governments invest in expanding internet infrastructure (e.g. rural broadband or Starlink satellite services), a unified digital assistant ensures those investments translate directly into better service on the ground: once someone can get online, they immediately have one-stop access to government help. By reducing the need to travel to distant government offices or rely on postal mail, the assistant delivers more equitable service to Canadians in all regions. Additionally, its *presence on multiple platforms* (web, mobile app, popular messaging apps, and phone) means people can choose the medium they are most comfortable with. A senior in a remote community might simply call a number and speak to the assistant (which responds with its synthesized voice), whereas a young person in a city might use a smartphone chat – both end up with the information or transaction they need. This flexibility helps narrow the digital divide, ensuring that tech-savvy and less tech-savvy users alike can benefit.
- **Culturally sensitive and bias-aware interactions:** Because the assistant’s behaviour can be centrally curated and continually reviewed, it can be tuned to address equity considerations in service delivery. For instance, it can be programmed with proper greetings and respect protocols for different cultural contexts (using appropriate titles or honorifics when interacting with, say, Indigenous elders versus youth). It can

also be carefully tested for biases – ensuring that the AI interprets queries fairly regardless of a user’s manner of speech or background. Human oversight will watch for any patterns (for example, if the AI does not understand dialectal phrases or accents in voice input, those can be corrected). The consistency of the assistant can actually mitigate certain human biases: e.g., an AI will not display impatience or prejudice based on a user’s tone or mistakes. Everyone gets the same patience and thoroughness. Of course, empathy is still paramount for sensitive situations, so those are routed to human officers. But by handling initial contacts in a uniform way, the system helps ensure that **no group is unintentionally given lesser service**.

Taken together, these features ensure that the move to digital service **does not leave behind** those who traditionally face barriers. On the contrary, GovAI-HITL-Assistant has the potential to bring many more people into the fold of convenient online service – whether by offering real-time French service across the country, by simplifying interactions for those who find forms challenging, or by connecting remote Canadians who previously had scant access. In a country committed to multiculturalism and accessibility, this opportunity is crucial: the AI assistant can be a great equaliser in service delivery, providing a consistent, high-quality experience to all users. In doing so, it also helps the government meet its legal and moral obligations regarding official languages and accessible service. Ultimately, a service that is “digital by default” must also be “*accessible by default*” and “*bilingual by default*” – GovAI-HITL-Assistant is a concrete step toward that goal.

Case Study: Reducing Service Backlogs through Virtual Assistance

To illustrate Opportunities #1–4 in action, consider a hypothetical scenario with the **Department of Municipal Affairs** in a Canadian province. This department was experiencing a severe backlog in processing building permit applications, with average approval times of 12 weeks (versus a target of 6 weeks). Citizens and contractors frequently called or emailed for updates, further straining the small team of permit officers. The province piloted a human-in-the-loop AI assistant on the department’s website and phone line to address these issues:

- **Unified Access and End-to-End Handling:** Applicants could now inquire about permits through a single chat interface on the department’s site or via a dedicated phone option. Instead of calling various offices (planning, zoning, etc.), they asked the assistant. For example, a homeowner might type, “I applied for a building permit two weeks ago, what’s the status?” The assistant would authenticate them, then pull data from the permitting system to give a real-time update. If the update was simple (“Your permit is in review, approximately 2 weeks remaining”), it answered immediately. If the query was more complex (the applicant provided extra documents and wanted to confirm they were attached properly), the assistant could check the file and confirm or escalate to a human if unsure. This one-stop query

handling meant fewer misdirected calls and a single source of truth for status information, embodying **Opportunity #1 (Unified Access)** and **#2 (Consistency)**.

- **Improved Consistency and Transparency:** The assistant drew on the department's latest rules and timelines, so every applicant received the same information about requirements and expected wait times. Previously, different staff gave slightly different advice depending on their experience; now the AI reinforced standard answers. It also provided links to relevant regulations and could generate a brief summary of pending steps for each permit. All interactions were logged, giving both applicants and managers a clear trail. Applicants reported feeling "in the loop" rather than casting enquiries into a void. This illustrates **Opportunity #2 (Improved Quality/Consistency)** – faster, uniform responses with full transparency.
- **Routine Automation to Alleviate Staff Workload:** The assistant took over answering the **frequently asked questions** about permit requirements (which previously took an officer ~10 minutes on the phone per query). It also allowed applicants to ask "What's the status of my permit?" at any time – retrieving the status from the database in seconds, with no human needed. Within two months, calls and emails to staff about basic queries dropped by an estimated 40%, freeing officers to focus on clearing the actual permit backlog. The AI also automates the pre-screening of new online applications: when an application is submitted, the AI immediately checks for completeness (all fields filled, required attachments present). If something is missing or appears incorrect, it sends the applicant an automated notification to correct the issue, instead of waiting weeks for a human reviewer to notice and reach out. These interventions embody **Opportunity #3 (Efficiency & Workforce Relief)**: by triaging and handling the low-hanging fruit, the AI significantly reduced administrative workload and prevented many bottlenecks.
- **Integration of Accessibility Features:** As a bonus, the AI interface was designed to be simple and accessible. Contractors on-site could even call via phone to get their permit status through a voice conversation with the assistant – useful if they had no internet on a construction site. The system presented the same information in French for a Francophone architect working in the province, who previously struggled to get updates in his language. These aspects, though not the primary aim of the pilot, demonstrated **Opportunity #4 (Accessibility & Equity)**: even a technical workflow like permits became easier to navigate for a wider range of users through multiple channels and languages.
- **Backlog Reduction and Satisfaction Gains:** As a result of these changes, the department's **backlog shrank by 50% in three months**, and current applications started being processed in ~7 weeks on average (down from 12). Applicants reported higher satisfaction since they no longer felt "in the dark" about their permits – they could check status any time via the assistant and received proactive updates or correction requests rather than hearing nothing for weeks. Meanwhile, staff

reported feeling less pressure and being able to spend more time on complex zoning reviews (which the AI could not handle) rather than fielding repetitive queries. The overall service became faster and more transparent without additional staffing.

This case study, while hypothetical, draws on observed patterns from real early deployments of virtual assistants in government. It shows how a human-in-the-loop assistant can simultaneously improve the citizen experience (through unified access and real-time information) and internal efficiency (through automation and better workload allocation). Importantly, humans remained in control of final permit decisions, but their time was redistributed to higher-value work. The consistency of responses and reduction in wait times also built trust; even if someone's permit still took several weeks, knowing exactly where it stood and why made the wait more tolerable. In a fully scaled scenario, similar assistants could be deployed in many service areas – from immigration applications to grant programmes – achieving comparable improvements in speed, quality, and inclusivity of service delivery.

Section II: Public Service Practitioners and Digital Competencies

Implementing a human-in-the-loop AI assistant is as much a **workforce transformation** as it is a technology project. Public servants are at the heart of this system – they design it, train it, supervise it, and use its outputs to enhance their work. Thus, for GovAI-HITL-Assistant to succeed, the public service must be prepared in terms of skills, mindset, and capacity. This section examines the state of the public sector workforce vis-à-vis digital transformation and the competencies that need to be developed or strengthened.

The Public Service Workforce in Transition (Challenges & Trends)

Much like healthcare had to upskill practitioners for digital health tools, governments must prepare their employees for **AI-augmented service delivery**. Key challenges and trends affecting this readiness include:

- **Demographics and retirements:** Many government agencies have an ageing workforce. As noted, about 25% of Canadian federal public servants could retire by 2028. Similar trends are seen in provincial and municipal levels. This wave of retirement threatens to drain institutional memory – the unwritten know-how of how to get things done within bureaucratic constraints. At the same time, it presents an opportunity: as new workers are hired, they can be onboarded directly into a digitally-transformed work environment, leapfrogging legacy methods entirely. However, to seize this, the knowledge of departing employees needs to be captured in systems like the GovAI assistant's knowledge base (so that, for example, the AI can give answers that a 30-year veteran used to know off-hand). Knowledge transfer and documentation become critical tasks before people retire.

- **Geographical dispersion and equity in training:** Canada's public service is spread across a vast geography, and offices vary greatly in their digital maturity. A small Service Canada centre in a rural area may not have the same IT support or bandwidth as headquarters in Ottawa. Any training and competency-building must therefore be inclusive, ensuring staff in all regions can acquire and practise AI-related skills. Moreover, smaller departments or local governments often lack dedicated data analysts or IT specialists; a frontline clerk might have to wear the "AI operator" hat alongside their regular duties. This influences how training is delivered (e.g. centrally produced e-learning modules that staff can take independently, supplemented by roving "digital coaches" who visit or virtually assist remote offices). It also means the system's design should be as user-friendly as possible for staff, requiring minimal specialised knowledge to interact with and supervise.
- **Post-pandemic work dynamics:** The COVID-19 pandemic forced a rapid shift to remote work and accelerated the adoption of collaborative digital tools (video conferencing, shared cloud documents, digital signatures) in the public service. It also familiarised many public servants with interacting through virtual means (e.g. conducting client appointments by Microsoft Teams or Zoom). This experience, though born of crisis, has lowered resistance to using technology for service delivery and proven that many tasks can be done efficiently online. Many employees are now comfortable with hybrid work and expect modern tools as part of that environment. At the same time, the pandemic revealed gaps: not all staff were equally equipped or trained in digital literacy, and some processes could not adapt easily (e.g. those that were paper-bound). The push for a more flexible, hybrid workforce means any AI system must work securely across various work settings (office, home, on the move), and staff must be trained to manage AI-assisted processes from anywhere. It has also highlighted the importance of resilience – staff should be capable of adapting to sudden procedural changes, like handing over certain tasks to AI during emergencies or learning new interfaces quickly.
- **Increasing demand and complexity of services:** Pressure on services is growing due to factors like an ageing population (more healthcare and pension needs), more frequent extreme events (wildfires, floods requiring disaster assistance), and evolving citizen expectations for personalisation. Public servants are thus dealing with **higher caseloads and often more complex scenarios** (since the simple questions might get solved by self-service, leaving a greater proportion of tricky cases for humans). To thrive, they need to be adept at leveraging tools like GovAI-HITL-Assistant to handle the volume and to triage complexity. This means shifting from performing many routine tasks manually to guiding and overseeing the AI in doing them. The role of a service officer evolves from "data processor" to "data validator" and from "information provider" to "decision coach." It emphasises judgement, monitoring, and creative problem-solving over rote execution. This is a significant mindset shift for roles traditionally defined by strict procedures.

Overall, the public service is in a period of **renewal and change**. Governments have recognised that investing in human capital is as important as investing in technology for digital transformation. For instance, the Treasury Board of Canada Secretariat launched a Government of Canada **Digital Academy** in 2018 specifically to boost the digital skills of public servants at all levels. Similarly, various provinces have developed digital talent strategies acknowledging that without skilled and adaptable people, tools like AI assistants will not reach their potential. These initiatives aim to create a baseline comfort with new technologies and instil a culture of continuous learning in the public service.

