



Deliverable D1.16

4th GDI quarterly implementation report

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WP Leaders	Laura Carletti (1. ELIXIR Hub)		
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Authors	Melissa Konopko, Juan Arenas Marquez (ELIXIR Hub), Dylan Spalding (CSC)		
Contributors	All GDI Nodes		
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1. Executive Summary

The European Genomic Data Infrastructure (GDI) is a deployment project co-funded by the Digital Europe programme. GDI's main objective is to realise the data infrastructure required by the 1+MG initiative to share high-quality genotypic and phenotypic data across borders, the 1+MG Virtual Cohort. Countries participating have committed to reach a concrete operational level before the end of the project (progressing across different phases: onboarding, deployment or operational), which will require them to fulfil technical and non-technical requirements.

In addition, the establishment of required technical capacity in each Node has been identified as a critical factor for the success of the project and the long-term sustainability of the data infrastructure and the initiative.

This document presents the results of the initial European Genomic Data Infrastructure monitoring activities laid out in [D1.12¹](#) that are initially focussed on:

- **the deployment of the technical expertise** required to deploy and operate the European Genomic Data Infrastructure to share access to data across borders, building the technical capacity to run the infrastructure beyond the end of the project, and,
- **the evolution of the European Genomic Data Infrastructure Nodes.** GDI Nodes will transition across different phases in their journey to be fully operational and integrated into the European Genomic Data Infrastructure.
- **identifying capacity-building actions required to target onboarding.** We acknowledge the different access to skills and resources each GDI Node has which implies that GDI Nodes will evolve and reach operational readiness at different speeds. We will use the information collected from GDI Nodes to identify gaps and opportunities to build capacity across the nodes both at the technical level and not technical levels to accelerate the journey across the different phases. In this case, we will focus on the onboarding phase.

These monitoring processes and tools aim to support GDI Nodes in their journey by assessing their progress on a quarterly basis and providing them with useful guidance and recommendations to reach their individual and project objectives, summarised in the commitment to have **6 Nodes technically operational by 2024**. This will be extended to **15 Nodes by 2026** with three additional Nodes reaching deployment and two more Nodes reaching onboarding.

A summary of the information collected every quarter will be presented to the 1+MG Group (in addition to being shared with project participants) in order to gather the contributions and support of the 1+MG Group on the direction of travel and their assistance in removing any roadblocks that could be identified.

The information presented here corresponds to the status of the Nodes by M15.

¹ <https://zenodo.org/record/7576210#.ZEYoBuzMJqs>



The current scope and content of the quarterly report could be updated if there is a need to modify it to better support the countries in their commitments or to facilitate reaching the overall project's initiatives. For instance, monitoring of the volume of data available in the European Genome Dashboard or via the 1+MG infrastructure could be implemented in the near future.

B1MG² has released the first full version of the 1+MG Framework <https://framework.onemilliongenomes.eu/> which is a useful resource to build capacity and facilitate the dissemination of the 1+MG recommendation and guideline coming from the project support the implementation (B1MG, GDI, GoE, EHDS,.....). The first official release in November 2023 is comprised mainly of B1MG outputs, but this alone could help GDI members to navigate recommendations and understand how the different components work together and align with the EHDS. The framework will now be updated and maintained by GDI, thus incorporating the latest resources that support the vision of the 1+MG initiative.

² <https://b1mg-project.eu/>





2. Contribution towards project outcomes

With this deliverable, the project has reached or the deliverable has contributed to the following project outcomes:

Outcomes	Contributed
<p>Outcome 1</p> <p>Secure federated infrastructure and data governance needed to enable sustainable and secure cross border linkage of genomic data sets in compliance with the relevant and agreed legal, ethical, quality and interoperability requirements and standards based on the progress achieved by the 1+MG initiative.</p>	Yes
<p>Outcome 2</p> <p>Platform performing distributed analysis of genetic/genomic data and any linked clinical/phenotypic information; it should be based on the principle of federated access to data sources, include a federated/multi-party authorisation and authentication system, and enable the application of appropriate secure multi-party and/or high-end computing, AI and simulation techniques and resources.</p>	Yes
<p>Outcome 3</p> <p>Clear description of the roles and responsibilities related to personal data and privacy protection, for humans and computers, applicable during project lifetime and after its finalisation.</p>	No
<p>Outcome 4</p> <p>Business model including an uptake strategy explaining the motivation, patient incentives and conditions for all stakeholders at the different levels (national, European, global) to support the GDI towards its sustainability, including data controllers, patients, citizens, data users, service providers (e.g., IT and biotech companies), healthcare systems and public authorities at large.</p>	No





<p>Outcome 5</p> <p>Sustained coordination mechanism for the GDI and for the GoE multi-country project launched in the context of the 1+MG initiative.</p>	<p>No</p>
<p>Outcome 6</p> <p>Communication strategy – to be designed and implemented at the European and national levels.</p>	<p>No</p>
<p>Outcome 7</p> <p>Capacity building measures necessary to ensure the establishment, sustainable operation, and successful uptake of the infrastructure.</p>	<p>Yes</p>
<p>Outcome 8</p> <p>Financial support to the relevant stakeholders to enable the extension, upgrade, creation and/or physical connection of further data sources beyond the project consortium or to implement the communication strategy and for capacity-building.</p>	<p>No</p>





3. Methods

The methods and processes to gather the monitoring information were established in [D³1.12](#). In this report, we will present and analyse the data initially collected as part of the periodic reporting exercise.

4. Description of work accomplished

Project participants and GDI Nodes were asked to provide the monitoring information related to the deployment of the technical expertise and the self-evaluation of the Node status.

4.1 Monitoring of the technical expertise deployment - Q4 results

4.1.1 Deployment of technical expertise at the GDI Node Level - Q4

As a result, the data show that **41.2%** of the expected technical expertise to be in place on average during the duration of the project was deployed. However, this has increased by almost 10% since the last quarter, so this shows marked improvement. All countries have started to use their allocated FTEs with particular countries (such as Belgium and France) that may need targeted support.

Project participants have reported delays in recruitment and some of them are also reorganising the national activities, which is expected to still have an effect in the forthcoming reports while the technical experts get fully deployed across all GDI Nodes.

We have noted that the trend of slow deployment of resources is ongoing and we will continue to monitor it in the coming reports. The Work Package 5 meeting in March 2024 has started to help give Nodes clarity on what Pillar II will provide and what is expected from them. However, further development in this area is still required. This should serve as guidance on how best to use the FTEs that they have been granted in the project and we anticipate this will support Nodes in technical expertise recruitment. If the lack of deployment continues by June 2024, we will need to consider alternatives to address the situation, reallocating resources to relevant project activities supporting the 1+MG ambition, for example:

- Support additional countries in joining GDI.
- Increase involvement of Nodes in WP6 to build data management capacity across all Nodes to accelerate the flow of data in compliance with the 1+MG Framework (<https://framework.onemilliongenomes.eu/ehds-data-lifecycle>)
- Guidelines/processes to prepare primary use data for secondary use, data quality aspects
- Federated/Distributed analytics Governance
- Making legacy data (<https://dashboard.onemilliongenomes.eu/>) data available for 1+MG (including synthetic data generation)
- Additional activities in order to accelerate Node deployment

³ <https://zenodo.org/record/7576210#.ZEYoBuzMJqs>





Table 1 Deployment of technical expertise across GDI Nodes

Technical expertise deployment Pillar II				By M15	Based on inputs from 92.3%
GDI Node	Operational Readiness (target)	Baseline FTEs	Actuals FTEs	Actuals / Baseline	
Belgium	Operational	4.0	0.2	4%	
Czech Republic	Operational	4.0	1.4	35%	
Denmark	Operational	4.0	1.5	37%	
Estonia	Operational	4.0	2.9	72%	
Finland	Operational	4.7	2.7	58%	
France	Operational	4.0	0.1	3%	
Germany	Operational	4.0	0.7	18%	
Italy	Operational	3.9	0.6	15%	
Luxembourg	Operational	4.3	0.9	22%	
Portugal	Operational	4.0	2.5	62%	
Slovenia	Operational	4.0	1.9	47%	
Spain	Operational	5.0	0.5	11%	
Sweden	Operational	4.5	3.8	84%	
The Netherlands	Operational	5.0	1.9	38%	
Norway	Operational	4.0	0.6	16%	
Bulgaria	Deployment	1.8	2.0	109%	
Latvia	Deployment	2.0	1.6	79%	
Lithuania	Deployment	2.0	2.6	129%	
Croatia	Onboarding	1.0	0.3	31%	
Ireland	Onboarding	1.0	0.7	68%	
Total:		71.1	29.3	41.2%	