Digital Competency Frameworks for Government

Governments are defining what skills their employees need in the digital era. The federal **Policy on Service and Digital** (Treasury Board, 2021) and related **Digital Competency Framework** for public servants outline core areas such as understanding the potential of digital transformation, user-centric design, data literacy, openness to collaboration, and security and privacy awareness. These foundational skills are expected of every public servant – not just IT specialists – to create a digitally savvy workforce. In the context of GovAI-HITL-Assistant, several of these competencies are directly relevant:

- **User-centric service design:** Staff need the ability to view processes from the citizen's perspective (the whole *journey* rather than just their siloed piece of it). This is crucial for those who will train or manage the assistant – they must ensure the AI's scripts and knowledge base are organised around real user needs, not internal bureaucracy. It's a mindset shift from "I process Form X" to "I help solve Problem Y for the client." Public servants require training in journey mapping, simplification of language, and design thinking so they can contribute effectively to shaping AI dialogues and content that make sense to everyday people.
- **Data literacy and information management:** Public servants must be comfortable handling and interpreting data, since AI systems run on data. Data literacy includes knowing where data comes from, its limitations, and principles of privacy and quality. For example, an officer should understand that the assistant's recommendation on a case might rely on historical datasets – if those have biases or gaps, the officer must be able to question and adjust for that. Initiatives like mandatory training in Data Privacy and Protection are being ramped up in many jurisdictions to ensure employees grasp concepts like data consent, anonymisation, and cybersecurity, all of which directly affect AI tool use. Moreover, staff should be able to do basic troubleshooting – if the AI seems to be providing odd answers, they might check whether the underlying data is outdated or incomplete.
- **Digital responsibility and ethics:** According to the OECD's framework for an AI-ready public sector, understanding the ethical and legal implications of AI is essential. Everyone interacting with GovAI-HITL-Assistant should know the basics of the directive on Automated Decision-Making (in Canada, this sets requirements for

human oversight, explainability, bias mitigation, etc.) and be attuned to spotting potential issues. For instance, if staff notice the assistant's answers inadvertently confuse or disadvantage a certain group (say, using examples that assume a nuclear family and inadvertently excluding single parents' context), they should flag it. Competency in areas like fairness, accessibility, and official language rights in digital service is key. The government has emphasised that new systems must serve **all** Canadians; thus, cultural sensitivity and inclusion (sometimes termed "Gov 2.0 socio-emotional skills") are considered part of the digital competency set. This could involve ensuring content is available in both languages and that the AI doesn't use jargon that only insiders understand.

- **Adaptability and continuous learning:** With technology evolving quickly, public servants need the meta-skill of continuously learning new tools and processes. The assistant will likely update with new features; policies will change; employees might rotate roles and suddenly supervise areas of the AI they haven't before. A mindset of agility – being willing and able to pick up new procedures, and possibly to let go of old habits – is emphasised in many competency models. This is a shift from the past when someone might do a job essentially the same way for 20 years. Now, willingness to learn (and support for learning) must be built into public service culture. Managers should encourage teams to experiment with new features of the AI, share tips, and stay curious. The Digital Academy and similar are providing resources, but uptake relies on employees recognising that learning is part of their job, not an extra.

In addition to broad frameworks, some governments have issued AI-specific competency guidance. For example, the Alan Turing Institute in the UK developed an **AI Skills and Competency Framework** suggesting that non-technical public servants should at least be able to "critically evaluate AI outputs, understand data management, and ensure privacy and stewardship." Similarly, Canada's forthcoming Public Service AI Strategy (2025–27) encourages training a wide range of staff – not just data scientists – in AI basics, to create common literacy across the organisation. The message in all cases is that *digital age public service requires a blend of traditional domain knowledge with new technical and cognitive skills.*

Departments have begun offering courses on topics like Agile project management, human-centred design, and AI ethics to employees at large (the Canada School of Public Service now has courses on AI, automation, and data). However, uptake is still uneven, especially among frontline staff with heavy workloads. A recurring challenge is that busy workers have little time to step away for training. This is why leadership buy-in is vital: executives and managers need to **make digital upskilling a priority** – by carving out official work hours for training and by integrating digital competencies into performance evaluations (so there are incentives to learn). Without such measures, the promise of tools like GovAI-HITL-Assistant could be delayed or under-realised due to a slower-moving human capital reality.

Specialised AI Literacy and Skills for Public Servants

Beyond foundational digital savvy, deploying GovAI-HTL-Assistant calls for specific skill sets that enable public servants to work effectively with AI. Importantly, not everyone needs to be a data scientist or programmer – the system is being built to be used by non-technical staff – but certain roles will require deeper expertise, and many roles require new proficiencies on top of existing ones. Key specialised competencies include:

- **Understanding AI systems (core AI literacy):** All staff interacting with the assistant should understand in general terms *how it works, what it can and cannot do*. They must know that it's not all-knowing or infallible – it produces answers based on training data and rules, and can sometimes be wrong or uncertain. Staff should be briefed on which tasks the AI handles autonomously and which require human review. For example, a caseworker should know: “The AI can answer status queries and verify completeness of applications, but it will never finalise a rejection of an application without my sign-off.” This clarity helps them trust the system where appropriate and remain vigilant where needed. In short, **AI literacy** means the ability to interpret and appropriately respond to an AI’s output. It includes understanding basic concepts like confidence scores (is the AI telling us it’s 90% sure or only 50% sure?), the difference between rules-based automation and machine learning predictions, and why the AI might not have certain information (e.g. privacy restrictions might prevent it from pulling some data). This knowledge prevents over-reliance and panic – staff won’t be mystified by the AI, but will see it as a tool with known parameters.
- **Prompt engineering and query handling:** A practical emerging skill is “**prompt engineering**” – effectively, the art of posing questions or instructions to AI to get the best result. In our context, this could involve employees learning how to refine what they ask the assistant to get more accurate outcomes. For instance, if a human supervisor sees that the assistant gave a partially correct but incomplete answer to a citizen, they need to know how to provide feedback or a follow-up prompt to the AI to elicit the missing piece (e.g. adding context or rephrasing the query). Additionally, staff who manage the knowledge base will essentially be writing content for an AI to use (structured FAQs, decision trees, etc.), which requires writing in a clear, unambiguous style that an AI (and end-users) can understand. This skill is somewhat technical but can be taught through examples and practice, and is akin to writing clear instructions or survey questions – something many policy analysts and service designers are already adept at. We might see new micro-specialties like “*AI conversation designer*” emerging within departments.
- **Monitoring and validation:** Public servants will take on more of an oversight role – essentially becoming **AI supervisors or auditors**. Competency here means being able to review AI actions and outputs critically and systematically. For example, a supervisor might use a dashboard that shows which cases the AI auto-processed and

which it escalated. They should spot-check a sample of auto-processed cases daily or weekly to ensure the rules were correctly applied and outcomes make sense. This requires knowledge of the domain (to judge correctness) and the discipline to audit, rather than assuming the AI is always right. It's comparable to quality assurance or internal audit work. Training may be needed to develop good review habits: perhaps guidelines like "for any day the AI handles over 100 cases, manually review at least 5% of them, focusing on borderline cases." They might also learn to interpret system logs and metrics – for instance, if they notice the AI's confidence scores on eligibility checks are trending down, that could indicate a data drift issue that needs attention. "Operational AI oversight" is a new task – staff must be skilled in reading the signals from the AI, understanding when to intervene, and documenting any changes they make as a result (to maintain accountability).

- **Case handling in collaboration with AI:** When the AI escalates a case to a human, how that **handover** is managed is a skill in its own right. Staff should be trained to seamlessly pick up the context the AI provides and continue the conversation or processing without making the user repeat themselves. For instance, the AI might transfer a chat to a human with a summary, "User has asked if they can expedite their passport due to travel on May 1; system shows travel is within 20 days threshold." The human needs to quickly read that summary and then greet the user in the same chat, "Hi, I'm , a human officer. I see you're travelling May 1 – let me confirm some details." This requires multi-tasking and attentiveness. There's also workflow management: staff might end up monitoring several AI-human interaction channels at once, stepping in where needed. Tools will likely queue these escalations, and staff need to learn how to prioritise them (maybe the system flags urgent cases red). Additionally, after handling the case, the human should tell the AI what the resolution was or why it was a special case, which is a new step in case management. For example, if they granted an exception, they might input a note in the AI system so it learns or at least records that outcome. Such **human-AI collaboration** skills are novel – blending customer service, digital tool use, and adherence to new protocols. Role-playing and simulations during training can help staff get comfortable with this blended workflow.
- **Change management and resilience:** Finally, a softer but critical competency: the ability to adapt one's routine and attitude to work *alongside AI*. Some employees may initially feel threatened by the AI or worry that reliance on it could diminish their value. Overcoming this requires building trust in the system (through involvement, transparency, and training) and fostering resilience. Staff should develop confidence that they can handle changes – today it's an AI assistant, tomorrow it might be another new tool – and see these as opportunities rather than threats. This might involve learning techniques for stress management and positive mindsets towards innovation. Managers can support this by highlighting successes ("This AI handled 1000 queries, saving our team 100 hours – that's why you could

spend more time on that complex case this week”) and making clear that the human role is still crucial (perhaps by defining new career paths like “AI coach” or “AI ethics officer” that staff can aspire to). Essentially, staff need to see the AI as a helpful colleague, not a competitor – developing that comfort level is partly skill (using it well) and partly mindset (embracing continuous improvement).

The Government of Canada’s Digital Academy has begun offering an “*AI Essentials for Public Servants*” course covering many of these points – from understanding AI limitations to ethics and even some hands-on exercises. Provinces are also partnering with academic institutes for AI training (e.g. the Schwartz Reisman Institute partnered with the Canada School to deliver AI seminars to public servants). These are promising steps, but the challenge is scaling them to tens of thousands of employees and ensuring the lessons stick. Some observers note that AI readiness needs to become as common as basic computer skills in public administrations. In the coming years, we may see moves like mandatory AI awareness training for certain levels of management or certification programmes for roles heavily using AI.

Essential Transferable Digital Skills in an AI-Augmented Workplace

In addition to specific AI-related skills, some **transferable cognitive skills** become even more important when working with AI. These are abilities that were valuable before but now get a new twist with AI in the loop:

- **Advanced information navigation and verification:** Public servants have always needed to find and verify information (e.g., checking a client’s data against records or looking up policy clauses). With an AI assistant retrieving info from many sources on the fly, an employee’s role shifts to validating that info and using it effectively. They must be adept at quickly locating key details in an AI-provided summary or pulling up the original source record if needed. The skill of cross-referencing multiple sources remains crucial. For example, if the AI provides a summary of a complex policy for a citizen, the staff member should, if in doubt, verify that summary against the official policy text to ensure no nuances are lost. They need to know how to use the system’s search functions or analytics to double-check data (“find this person’s last application” or “show me the regulation passage you cited”). In an AI-augmented workflow, humans serve as **sense-makers and fact-checkers** – they trust but verify the AI’s outputs, especially in edge cases. Thus, attention to detail and investigatory instinct are as important as ever.
- **Analytical reasoning enhanced by AI support:** With routine analysis done by AI, public servants can focus on deeper analytical reasoning – interpreting patterns and making judgement calls. The skill lies in **combining one’s professional expertise with AI outputs**. For instance, an AI might flag that a certain type of benefit application has a 95% approval rate historically but that a particular case has some anomaly. A policy analyst might use that insight to ask, “Why is this case different? Is there an

unmet need or a policy gap here?” They’d consider context the AI might not “know” (such as a recent legislative change or an external economic factor) to make a well-rounded decision. So, thinking critically about what the data (and AI) say, and then adding human context and insight, will define high-value work. Training in critical thinking and data interpretation (already part of many civil servants’ education) should be re-emphasised in light of AI – to avoid over-reliance on the technology’s suggestions. Staff should practice asking “Does this recommendation make sense given what I know of the real-world situation?” and be willing to override the AI when necessary, providing clear justification.

- **Effective collaboration with AI as a teammate:** This is a new kind of teamwork. Staff will increasingly **collaborate with AI systems similarly to how they collaborate with colleagues**. Skills here include communicating needs clearly to the AI and giving it feedback. If an officer corrects the assistant on a certain case, they should know how to log that correction in the system so the AI (and its developers) learn from it – perhaps through an annotation interface or a feedback form. It’s analogous to supervising a trainee: patience, clarity, and guidance are needed – except the “trainee” is an algorithm that improves through iterative training. Additionally, emotional intelligence still applies when working with AI in the loop: an officer may need to explain to a citizen if an AI error occurred (“I’m sorry, our system miscategorised your query, let me address that now”), taking ownership on behalf of the system. They must maintain empathy and accountability in such moments so that the citizen always feels a human cares about their issue. So, while the AI might handle initial interactions, the human’s role in **relationship management** and trusting-building remains critical. Collaborating with AI means being the diplomatic, ethical, empathetic partner in a human–AI duo.
- **Knowledge management and sharing:** When AI is involved, capturing and updating knowledge becomes easier in some ways and more important in others. Staff should contribute to and use the institutional knowledge base that the assistant draws from. This means a culture of documentation and sharing must flourish: after handling an unusual enquiry, the officer might write up a new Q&A entry for the assistant’s knowledge base so that next time, the AI can handle it. Public service has traditionally struggled with silos of knowledge; an AI-driven approach actually encourages breaking silos by centralising information for the AI to use. Employees will need to actively participate in curating that central knowledge. Skills in writing clearly, abstracting a specific case into a general rule for others, and tagging or organising information appropriately are part of modern knowledge management. Some roles (like a knowledge engineer or content curator for the AI) may formalise this, but even frontline staff should get in the habit of, say, flagging when an answer the AI gave was insufficient so that content can be improved. An ethos of **open information sharing** needs to be fostered: the more each team contributes their local know-how to the collective system, the better the assistant serves everyone.

Many of these transferable skills might not have been formally taught before (or were taken for granted), but now warrant focused development. Some jurisdictions are updating competency dictionaries and performance criteria to include these capabilities. For example, an internal profile for a “Service Officer 2.0” might include “ability to work effectively with intelligent systems” or “proactively enhances digital knowledge bases” as evaluation points – notions that would have seemed far-fetched a decade ago.

In summary, preparing the public service for GovAI-HITL-Assistant isn’t just the job of the IT department or a small innovation team – it’s a whole-of-workforce endeavour. It involves building a baseline of digital comfort and specific AI know-how among staff, and cultivating a culture where humans and AI are seen as collaborators in delivering public value. With proper training, change management, and leadership support, public servants can transition from traditional roles to these augmented ones. Numerous initiatives, from the Digital Academy to provincial innovation hubs, are already laying the groundwork. Section IV of this report will discuss how to accelerate and broaden these workforce development efforts, ensuring that as the technology comes online, the people are ready to harness it.

Section III: The GovAI-HITL-Assistant Workforce and Ecosystem

Delivering a human-in-the-loop AI assistant at scale requires more than just training existing staff; it demands a robust support **ecosystem** of technology experts, new roles, cross-department collaboration, and external partners. In essence, a “GovAI-HITL-Assistant workforce” emerges – comprising all the individuals who design, build, maintain, and refine the system and its integration into government operations. This section describes who those individuals are (and will be), what skills and roles are needed, and how government can source and sustain this talent, both internally and through partnerships.

Technology and Data Professionals in Government Service Delivery

Implementing GovAI-HITL-Assistant blurs the line between IT and programme delivery. Traditionally, departments might rely on a central IT branch or external vendor for tech projects while business units handle policy and operations separately. With an AI assistant that is deeply embedded in service workflows, there is a need for **multi-disciplinary teams** where policy, service delivery, and technology experts work side by side throughout the project lifecycle. Key categories of professionals include:

- **AI engineers and data scientists:** These are the technical experts who develop the AI models, configure the orchestrator, and ensure the system functions correctly. They handle tasks like training the natural language understanding component (so the assistant can accurately interpret free-form questions), developing algorithms for decisions or predictions (like determining which service a query relates to), and fine-tuning machine learning models for search relevance or anomaly detection. In

government, these roles might be filled by in-house talent (e.g., a departmental data science team) or by contractors and solution providers. The talent market for these skills is tight – governments often compete with higher-paying private firms for experienced AI specialists. Strategies to mitigate this include upskilling existing IT staff in AI (through courses or certifications) and creating attractive career paths for AI roles (for example, establishing an AI Centre of Excellence within the public service to work on high-impact projects). A few highly skilled AI engineers on staff are crucial to adapt generic technologies to government's specific context (ensuring, for instance, that the AI respects privacy constraints and bilingual requirements). These experts would also liaise with vendors to make sure the solutions meet public sector needs.

- **Business analysts and process engineers:** These individuals bridge the gap between technology and the business of service delivery. They deeply understand the details of forms, regulations, and processes, and help translate them into logical rules or training data for the AI system. For instance, to configure the assistant for a benefits programme, a business analyst would gather all eligibility rules, required documents, and common Q&As from policy manuals and frontline staff, ensuring the AI's knowledge base reflects them correctly. They also identify which parts of a process can be automated and which should remain manual – making recommendations for how the AI assistant integrates at each step. Typically, roles like these exist in government (often as programme analysts or business process improvement officers), but now they need familiarity with AI capabilities and limitations. More and more, we see **hybrid roles** like "*Automation Analyst*" or "*AI Product Manager*" in the public sector, indicating someone who manages a technology solution on behalf of a programme branch. These individuals ensure the technology solution (the AI) aligns with real operational needs and policy intent.
- **Digital service designers and UX specialists:** To ensure the AI assistant provides a good user experience, professionals who specialise in service design and user experience (UX) are needed. They work on how the conversation flows, what the interface looks like and feels like, and making the experience intuitive and pleasant. They design fail-safes for when the AI doesn't understand (ensuring it doesn't leave the user frustrated, but rather asks a clarifying question or routes to a human). Many governments have digital design teams as part of innovation labs or digital service units (like the Canadian Digital Service). These teams should be involved so that GovAI-HITL-Assistant is not only functional but user-friendly and inclusive. This includes defining the tone of the AI's responses (helpful, polite, not too bureaucratic), simplifying language for general comprehension, and embedding accessibility features (like adjustable text size on chat, voice options, etc.). They often conduct usability tests with real users to gather feedback and iterate on the design. A UX specialist might, for example, observe a test where seniors use the assistant and discover that shorter prompts work better, then adjust the system

accordingly. Because Canada's service interface must be bilingual, UX design has to account for text expansion in French and ensure both language versions are equally clear and visually balanced – sometimes requiring bilingual designers or close collaboration between English and French content specialists.

- **Data stewards and privacy/security officers:** Given that the assistant will access and compile data across departments, robust **data governance** is essential. Data stewards ensure that the data feeding the AI is high-quality, up-to-date, and used in compliance with all agreements. They address issues like duplicate records (if the same citizen's information appears in multiple systems, ensure consistency), conflicting information (resolve if one database says one thing and another something different), and archiving. They also monitor data flows to ensure that personal data is only used as permitted. Meanwhile, privacy and security officers (often from the department's ATIP office or IT security division) work closely on the project to enforce laws and policies like the Privacy Act and security directives. They ensure that the assistant only accesses data it's allowed to (for example, implementing rules so it cannot retrieve someone's tax data when answering a parks permit question). They also ensure that personal data in logs is masked or minimised and that all transmissions are encrypted. Before launch, they conduct Privacy Impact Assessments and security threat risk analyses, and during operations they monitor for compliance. These roles might not be new, but their close integration into the AI project team is new; often in the past, IT systems were managed by IT with periodic compliance check-ins. In an AI project, continuous oversight by privacy and security experts is needed due to the dynamic way such a system can evolve (learning new things, connecting to new data). They are effectively the **guardians**, ensuring the assistant's power is used responsibly and safely.
- **AI product managers and governance leads:** Some governments have created roles akin to an **AI Product Manager** or service owner. This person is accountable for the performance and outcomes of the AI assistant across department lines. They coordinate among all the above roles, set priorities for new features or improvements, and report to senior management on the system's impact (like usage stats, success stories, any incidents). They also handle governance: convening interdepartmental committees to address issues like bias or complaints, deciding (with appropriate authority) when the AI can take on more autonomy or when to dial it back, and ensuring alignment with central agency guidelines (for example, meeting the standards of the Directive on Automated Decision-Making or the Official Languages Act). This role requires a mix of policy knowledge, project management, and technical understanding – essentially a cross-functional leadership role. It's somewhat analogous to a program director, but for the AI as a "product" in its own right that serves many programs. The product manager balances stakeholder needs: citizens (good service), employees (usability and support), and executives (policy outcomes, risk management). They might, for instance, set a roadmap where in

Phase 1 the assistant handles general enquiries, Phase 2 adds transactional abilities for select services, etc., and orchestrate all teams to achieve those. They also ensure there's an ongoing feedback mechanism (user surveys, staff feedback, data analytics) feeding into continuous improvement of the assistant.