4.2 Monitoring the evolution of the European Genomic Data Infrastructure Nodes - Q4 results

- The main purpose of the GDI Nodes Operational Readiness data gathering is to monitor the Nodes' journey and identify capacity-building actions that will help them meet their targets by the end of the project.
- The Nodes have begun to define their timeline for advancement along the defined path towards operational readiness as illustrated in D3.2. However, this deliverable received limited input from the Nodes. Indicative timelines have been established for countries that have not provided a new roadmap based on the original data given at the onset of the project. More details on each Node have been gathered at the WP5 face-to-face meeting in March 2024 and will be used to fill in some Pillar II knowledge gaps in this space. During the March meeting, Nodes timelines for the fulfilment of the commitments established in the [1+MG Roadmap](#) and the project were presented ([see annexe V](#)) as well as recommended actions to demonstrate the development of technical capacity, the coordinator will follow up with the Nodes to ensure follow-through.
- There are two different views provided from the collected data, detailed in the following sections: 4.2.1: The level of operational readiness and 4.2.2: the overall percentage of progress across all indicators.
- Further analysis of the overall progress has been provided to identify capacity-building and other actions required to support nodes to reach the onboarding stage and beyond, as indicated by the Node roadmap.

4.2.1 GDI Node Operational Readiness level - Q4 results

- The GDI Node Operational Readiness level shows the expected phase Nodes should have attained by the time that the data is collected: Onboarding, Deployment and Operational, and where the GDI Nodes see themselves (self-evaluation) at the time of providing the information.
- The Q4 progress is relatively similar to that of Q3 due to a couple of contributing factors. The winter holidays likely caused a slow down in forward momentum, but several Nodes noted they require some critical information to be decided at a project and governance level before they can move forward. Much of this information will be developed based on the outcomes of the WP5/Pillar I joint meeting in March 2024.
- At this point, no Node has attained the Onboarding level, although 11 Nodes have committed to reaching it at this point. However, several Nodes have made significant progress with Ireland now joining France and Sweden in completing 100% of the Non-technical Onboarding



indicators (see Annexe I) and 14 countries have reported that they have now completed 50% or more of the combined technical and non-technical steps required, bringing them into a position to complete the steps in the next two quarters.

- The Spanish Node has clarified the Node roles in question last quarter, and are showing 59% of Onboarding steps completed.





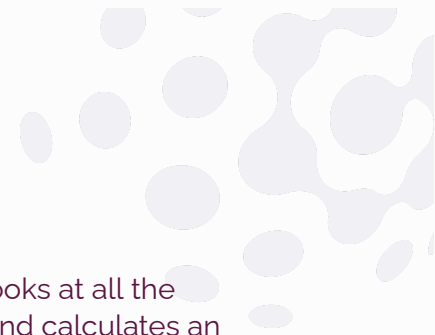
Table 2 GDI Nodes Operational Readiness level by M15

GDI Node Operational Readiness	Start date Duration By Month	2022-11		Overall status: No expectations for nodes to reach onboar yet	
		48			
		15	2024-1		
Operational Phase (2026)	GDI Node	Vanguard Node?	Expected Phase	Current Phase	Management Board comments and recommendations
Operational	Belgium	Yes	Onboarding	TBD	N/A
Operational	Czech Republic		Onboarding	TBD	N/A
Operational	Denmark		TBD	TBD	N/A
Operational	Estonia		TBD	TBD	N/A
Operational	Finland	Yes	Onboarding	TBD	N/A
Operational	France		Onboarding	TBD	N/A
Operational	Germany		TBD	TBD	N/A
Operational	Italy		Onboarding	TBD	N/A
Operational	Luxembourg	Yes	Onboarding	TBD	N/A
Operational	Portugal		Onboarding	TBD	N/A
Operational	Slovenia		Onboarding	TBD	N/A
Operational	Spain	Yes	Operational	TBD	N/A
Operational	Sweden	Yes	Onboarding	TBD	N/A
Operational	The Netherlands	Yes	Onboarding	TBD	N/A
Operational	Norway	Yes	TBD	TBD	N/A
Deployment	Bulgaria		TBD	TBD	N/A
Deployment	Latvia		TBD	TBD	N/A
Deployment	Lithuania		TBD	TBD	N/A
Onboarding	Croatia		TBD	TBD	N/A
Onboarding	Ireland		TBD	TBD	N/A
Onboarding	Cyprus		TBD	TBD	N/A
Onboarding	Hungary		TBD	TBD	N/A
Onboarding	Malta		TBD	TBD	N/A
Onboarding	Romania		TBD	TBD	N/A
	Phases (Metrics)		Plan	Actual	
	Onboarding		10	0	
	Deployment		0	0	
	Operational		1	0	
	TBD		9	20	