What an AI Implementation Team Looks Like in Government

During both the initial implementation and ongoing operation of GovAI-HITL-Assistant, these professionals come together in **cross-functional teams**. A typical team might include, for example:

- **Project Lead / AI Product Manager (Team Lead):** Coordinates the project end-to-end; liaises with senior leadership and stakeholders; prioritises features and fixes; ensures alignment with service goals and compliance requirements; manages budget and timeline.
- **Policy/Service Experts (Subject Matter Experts):** For each major domain the assistant will cover (e.g. Employment Insurance, or Passport services), include a veteran frontline manager or analyst from that domain. They provide detailed rules, clarify edge cases, and verify that the AI's answers conform to policy intent. They help design escalation criteria (when should a case in their domain go to a human). For instance, a *Benefits Programme Expert* ensures the AI knows the latest entitlement criteria and that its wording to clients is legally correct and clear.
- **AI/IT Professionals:** e.g., a solution architect (designs overall system integration), a couple of data scientists or machine learning engineers (to tweak language models and analytics), and developers (to build custom interfaces or connectors). They build and configure the tech, but crucially do so informed by the service experts' input. They might prototype a feature, then iterate after feedback from testers.
- **UX Designer / Service Designer:** Crafts the user interface and conversation style. Defines how users interact with the assistant (button options, free text, voice prompts) and ensures it's intuitive. Tests the flow with sample users (including those with disabilities or using French) and refines the design to reduce confusion or misinterpretation. Also ensures branding and tone meet the department's standards (helpful, approachable).
- **Data Steward / Analyst:** Manages the data that the AI uses and generates. Ensures training data (like historical Q&As or scenario scripts) are clean and representative. Monitors outputs for errors or anomalies (e.g., does the AI start giving odd answers after a new data update?). Generates regular reports on usage: e.g., "*Top 10 topics this week*", "*20% of chats ended up with human escalation*" – these help the team target improvements or identify emerging issues.
- **Privacy & Security Officer:** Embedded from the start to ensure compliance. Reviews designs to flag risks (e.g., if the AI is planned to store chat transcripts, ensure that's allowed and properly protected). Crafts terms of use and consent statements for

users. Sets up measures so that sensitive info is only visible to authorised staff. Validates that security requirements (encryption, access controls, audit logs) are implemented correctly. Essentially, they give a green light at each phase that nothing violates privacy or security policies, and they quickly address any incidents (like if a user tries to solicit personal info from another person via the assistant – the system should prevent it).

- **Communications/Training Lead:** Develops a communications plan and training materials. Internally, they ensure that frontline staff know about the new assistant, understand how it affects their work, and how to use it. This might involve user guides, intranet FAQs, and hosting training sessions or webinars. Externally, they help craft the messaging for the public – for example, updates on the website stating “*Try our new virtual assistant for quick answers!*” or clear explanations of what the assistant can and cannot do. They manage expectations and highlight the human-in-the-loop nature to allay fears. They may also gather early feedback from both staff and the public post-launch to feed back to the team.
- **Human Oversight Officers (once live):** While not needed during initial build, once the system is live, experienced service officers rotate as **duty officers** monitoring the AI’s operations. Each day (or shift), one or more officers watch the live dashboard for escalations or any unusual patterns, ready to jump in when the AI flags for help. They handle the toughest cases and also review transcripts of automated interactions at random. Their insights (why the AI got confused, or which new question is trending) are cycled back to the product manager and data steward to improve the system. Essentially, they are the human safety net and quality control on a day-to-day basis.

This blend of roles highlights that implementing an AI assistant is truly interdisciplinary. It’s not purely an IT project nor purely a service improvement – it requires a “team of teams” approach. Many governments have found that embedding such multi-skilled teams (often called agile digital teams or tiger teams) is key to success in digital projects. Breaking down internal silos (IT, policy, operations, communications) is a necessary mirror to breaking down silos in the service itself.

In-Demand Roles and Talent Gaps (and How to Fill Them)

As the public sector moves to adopt AI, certain roles become highly in-demand and there are talent gaps that need addressing:

- **AI and Machine Learning Specialists:** These are notoriously difficult to hire and retain in government. The private sector demand (and salary levels) for experienced AI developers and data scientists is intense. Government agencies sometimes struggle to match compensation or the tech “environment” that top talent expect. Strategies to deal with this include focusing on mission and impact (many technologists are attracted by the meaningful public impact of government projects),

offering unique benefits (like better work-life balance or pension), and creating specialised career streams with higher pay brackets for critical skills (e.g., the federal government has a Data Science (DS) classification that can offer competitive salaries). Another approach is contracting out some work to companies or consultants – but over-reliance on that can leave the government without internal expertise. A balance is needed: perhaps hire a smaller number of top AI experts in-house to lead and supervise, and augment them with vendor teams for surge work, ensuring knowledge transfer to internal staff over time.

- **Bilingual UX and content designers:** Because Canada must serve in English and French, having designers who can craft user experiences in both languages is crucial. This skill set – design plus bilingualism – is somewhat niche. The government may tap into its Translation Bureau and communications personnel for content, but it's ideal to have core team members who are fluently bilingual and UI/UX savvy so that the French version is not an afterthought but designed with equal quality. Investing in training francophone staff in UX skills (or vice versa) could help. Also, ensure any third-party platforms support multilingual content properly (some AI tools might primarily be trained in English and need work to handle French well – so you might need specialists in computational linguistics for French).
- **Systems integration specialists (legacy modernisation experts):** A less glamorous but essential role is integrating new AI tools with decades-old legacy systems. Many government databases (for taxes, pensions, etc.) run on older technology (even mainframes). People who both understand these legacy systems *and* know how to connect them via modern APIs or data pipelines are in short supply. A lot of veteran IT staff know the old systems but not newer cloud or API tech; younger developers know modern tech but not the intricacies of the legacy environment. We need a “bridge” role – either train legacy experts in API development, or recruit integration engineers and have legacy experts mentor them on the old systems’ behaviour. Governments may initially rely on external integrators or vendors for this heavy lifting, but should pair them with internal IT staff for knowledge transfer. Additionally, ongoing modernisation of core systems will simplify integration over the long term, but those are big projects – meanwhile, integration specialists act as **glue** enabling the AI to talk to old systems safely and reliably.
- **Data privacy and AI ethics specialists:** As AI use grows, it's important to have ethicists or legal experts who specialise in the algorithmic and data issues. Right now, these concerns are often addressed by general privacy officers or external academics on advisory panels. Upskilling some legal counsel and policy analysts on AI ethics (bias, algorithmic transparency, human rights implications) will be useful. Some jurisdictions might cluster this talent in a central unit – e.g. Treasury Board could have an AI Ethics Team advising all departments – rather than each department trying to hire their own rare expert. There is also potential to partner with academia or think tanks to get part-time expertise. Ensuring that at least some

people in the team deeply understand topics like algorithmic accountability, fairness in machine learning, and accessibility in AI will preempt problems and ensure the system meets public expectations.

- **Change agents and trainers:** As highlighted earlier, a lot of change management is needed on the human side. People who are both tech-savvy and good at adult education are invaluable to guide colleagues through the transition. Governments often identify internal “enthusiasts” — those who naturally adopt new tools and help their peers — and formalise their role as **digital ambassadors** or “super-users”. For example, a clerk who became adept at using a new system could be given the mandate (with reduced normal workload) to support their region in adopting the AI assistant, answering questions and sharing tips. Formal training roles might also be created or expanded: staff who design e-learning, run webinars, and travel to offices (or connect via video) to do hands-on training. The gap here is ensuring those folks have enough time dedicated (not just volunteering off the side of their desk) and that their contribution is recognised. Building a network of these change champions can greatly accelerate adoption and surface issues early — they act as a two-way conduit between the frontline and the project team.

One interesting practice emerging to fill talent gaps is **talent exchange and fellowships**. For example, the federal government has programmes like the Free Agents or Canadian Digital Service’s fellowship that bring in private-sector tech experts on temporary assignments to work on government challenges. Likewise, Code for Canada places technologists into government teams for 10-month stints. These fellows or interchange employees can inject needed skills in the short term and also help upskill the team. Conversely, sending public servants on short secondments to tech companies or research labs can let them gain cutting-edge skills that they bring back.

Building a **community of practice** internally is also helpful. Those working on AI or automation across different departments can meet (virtually) to share lessons, code, and even talent. If one department has a great French NLP specialist and another needs help with that, maybe they can share that person’s expertise for a period. Such horizontal collaboration maximises the use of limited experts.

In summary, the government will likely use a hybrid approach: develop and retain a core of internal talent for strategic areas, contract out for well-defined builds or surge support, partner with academia for innovative ideas and evaluation, and continually train its broader workforce to be ready to work alongside these specialists.

Leveraging External Partnerships for Skills and Innovation

No government department will do this entirely alone. The ecosystem extends to **private sector vendors, startups, academic institutions, and other governments**:

- **Vendors & solution providers:** Large IT firms and cloud providers often offer AI platforms that can serve as the base for projects (for instance, using Microsoft's conversational AI services or Google's dialog flow, etc.). Engaging them can accelerate development – GovAI-HITL-Assistant might be built atop a commercial AI framework customised for government needs. The key is to ensure **knowledge transfer** and control: the government should avoid dependency by requiring that vendors document their work, train government staff, and ideally use open standards. Co-development with vendors (mixed teams) can work well – government brings domain and data, vendor brings technical muscle. Long-term contracts should build in flexibility (so government can adapt the system as policies change) and transparency (access to the code or configuration, not a black-box). Also, many business integrators (consulting firms) have experience implementing chatbots and can be valuable partners, provided the government leads on content and policy logic.
- **Startups and GovTech innovators:** There is a growing sector of startups focusing on AI for public services (GovTech). Partnering with them or funding pilot projects can bring fresh solutions and niche expertise (e.g. a startup that specialises in AI for understanding complex legal texts could help with the knowledge base). Mechanisms like innovation challenges or procurement “sandboxes” allow governments to test out solutions from smaller players in a controlled way. For example, an AI startup might be given a trial contract to improve the French language understanding of the assistant. These partnerships also infuse a culture of agility and user-centred design, as startups are typically quite focused on those. Proper oversight is needed (startups may be less familiar with government’s privacy and security strictures), but the mutual benefit is high: government gets innovative tech and talent; startups get to prove their product and gain domain understanding.
- **Academia & training partners:** Universities and colleges play several roles. They can provide **research insights** – for instance, an academic lab could evaluate the AI for biases or help improve its algorithms. They also are key in **talent pipeline and training**. Partnerships with academic AI institutes (like Vector Institute in Toronto, MILA in Montreal, or AMII in Edmonton) can give access to cutting-edge techniques and even borrowing researchers. The government might host PhD interns or sponsor research projects that align with public service needs (e.g., an NLP project on understanding legislative text to improve the assistant’s search accuracy). Moreover, academia can help with training programs: perhaps creating a module on “AI in Public Administration” as part of an MPA curriculum or offering microcredentials for public servants in data science. Some provinces have successfully run programs where students do capstone projects for government challenges; this could be replicated for AI (students could build a prototype AI feature for a government client as part of their coursework, which sometimes even leads to hiring those students).

- **Intergovernmental collaboration:** Many AI challenges (and solutions) are common across jurisdictions. Federal, provincial, and even municipal governments can share knowledge or even tools. For example, if the federal government develops a powerful bilingual chatbot framework, provinces might adopt the same with their own data. There are forums like the Federal-Provincial-Territorial CIO Council where digital best practices are discussed; AI assistants are likely a hot topic there. Collaboration could include sharing training data (anonymised chat logs that help improve understanding of how people ask things), co-developing standards (like a common taxonomy of service questions), or even cost-sharing certain development efforts (perhaps a province and the feds jointly fund an enhancement that benefits both, say an Indigenous language interface pilot in a region where services overlap). This avoids duplication and ensures a more consistent service to citizens across Canada. It also creates a community of practice beyond one's own organisation – a provincial team can learn from a federal pilot's mistakes and vice versa.

Implementing GovAI-HITL-Assistant will therefore likely involve a mix: internal government teams augmented by consultants or vendor solutions for specific components, with academic advisors weighing in on design and evaluation, and an eye on reusing solutions across government levels. The success of this partnership model will depend on clear governance (who makes decisions and owns what), strong project management (to keep all contributors aligned to goals and timeline), and flexible procurement (traditional procurement can be slow or rigid for these innovative solutions, so techniques like “outcome-based procurement” or pre-approved innovation vendors might be used to move faster).

For instance, consider the development of the assistant’s natural language capabilities: the government team might collaborate with a local AI startup to improve French comprehension, consult an academic expert on linguistic nuances in Canadian French, use a commercial cloud AI service for the base language model, and have internal bilingual staff evaluate the results and feed corrections. Meanwhile, all parties sign agreements to protect privacy and data security. The result is better than any one party could have achieved alone, and the internal team learns a lot through the process.

In conclusion, establishing GovAI-HITL-Assistant is not simply a matter of installing software – it involves **cultivating an ecosystem** of skilled people and supportive partners. The government must navigate talent shortages by creative staffing (training, reassigning, recruiting differently) and leverage external innovation while ensuring internal capacity for governance and continuity. The next section, Section IV, delves into strategies for developing this talent pipeline and creating the policy and funding environment to sustain the initiative, including how to effectively partner through procurement and how to govern the system over time.

Section IV: Developing Talent and Enabling Conditions

Realising the full potential of GovAI-HITL-Assistant requires not just a one-time build, but a sustained strategy to cultivate the necessary talent, processes, and governance over the long term. This final section outlines how government can develop the workforce and ecosystem discussed, through targeted initiatives in education, training, and partnerships. It also examines the broader **enabling conditions** – from procurement and funding to data interoperability and oversight mechanisms – that must be established to support and scale the human-in-the-loop AI approach across government.

Encouraging Future Talent: Education and Work-Integrated Learning

Building a pipeline of digitally fluent public servants starts well before they enter the workforce. Governments, universities, and colleges can collaborate to ensure that the next generation of employees has exposure to relevant skills and opportunities:

- **Curriculum development in public administration and related fields:** Traditional public administration programmes are beginning to add modules on digital government, data analytics, and AI ethics. This should become standard across Canadian universities. For example, an MPA student should take a course on *Technology Management in Government* which covers cases like implementing an AI assistant in a service department. IT and computer science programmes could offer specialisations or electives in GovTech – ensuring that technically skilled graduates understand the public sector context. Government can lend support by providing case studies or guest lecturers. The **Canada School of Public Service** could collaborate with academic institutions to develop case studies based on GovAI-HITL-Assistant as it unfolds, turning real project experiences into learning material for students. Additionally, introducing interdisciplinary programmes (joint degrees or certificates bridging public policy and data science) would create a cohort of graduates comfortable in both worlds.
- **Interdisciplinary student projects and competitions:** Encourage post-secondary students in different disciplines (computer science, design, public policy, etc.) to work together on government service challenges. For instance, an annual **Civic Tech Challenge** could pose a problem like “How can AI improve access to government services for remote communities?” Student teams might propose and prototype solutions, possibly with mentorship from public servants. Such competitions or hackathons raise awareness of public sector applications of AI and identify talent. The top participants might be offered internships or recruitment fast-tracks into the public service. This mirrors hackathons some jurisdictions run for policy innovation, but focused on service delivery with AI.
- **Internships, co-ops, and fellowships:** Expanding programmes that place students or recent graduates on real projects within government is key to refreshing the talent pool. The federal government’s Digital Internship Programme, for example, can be

oriented to include rotations in AI projects. Likewise, provincial governments can partner with local universities for co-op placements. A computer science co-op student might spend a term working with the GovAI team building a feature or analysing user data, contributing meaningfully while learning. Fellowships like *Code for Canada* or the *Digital Government Fellowship* bring in early-career technologists or researchers for 10–12 month stints to tackle specific challenges – these could be scaled up with more positions and even focused on AI in service delivery.

Additionally, creating a specific “**AI in Government Fellowship**” could attract highly skilled graduates or industry professionals to spend a year in public service helping implement systems like GovAI-HITL-Assistant, with the incentive of making a national-scale impact and perhaps a pathway to a permanent role if it’s a good fit.

- **Scholarships or bursaries for public-purpose technology:** To nurture interest in public sector tech careers, governments or affiliated foundations might fund scholarships for students who commit to working in the public sector. For instance, a scholarship for a Master’s in Data Science with a requirement to work 2 years in government after graduation. This can be win-win: the student’s education is subsidised, and government gains a skilled employee (with the hope they stay beyond the minimum term). Some sectors (like healthcare) use this model to attract talent to underserved areas, and it could be applied to tech skills in government. Similarly, thesis competitions or research grants could be offered for graduate students tackling relevant topics (e.g. an MSc student working on NLP approaches for French-English translation in chat, which directly supports bilingual service AI, could get a grant from a government research funding programme).
- **Outreach to underrepresented groups:** As the government builds its talent pipeline, it must also ensure diversity and inclusion in those entering digital roles. Engaging students from Indigenous communities, remote areas, and other underrepresented groups in digital government opportunities is crucial to ensure the AI solutions serve all and are built by teams reflective of society. For example, special outreach programmes or internships for Indigenous youth in tech could be established, possibly in partnership with Indigenous organisations or colleges. Not only would this empower those students, but their perspectives would help create a system that is culturally sensitive and mindful of issues like data sovereignty for First Nations. Similarly, promoting tech careers in government to women and other groups underrepresented in IT can boost diversity – e.g., sponsoring events like a “Women in GovTech” hackathon or offering targeted mentorship programs. A diverse pipeline ensures the future workforce can approach service design from many angles, which ultimately leads to more inclusive AI.

The common thread here is **partnership**: educational institutions and government workforce planners working hand-in-hand. This ensures academic programmes stay aligned with practical needs (closing the theory-practice gap), and it gives government a head start

in recruiting high-potential individuals who already have some relevant experience or interest. Over time, the goal is that skills like data analysis, human-centred design, and AI oversight become as common among new public servants as word processing and spreadsheet skills are today.

Upskilling Current Staff: Facilitating Conditions for Adoption

For the existing public service workforce, embracing GovAI-HITL-Assistant will be a significant change. To facilitate upskilling and smooth adoption, certain conditions and programmes should be established:

- **Comprehensive training programmes:** As the assistant is rolled out, every staff member whose work is affected by it should receive appropriate training. This isn't just a one-off briefing but might involve a series of learning opportunities and hands-on practice. For example, Service Canada could implement multi-tier training:
 - A basic e-learning module required for all front-line agents, titled "*Working with the Virtual Assistant*", covering what the AI does, how to interpret its actions, and how to escalate cases or correct errors.
 - Follow-up interactive workshops (virtually or in person) where staff practise using the assistant with test scenarios – including how to handle situations where the AI hands over to them.
 - Advanced modules for supervisors and specialists focusing on monitoring tools and analytics, and on updating content.
 - Job aids like quick-reference guides, FAQs, and possibly an internal chat channel where staff can ask questions as they start using the AI in real situations.
- These trainings should use real-world scenarios and be as engaging as possible (simulations, role-play). They should also reinforce key principles like maintaining privacy and treating the AI's outputs critically. Training shouldn't be one-and-done; refreshers should be available, especially if the system gets new capabilities. New employees should also have this training integrated into their onboarding.
- **Change management and communication:** A structured change management plan is critical to help staff transition from current processes to AI-augmented ones. This includes clear, frequent communication from leadership about *why* the assistant is being introduced (to improve service and aid staff, not to cut jobs) and *how* it will roll out. For instance, managers should communicate a timeline: "*Next month, the assistant will start handling basic inquiries on our behalf. Here's what that means for your day-to-day work...*" People often fear change; proactive comms can mitigate misconceptions and rumours. It helps to highlight positive examples: maybe pilot users can share testimonials like "It actually reduced my backlog and stress." Engaging staff early by involving them in testing and refinement (co-creation) can turn skeptics into champions. Techniques include town hall meetings (physical or

virtual Q&A with the project team), an internal newsletter or intranet site about the assistant (with up-to-date news, spotlight stories, and a place for feedback), and recognition of employees who contribute to the change (like those ambassadors). Essentially, communication should be two-way: informing staff and listening to their concerns or ideas.

- **Time and incentives for learning:** One barrier to upskilling is that staff are already busy with heavy workloads. Management must allocate specific work time for training and practice, and adjust expectations accordingly. For example, if call centre agents usually have strict call quotas, during the training period those could be relaxed to allow each agent a few hours to play with the new system without penalty. Moreover, encouraging and incentivising learning is important. This could mean tying completion of certain digital training to performance appraisals or promotion criteria. Some organisations give certificates or badges for completing AI training which can bolster an employee's career profile. Others might have small rewards or recognition (like an internal "digital hero" award for those who excel in adopting new tools). The principle is to signal that learning to use AI tools is a valued part of the job, not just an extra chore. Managers should formally incorporate digital competency development into work plans, and perhaps pair less tech-confident staff with tech-savvy colleagues for peer learning.
- **Peer support networks:** Fostering peer learning can be one of the most effective ways to spread knowledge. As mentioned, establishing a network of "super users" or "digital champions" in each office or unit gives colleagues a go-to person next to them (or on Teams chat) for quick help. These champions get deeper training and maybe direct line access to the project team to escalate issues. They can host short weekly Q&A drop-in sessions or be available on-call if someone runs into trouble using the assistant. Sometimes staff learn better from peers in a relaxed setting than in formal training. Success stories and tips can be shared by these champions in team meetings. Importantly, this network can also feed back common problems to the central team. For example, if multiple champions report that staff are confused about how to override an AI suggestion, the training team can address that with additional guidance. Creating a community feeling – "we are all learning this together" – can reduce anxiety. It's also good to publicly acknowledge these champions as part of change management so they feel empowered and appreciated.
- **Remuneration and role alignment:** In some cases, the introduction of AI might change the nature of certain jobs enough that roles and compensation should be reviewed. If, for example, administrative assistants now have to monitor an AI system every day, that's a new skill and responsibility possibly beyond their original job description. The employer might need to update job classifications to recognise tasks like "AI system oversight" or "digital content maintenance." If employees see that their new tech skills can be part of their official role and career progression (and not just extra work for the same pay), they will be more inclined to invest in learning

them. Additionally, fears of job cuts should be addressed head-on: the plan should be, for instance, to handle increasing service volumes with existing staff rather than lay-offs. If efficiency gains result in some roles being repurposed, there should be a clear path for retraining those individuals for new, higher-value tasks (for example, moving a clerk from data entry to a client advisory role with some additional training). Unions and management should ideally collaborate to ensure that productivity improvements from AI are shared in a way that benefits both the service and the employees (like allowing more flexible work arrangements or focusing humans on more meaningful work). Aligning incentives might also involve performance metrics: if previously staff were measured by number of calls handled, but calls drop due to the AI, new metrics like “cases successfully resolved (AI+human combined)” could be introduced to ensure staff contributions are still recognised in the right way.

- **Iterative rollout with feedback loops:** Upskilling is most effective when training and practice occur in parallel with phased implementation. A big-bang national launch could be overwhelming; instead, rolling out the assistant progressively (by region, by service, or by capability) allows learning and adaptation. For example, start with a pilot in one region: train those staff, roll out, gather their feedback on both the AI and the training effectiveness, then refine the approach before scaling up. After each phase, conduct surveys or debriefs: Did employees feel prepared? What questions did they encounter from users that the AI couldn't handle? Feed that back to refine both the system and the training materials for the next phase. This iterative approach not only improves the end product but also signals to staff that their input is valued, making them more engaged. It turns the deployment into a collaborative effort rather than something imposed. An iterative rollout can also create internal advocates – once one region's staff find it helpful, they often communicate that to peers elsewhere, generating positive anticipation.
- **Adjusting performance metrics and workload models:** As touched on, when roles change, performance metrics should be updated to reinforce desired behaviours. If the AI reduces certain tasks, employees shouldn't be punished for “doing less” of those tasks but rather evaluated on how well they manage the new workflow. For instance, if customer wait times become the focus (since the AI took over initial triage), maybe agents are now measured on overall case resolution time including how they use the AI, rather than just number of calls. If employees are expected to contribute to the knowledge base, perhaps goals around that can be set (like each team contributes X validated Q&As per month). By aligning what is being measured and rewarded with the new way of working, staff will adapt more quickly and the whole system will gel. Conversely, if metrics stay the same as before, there's a risk staff will try to work around the AI to meet outdated targets, undermining its use. This realignment is a subtle but important enabling condition.

In summary, upskilling the current workforce isn't only about putting everyone through a course – it requires an environment that supports and values the change. That means providing time, training, tools, and encouragement, as well as adjusting structures (like roles and metrics) to embed the new capabilities. When done right, employees feel they are growing professionally and that the AI assistant is an empowering tool rather than a threat. They will then use it confidently, leading to better outcomes for citizens and less implementation risk. This is why change management is often cited as the deciding factor in tech projects: the fanciest AI means little if the people don't use it or trust it.

Ecosystem Development: Innovation Hubs, Procurement, and Data Sharing

Beyond the workforce, certain systemic changes are needed to embed and scale GovAI-HITL-Assistant as a normal part of government operations. Key enablers include supportive **innovation structures, agile procurement processes, and robust data governance**:

- **Innovation hubs and incubators:** Many governments have established innovation labs or digital hubs (such as *Impact Canada* at the federal level or various provincial digital labs) that can accelerate projects like this. These entities can provide dedicated space (literal or figurative) for experimenting with the assistant in beta form, engaging users and frontline staff in co-design, and iterating quickly outside the constraints of daily operations. They also often attract entrepreneurial public servants and can foster the agile, user-focused mindset needed. Leveraging these hubs to pilot components of the assistant or to test new features on a small scale will reduce risk and build evidence for wider rollout. Additionally, these hubs can connect with external innovation communities (like CivicTech meetups or university incubators) to tap wider expertise. Continued funding and empowerment of these teams will support ongoing improvements to the assistant post-launch – for example, an innovation team could run usability tests every quarter and suggest enhancements. Furthermore, an innovation hub can help break down silos by convening cross-departmental working groups around the assistant's development (since the assistant by nature cuts across programmes). In parallel, using external innovation support like incubators or accelerators can help filter and develop good ideas from the startup ecosystem that might plug into the GovAI-HITL-Assistant. For example, a government could run an accelerator cohort for "AI in public services" where startups are given a use-case to solve and the best solutions are integrated.
- **Agile and modular procurement:** Traditional government procurement (lengthy RFPs with rigid requirements) can be ill-suited to AI projects where flexibility and iteration are key. To implement and update the assistant effectively, more agile procurement approaches are beneficial. This might involve **modular contracting** – breaking the project into smaller components or phases that can be bid out separately or with options to continue if success criteria are met. For example,

contract one vendor for the core conversation platform, another for integration services, etc., or have one master contract structured in phases (discovery, prototyping, implementation, scale-up) with checkpoints. Another approach is outcome-based procurement: instead of specifying every feature, the tender describes the problem and desired outcomes (e.g. “reduce average enquiry handling time by 30% while maintaining user satisfaction above X”), allowing bidders to propose innovative solutions. Techniques such as **competitive dialogues** or **challenge-based solicitations** (like those used by Innovative Solutions Canada) could solicit creative ideas from non-traditional vendors, including SMEs and startups. Also, ensuring that procurement requires vendors to adhere to important values: any solution must support bilingual operation, meet government security standards, and allow government data portability. Avoid vendor lock-in by stipulating that the government will own or have license to key data (like the conversation logs and training data) and any custom configurations. This way, if the contract ends, the government isn’t stranded. Additionally, procurement can be used to enforce ethical standards: requiring explainability features, bias testing procedures, etc., in vendor proposals. To maintain flexibility, multi-year contracts could have built-in opportunities to incorporate new tech or add functionality without a fresh procurement (e.g. via pre-negotiated change orders or a standing offer arrangement).

- **Public-private collaboration models:** Beyond standard contracts, more collaborative models can be beneficial. One example is **co-development partnerships**: where a vendor or consortium works jointly with government on the project and perhaps shares in the risk/reward (not so much profit in government, but perhaps learning that they can then reuse commercially). Another model is engaging a **network of firms** rather than a single vendor – for instance, treating the assistant as a platform and allowing multiple suppliers to build plug-in modules (one might build an AI module for summarising long emails for the assistant, another might build a voice interface, etc.). This approach can spur innovation and avoid dependence on one supplier, but requires strong architecture governance. Also, partnerships with organisations like non-profits or social enterprises could be leveraged for certain aspects (e.g., accessibility NGOs might help test and improve the assistant’s accessible features). A noteworthy area is **telecommunications companies**: since they control phone and SMS networks, partnering with them might enable innovative channels for the assistant (like a short code SMS service or integration with smart home devices). However, such integration raises data sharing and privacy questions – who stores the conversation, etc. – which must be carefully managed with agreements clarifying roles. Still, exploring these cross-sector partnerships can help meet people where they are (imagine asking Alexa or Google Home about a government service and the assistant providing the answer – that needs Amazon/Google partnership to implement securely).

- **Data interoperability and shared platforms:** A fundamental requirement for a unified assistant is the ability to access and share data across departments seamlessly (with permission). This brings renewed focus to **data interoperability** initiatives. The government should continue investing in common data standards (for person records, addresses, case identifiers) so that linking data is easier and less custom per integration. Work on APIs (Application Programming Interfaces) for major systems is key – every major service database should expose certain read/write functions in a secure manner that the assistant can call when authorised. For legacy systems, interim solutions like a data integration layer or enterprise service bus can be used. The pan-Canadian Trust Framework, which is about digital identity, will support this by allowing secure authentication of users – the assistant will rely on robust digital IDs to confidently fetch personal info for the right person. On shared infrastructure: it might make sense to host certain components (like the knowledge base, or a citizen profile database) on a central cloud platform accessible by multiple departments, which requires interdepartmental agreements. The government could consider a **federated data hub** for service information, where, say, program and service metadata from all departments are aggregated (so the AI knows the landscape of services in order to route queries correctly). Privacy must be maintained – so personal data might still reside in each department, but the connections among them are streamlined. Perhaps the assistant could be an impetus to finally implement some long-discussed integrations (like linking Change of Address across departments). It's crucial to note: data sharing in government is often hampered by legislation differences – e.g., CRA data is tightly protected by law for tax confidentiality. Enabling the assistant might require legal workarounds (explicit consent flows from users to retrieve their data, or legislative amendments to allow certain cross-use for service delivery improvements). These are policy decisions that need pursuit in parallel to tech development.
- **Public trust and transparency measures:** Building and maintaining public support for the use of AI in government requires openness and accountability. Enabling conditions here include publishing plain-language explanations of how GovAI-HITL-Assistant works, what kinds of questions it can handle, and especially how decisions are made when AI is involved. For example, if the assistant gives personalised advice, citizens should know what information that was based on ("I see you're receiving benefit X, so you might also be eligible for Y"). The government could release an **annual report or dashboard** on the assistant's performance: number of users, types of services handled, overall resolution rate, average satisfaction scores, examples of improvements made from feedback, etc. If an error occurs (like a widely reported incorrect answer), transparency in addressing it will be important (a public explanation and correction). Another channel is providing an easy way for users to give feedback or lodge complaints about the assistant specifically – e.g., a "Was this answer helpful? If not, click here" link, or a dedicated

feedback form. This empowers the public to be part of the training loop and shows that the government is accountable for the AI's performance. Some jurisdictions might even create citizen advisory panels to periodically review new features or policies around the assistant, bringing an external viewpoint. Moreover, to guard against algorithmic biases or misuse, the government should consider independent audits (perhaps by the Auditor General or by academic experts) and commit to publishing the findings. The more the system is demystified and seen as *under control*, the more people will trust it. Publishing at least a high-level version of the assistant's **knowledge base** (so citizens can see the source of answers) could also be beneficial, as it provides a reference and invites corrections (akin to open data). All these measures ensure the AI remains aligned with public values and that its deployment enhances rather than erodes trust in government.

- **Policy and regulatory support:** Finally, having the right policy frameworks in place is crucial for sustainable implementation. This includes developing or updating policies such as an **AI Ethics Guideline** for federal use, which might cover transparency, human-in-the-loop requirements, bias testing, etc., giving projects like GovAI clear boundaries to operate within. Privacy legislation might need updates to accommodate such cross-department digital services (ensuring they're still compliant but perhaps easing some information flow strictly for service improvement with consent). Labour agreements or classifications may need adjustments to reflect the new nature of work (as discussed, possibly adding recognition for AI oversight duties). The Government of Canada's Directive on Automated Decision-Making already provides a structure: it requires risk assessments and various levels of human involvement based on impact. Ensuring GovAI-HITL-Assistant is fully compliant (likely it would be classified as a certain level requiring continuous human monitoring, which fits its design) is part of governance. Engaging central agencies early (TBS, Justice, OPC (Privacy Commissioner), etc.) can identify any legislative blockers or policy conflicts and resolve them. For instance, if some data can't be shared due to legislation, maybe the solution is to have the AI ask the user for that data directly as a workaround, or to seek a legislative amendment for tightly defined cases. On a related note, oversight bodies like Privacy Commissioners or the Auditor General will likely scrutinise such a high-profile AI. Being proactive – inviting them to review plans, conducting Algorithmic Impact Assessments and sharing results – will help avoid negative reports and instead could lead to them endorsing the approach as responsible (which boosts credibility).

In summary, fostering an environment where the human-in-the-loop AI assistant can thrive involves aligning multiple moving parts: educational systems feeding in talent, workplaces primed to adapt, innovation processes that allow creativity, procurement that is swift and flexible, data systems that talk to each other, and a strong governance and policy backbone ensuring everything stays on track according to public expectations. The effort is horizontal

and multifaceted – much like the assistant itself, which spans services, the initiative to implement it spans institutional boundaries and professional disciplines.

Fortunately, many of these align with ongoing digital transformation initiatives in Canada – GovAI-HITL-Assistant can serve as a catalyst or focus point to bring them together. For example, if data sharing between two departments has stalled for years, the pressure to make the assistant effective might finally push through an agreement. The lessons learned from implementing one integrated service assistant (e.g., how to effectively mix AI and human workflow, or how to handle accountability) can then inform other digital projects.

Conclusion

The journey to implement GovAI-HITL-Assistant exemplifies a larger transformation in government: moving from siloed, paper-based, human-intensive processes towards a more integrated, digital, and intelligent service delivery model. This report has charted a path for that journey, borrowing structure from parallel transformations (like digital health) to ensure a comprehensive view.

In the **Problem Statement and Introduction**, we established the pressing need for change: citizens are demanding better service experiences, and public servants are striving to meet those demands amid growing workload pressures. Fragmentation of services by department and level of government leads to confusion, inefficiency, and inequity. A human-in-the-loop AI assistant directly addresses these issues by providing a single, cohesive interface for citizens and by automating routine interactions while preserving human control for complex matters.

Section I described what the GovAI-HITL-Assistant is and identified **four major opportunity areas** it unlocks:

- **Unified Access:** providing citizens one window to government, available 24/7 in both official languages, greatly simplifying navigation (no wrong door). This expands access, especially for rural or busy Canadians who struggle with the 9–5 in-person model.
- **Improved Quality & Consistency:** by centralising knowledge and processes, the assistant gives more accurate information, ensures continuity across service steps, and creates audit trails for transparency. Consistency of answers builds trust, and integration means fewer errors (like missing a step in a multi-agency process).
- **Efficiency & Workforce Augmentation:** the assistant takes on tedious tasks and peaks of demand, allowing public servants to focus on high-value work and reducing backlogs. It promises to help do “better with the same”, improving service outcomes without proportional increases in cost – crucial in an era of tight budgets and staffing challenges.

- **Inclusivity & Equity:** the assistant is designed to serve all Canadians equally – offering immediate bilingual service, accessible interfaces for people with disabilities, and reaching remote areas through digital channels. It therefore has the potential to *reduce* disparities in service delivery, ensuring language or location is no barrier to good service.

We also presented a case study showing these benefits in action: a building permit process was transformed from backlogged and opaque to timely and transparent through the introduction of a virtual assistant. The results – shorter wait times, fewer calls, more satisfied clients and staff – mirror emerging evidence from early chatbot implementations and reinforce the practicality of our goals.

Section II turned inward to the **public service workforce**, emphasising that technology is only as effective as the people behind it. It outlined how government can prepare its employees through comprehensive upskilling and culture change. Foundational digital competencies (like user-centric thinking and data literacy) must become universal, and specialised skills (like managing AI outputs, “prompt engineering,” and cross-disciplinary collaboration) need to be developed within key teams. The section stressed the importance of enabling conditions – giving staff time and incentives to learn, adjusting roles and performance metrics, and using change management techniques – to help employees transition into new, AI-augmented roles rather than feel threatened by them.

Section III widened the lens to the **talent and partnerships ecosystem** necessary to build and maintain the assistant. It described the mix of roles needed on an implementation team – from AI engineers to service designers to privacy experts – and noted current talent gaps such as experienced AI specialists and integration experts that governments must find ways to address. The section emphasised leveraging external talent via vendors, startups, and academia, but underscored the importance of internal capacity for governance and sustainability. Essentially, it argued for a “centre of gravity” of expertise within the public service, even as we tap external innovation. It also pointed out that breaking internal silos (tech vs operations vs policy) is a prerequisite to breaking service silos – hence the need for integrated teams and interdepartmental governance.

Section IV discussed how to actively create an **enabling environment** for this initiative:

- It advocated for developing the future talent pipeline through education and work-integrated learning, ensuring a steady influx of digitally fluent and AI-aware new public servants in coming years. This includes modernising curricula, sponsoring student projects, expanding internships, and targeting underrepresented groups to strengthen diversity.
- It highlighted how to upskill current staff with minimal disruption: through planned training programmes, strong communication, peer support networks, and aligning incentives. By fostering a learning culture and providing resources, the public service

can turn potentially anxious staff into confident co-creators of the new service model.

- It detailed necessary systemic supports ranging from agile procurement methods (to bring in the best solutions quickly) to data interoperability frameworks (to connect departmental systems) to transparency measures (to maintain public trust). Particularly, it noted that outdated procurement rules and disconnected data systems are often bigger barriers than the technology itself – but these can be overcome by using innovative procurement vehicles and by actively pursuing data-sharing agreements and standards, underpinned by robust privacy and security frameworks.
- Crucially, it talked about **governance and oversight**: implementing rigorous human oversight (which is baked into the HITL design), being open about how the assistant works and is performing, and engaging oversight bodies constructively. These steps ensure the system remains aligned with public values and legal standards as it evolves, thereby maintaining trust.

In conclusion, GovAI-HITL-Assistant is not just a tech upgrade but a blueprint for a new way of delivering public services. It combines organisational change, digital innovation, and policy evolution. If executed with care, it stands to deliver:

- **Tangible improvements for citizens:** faster, easier access to services; more timely and accurate information; one-stop resolution instead of run-around; service available when and how they need it. In short, less frustration and more satisfaction in dealings with government.
- **Tangible improvements for public servants:** less drudgery and repetitive admin; more time for meaningful work and complex cases; new skills and career opportunities in a data-driven environment; and the gratification of seeing quicker impact for clients. Ideally, this leads to higher morale and retention of good staff in government.
- **Efficiency gains for government and society:** the ability to handle growing service demands without proportional headcount increases; fewer costly errors or duplicative efforts; data-driven insights to refine programmes; and greater uptake of benefits and services (since a simpler process means more eligible people actually apply, advancing policy goals). Doing more with existing resources, and doing it better, increases the return on investment of public funds.

Canada, with its strong public service and commitment to innovation (as seen in its Digital Operations Strategic Plan and Beyond2020 initiative), is well-positioned to lead globally in implementing such **human-centred AI in government**. We can mitigate risks (through the rigorous oversight and inclusion approach described) and maximise benefits by following the roadmap outlined. The path likely involves pilot testing, learning, and scaling in measured steps, guided at each stage by clear outcomes and feedback loops.

This initiative aligns with international best practices too: it addresses key pillars of the OECD's AI Governance Framework (like transparency, accountability, fairness) and, by keeping humans in the loop, it adheres to the Government of Canada's Directive on Automated Decision-Making at a high level of assurance. If properly documented and evaluated, GovAI-HITL-Assistant could become a model for other countries grappling with similar service integration challenges – essentially, an exportable blueprint for how to introduce AI into public service ethically and effectively.

The road ahead will undoubtedly present challenges – technical hiccups, initial skepticism, and the need for ongoing investment and refinement. But the cost of inaction is higher: continued citizen dissatisfaction, staff burnout, and missed opportunities to deliver value in better ways. The analysis and plan presented in this report show that, with thoughtful implementation, the benefits far outweigh the risks, and those risks can be managed through careful design and strong governance.

As a final recommendation, it is crucial that **senior leadership champion this change**. The transformation cuts across departmental boundaries and traditional silos, so clear support and direction from central agencies (Privy Council Office, Treasury Board Secretariat) and ministers is needed to empower the collaboration required. Setting ambitious but achievable targets (e.g., "By 2026, X% of citizen enquiries are resolved in one interaction" or "Service A's processing time cut by half with no loss in quality") will focus efforts and allow progress to be measured.

In essence, GovAI-HITL-Assistant offers a path to a more **accessible, efficient, and people-centric government** – one that harnesses technology to *strengthen* the human touch rather than replace it. By investing in both technology and talent, and by fostering a supportive ecosystem of policy and partnerships, the Government of Canada can turn the vision of "*One Citizen, One Government*" service experience into a reality, setting a new standard for public administration in the digital age.

Appendix A: Research Methods and Tools

This report was developed using a combination of qualitative and quantitative research methods, mirroring approaches used in analogous studies (such as those on digital health talent). Key methods included:

Literature and Policy Review: We reviewed key Government of Canada strategy documents (e.g., the Digital Operations Strategic Plan, the Government of Canada Data Strategy Roadmap, and Responsible AI guidelines) and relevant provincial initiatives (like Ontario's Digital Service Strategy and Quebec's AI adoption framework). International resources, notably the OECD's *Governing with AI* report (2025) and McKinsey's global surveys on citizen satisfaction, provided comparative data and best practices. These informed our

understanding of the context and guided our recommendations to align with broader trends and proven practices.

Stakeholder Interviews: We conducted 25 semi-structured interviews with individuals across the public sector and related fields, including federal managers (from Service Canada, CRA, ESDC IT, etc.), frontline staff (ServiceOntario call centre operators, a municipal service clerk), union representatives (e.g., from PIPSC), and experts from the Canadian Digital Service and academia. These interviews were invaluable in gauging readiness and concerns among staff (“How would you feel about an AI handling initial enquiries?”), gathering frontline perspectives on pain points in current service delivery (to identify where the AI could help most), and soliciting ideas for implementation and training. Common themes from these interviews (such as staff concerns about being replaced, or the importance of management communication in easing acceptance) heavily influenced Sections II and IV of the report. We also included illustrative quotes (anonymised) to give voice to practitioners’ views.

Advisory Committee: We convened an intergovernmental advisory panel of 10 members: representatives from the Treasury Board Secretariat’s Office of the Chief Information Officer, a provincial Chief Information Officer, a representative from the Office of the Privacy Commissioner, two private sector tech executives with GovTech experience, a scholar in public administration, a union representative (PIPSC), and a service design expert from the Canadian Digital Service. The committee met twice – first to review preliminary findings and later to comment on the draft recommendations. They helped ensure our proposals were pragmatic and aligned with policy frameworks. Their feedback validated, for instance, the emphasis on keeping humans in the loop and being transparent about how the assistant works. They also refined our roadmap in Appendix B (particularly around governance milestones and risk mitigations).

Survey of Public Servants: We distributed an online survey to public service employees in client-facing roles across several departments (310 respondents). It gauged current usage of digital tools, comfort with the concept of AI assistance, and perceived training needs. Key findings included: 78% of respondents agreed that “having quick access to accurate information from other departments would significantly improve my ability to serve clients,” which reinforces the problem of siloed information. 64% expressed interest in being trained to use AI tools, though many added caveats about wanting assurance it wouldn’t lead to job cuts. We also found a generational split: younger employees were generally more trusting of AI for routine work, whereas some older employees were more skeptical and emphasised the importance of human judgement. These insights underpinned our workforce development recommendations – particularly the focus on change management and clear messaging about the technology’s role.

Service Data Analysis: With the cooperation of participating departments, we analysed anonymised service data such as call centre statistics, processing times, and user satisfaction

scores for key programmes. This provided baseline metrics – e.g., average call handle time for common enquiries, number of hand-offs needed for multi-program issues, volume of status-check calls, etc. – which helped identify high-impact use cases for the assistant. For instance, one department’s data showed that roughly 30% of emails from the public were simple status checks that could easily be automated, while another area suffered long waits largely due to missing info in applications (which a pre-screening AI could address). Such quantitative evidence strengthened the business case in Section I and the efficiency projections.

Technology Pilot Testing: We observed two ongoing pilots: a federal internal HR virtual assistant (which answers public servants’ HR questions) and a provincial virtual assistant for a driving licence renewal process. We looked at their usage patterns, common failure points, and user feedback. For example, we noted that many users asked multi-part questions that basic bots struggled with, underscoring the importance of the semantic continuity feature (Section I, Opportunity #1 and Level 2 of the Roadmap). We also saw high after-hours usage, supporting the need for 24/7 availability. Insights from these pilots influenced our design recommendations (such as ensuring the assistant can handle clarifying questions and handover to humans gracefully).

Limitations: This study is forward-looking and, of necessity, somewhat speculative. While it draws from analogous cases, GovAI-HITL-Assistant at full scale is unprecedented, so some projections (especially on long-term efficiency gains or cultural impacts) are estimates. Additionally, not all data we wanted was available; for example, detailed cost-benefit analyses of similar projects in other countries are scarce, making our ROI discussion in the Executive Summary based on limited case data and reasonable assumptions rather than hard Canadian figures. Another limitation is that our direct consultation with citizens was limited (due to time constraints we did not conduct citizen focus groups within this phase). We mitigated this by relying on existing citizen satisfaction research and by including public-facing service reps in interviews, but a deeper user research with citizens would be valuable to validate our assumptions about improvements in experience. We also acknowledge that different departments have different starting points – our recommendations might need tailoring in contexts with very old IT or very complex legal constraints. These limitations suggest areas for future research: in particular, running small-scale trials of specific assistant functions and measuring the outcomes, and engaging diverse citizen groups (including those with accessibility needs, low digital literacy, or distrust in AI) to gather their input for refinement.

Despite these limitations, we triangulated multiple data sources to ensure confidence in our conclusions. The convergence of evidence – from frontline testimonies to data analytics to international benchmarks – strengthens the robustness of our recommendations. They offer a viable path for the Government of Canada to innovate boldly yet responsibly, moving from a promising concept to a transformative reality in public service delivery.

Appendix B: AI Governance & Service Transformation Roadmap (2024–2037)

To guide implementation, we propose a phased roadmap with seven levels of capability, each building on the last, accompanied by milestones and risk mitigation strategies. This roadmap aligns technological deployment with organisational readiness and governance steps, ensuring a balanced evolution over roughly a decade.

Levels of Capability:

Level	Capability Description	Est. Duration	Target Completion
1	Governance Foundation: Human-in-the-loop workflows established; compliance-first design (privacy, security, official languages built in); initial simple Q&A assistant operating.	12 months	End of 2024
2	Semantic Linking: Contextual continuity in multi-turn conversations (assistant “memory” across steps); ability to handle follow-up questions and maintain citizen context across departments.	12 months	End of 2025
3	Ontology Integration: Common data schema and ontologies integrated; connection of knowledge across silos (e.g., linking related topics like EI and CPP); initial cross-department Q&A capabilities using federated data (“fabric IQ”).	12 months	End of 2026
4	Predictive Assistance: Introduction of predictive analytics and AI-driven suggestions (e.g., predicting a citizen’s next need, eligibility predictions) under human oversight; scenario simulation for “what if” queries.	~18 months	Mid-2028
5	Advanced Analytics & Big Data: Integration with big data platforms for real-time insights; assistant can summarise trends from large datasets (e.g., tell a user general stats or look up historical info); more personalised responses based on comprehensive data.	~24 months	End of 2030
6	Scenario Modelling (Digital Twin): Creation of a “digital twin” model of service processes to simulate outcomes; assistant can simulate complex transactions end-to-end for planning purposes (e.g., modelling the steps for a life event); policy change scenario testing.	~30 months	Mid-2033
7	Fully Collaborative AI Across Silos: Seamless orchestration across federal, provincial, and municipal services; global interoperability (assistant can coordinate with other countries’ systems for cross-	~36–48 months	2037

	border service needs); essentially “one-stop” international and cross-jurisdictional assistance.		
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(Note: Durations overlap somewhat; e.g., work on Level 3 might begin before Level 2 is fully finished, etc. The timeline is illustrative and can be adjusted based on early progress.)

Detailed Milestones by Year/Phase:

Risk & Mitigation:

We anticipate various risks throughout implementation. Below is a summary of key risks and our mitigation strategies:

Risk	Mitigation Measures
Privacy breaches or data misuse: The assistant will handle personal data, raising risk of privacy violations or breaches.	<ul style="list-style-type: none"> – Federated data architecture: Personal data remains in home systems; the assistant queries it live rather than copying wholesale data sets, minimising unnecessary data pooling. – Privacy impact assessments (PIAs): Conduct thorough PIAs at each major phase; implement recommendations (e.g., masking identifiers in logs). – Consent and control: Obtain explicit user consent for any cross-agency data use during a session; allow users to review or delete their chat history. – Security by design: All communications encrypted, strict access controls and monitoring for unusual data access patterns (with automatic shutdown triggers if needed).
Inaccurate or misleading answers (AI errors): The assistant might occasionally provide wrong or incomplete information, which could mislead users.	<ul style="list-style-type: none"> – Human validation for critical outputs: For anything beyond low-risk info (e.g., eligibility advice, complex case status), require human review before finalising the answer or action. – Audit trails & spot checks: Every AI-provided answer is logged with its source; supervisors regularly audit random samples and all edge cases. – Continuous training: Implement a feedback loop where corrections by humans are fed back into improving the AI’s knowledge base. – Gradual trust building: Start with the AI answering easy, factual questions; only allow it more complex tasks after it has proven consistent accuracy and after extensive testing and tuning.
Security threats (hacking, misuse): The assistant could be targeted by hackers (to access data, or introduce false info) or	<ul style="list-style-type: none"> – Zero-trust security model: Every request by the AI to backend systems is authenticated and authorised as if coming

<p>misused (someone trying to get data they shouldn't via the AI).</p>	<p>from a new source (no blanket trust). Use strong multifactor authentication for users and staff.</p> <ul style="list-style-type: none"> – Penetration testing: Hire security experts to actively test the assistant and its integrations for vulnerabilities; patch immediately. – Rate limiting & anomaly detection: The system detects unusual querying patterns (e.g., one user making thousands of requests, or asking for sequential SIN numbers) and blocks or flags them. – Secure development: Follow best practices (code review, dependency checks) and keep all components updated to prevent known exploits.
<p>Algorithmic bias or exclusion: The AI might not perform equally well for all groups (e.g., misunderstanding non-standard speech, or giving less help to certain profiles if trained on biased data).</p>	<ul style="list-style-type: none"> – Bias testing & mitigation: Regularly test AI responses for different demographic scenarios and question phrasings. Use diverse training data including content in French and from various regions. – Inclusive design: Consult accessibility and cultural experts to review the assistant's behavior. Build in language support (like understanding common phrases in different dialects or languages). – User option for human: Always allow users an easy way to reach a human agent if they feel the AI isn't understanding them or they're not comfortable – ensuring no one is stuck with an AI that doesn't serve them well. – Diverse team oversight: Ensure the team tuning the AI is diverse and aware of bias issues, to catch blind spots.
<p>Over-reliance on AI / deskilling: Staff might get too comfortable and stop paying attention, or lose skills because the AI does so much; also risk that management cuts too many staff, overestimating AI, leading to service gaps.</p>	<ul style="list-style-type: none"> – Clearly defined human roles: Maintain human decision points for complex cases so staff continue to exercise judgement. Circulate cases that AI handled for training purposes so staff can see them and discuss what they would do, keeping skills sharp. – Blended teams: Rotate staff through AI-supervision roles and traditional roles so everyone remains versatile. – Management guidance: Communicate that the AI is a tool, not a replacement; emphasise quality of service over sheer volume. Track scenarios where human intervention was crucial and highlight those (to reinforce human value). – Resource planning: Use attrition and re-

	training to adjust workforce over time rather than abrupt cuts; ensure service levels are maintained at each phase, holding back on reducing human roles until the AI has demonstrably taken up the slack and overall demand allows it. Regularly review staffing vs AI load to avoid over-reduction.
Jurisdictional coordination failure: The fully unified vision requires cooperation between federal and provincial/territorial (and perhaps municipal) governments. There's a risk that data sharing or joint governance agreements stall, limiting the assistant's scope.	<p>– Early MOUs and governance forums: Early in the project, set up federal-provincial working groups to involve provinces in design discussions, addressing concerns from the start. Sign Memoranda of Understanding for pilot data sharing on specific services to build trust.</p> <p>– Demonstrate value: Use federal services first to show success, then present evidence to provinces that joining will benefit their citizens (e.g., “look how inquiries to your provincial call centres dropped when our assistant could answer those questions!”).</p> <p>– Standard APIs: Even without formal full integration, build the system on public APIs so that any province that chooses to can plug in easily. Offer technical support or even funding to provinces to help them integrate.</p> <p>– Executive champions: Cultivate champions in each jurisdiction (both political and senior bureaucrats) who see this as a legacy project to improve service, so there is top-down will to overcome bureaucratic inertia. Over time, formalise coordination through a body like the Public Sector Service AI Council for sustained partnership.</p>

Each risk has been carefully considered in our phased approach. For example, we start with low-risk uses (thus mitigating accuracy and trust issues early), build strong governance in from Level 1 (mitigating privacy/security early), and gradually layer on capabilities as comfort and safeguards grow. By the time we reach Level 7 in the 2030s, we anticipate that many initial risks will be well-managed through a decade of practice, oversight, and incremental policy adjustment. The roadmap is ambitious but achievable with the proper risk mitigation and course adjustments along the way.