Note: The “Expected Phase” is based on the Node Roadmap provided in D3.2. For the countries that have not given an updated timeline, the default timeline provided during the planning phase has been used.



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4.2.2. GDI Node general progress indicator - Q4 results

The GDI Node general progress indicator view, provides us with a metric that looks at all the individual steps across all the phases of the GDI Node Operational Readiness and calculates an indicator of progress (%) based on how each individual question, regardless of its level, has been answered, assigning a score as follows:

- 1.0 if the step has been met,
- 0.5 if the step has been met partially or,
- 0.0 if not met or not reported



Table 3 GDI Node general progress indicator and comparison with previous quarter data

	GDI Node Operational Readiness		Step Phase Type			
	Operational Phase (2026)	GDI Node	Expected Phase	Vanguard Node	Progress indicator: (Yes =1, Partially =0.5)	Change since previous quarter
M15 Reporting Complete	-	-	-	-	-	-
yes	Operational	Belgium	Onboarding	Yes	25%	-3%
yes	Operational	Czech Republic	Onboarding		19%	1%
yes	Operational	Denmark	TBD		37%	0%
yes	Operational	Estonia	TBD		13%	0%
yes	Operational	Finland	Onboarding	Yes	43%	4%
yes	Operational	France	Onboarding		26%	6%
yes	Operational	Germany	TBD		25%	3%
yes	Operational	Italy	Onboarding		26%	6%
yes	Operational	Luxembourg	Onboarding	Yes	21%	0%
yes	Operational	Portugal	Onboarding		37%	0%
yes	Operational	Slovenia	Onboarding		18%	1%
yes	Operational	Spain	Operational	Yes	25%	25%
yes	Operational	Sweden	Onboarding	Yes	44%	0%
yes	Operational	The Netherlands	Onboarding	Yes	35%	0%
yes	Operational	Norway	TBD	Yes	32%	4%
yes	Deployment	Bulgaria	TBD		9%	4%
yes	Deployment	Latvia	TBD		12%	3%
yes	Deployment	Lithuania	TBD		10%	0%
yes	Onboarding	Croatia	TBD		9%	0%
yes	Onboarding	Ireland	TBD		13%	10%
no	Onboarding	Cyprus	TBD		3%	3%
no	Onboarding	Hungary	TBD		0%	0%
no	Onboarding	Malta	TBD		6%	6%
no	Onboarding	Romania	TBD		0%	0%
100%						3%

For a breakdown of progress within the Onboarding indicators, see Annexe I. Progress has been made from the last report (M12) with an average of 3% increase across all indicators and Nodes since



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the previous quarter. There was a slower pace of advancement this quarter for the reasons mentioned above. Countries expect to be unblocked after certain governance and related technical decisions that were made at the WP5/Pillar I meeting in March 2024. And, well-aligned with the levels of technical expertise deployment seen in Table 1, several countries have noted that further advancements can be made once local experts have been hired.

4.2.3. GDI Node general progress indicator - Capacity building actions

At this point in the project, only Spain has planned to achieve a stage beyond Onboarding, so support for advancement is focussed on these indicators. That said, there has been an overall 10% increase in progress on Deployment non-technical indicators across all Nodes since last quarter. Spain has recently overcome some internal political challenges and has made significant progress in a short time. As four new Nodes have been added to the reporting, some indicators show a lower percentage of overall completion since last quarter, but this is an artefact of the expansion of the project. Looking at the information provided by the Nodes, clear actions emerge to build capacity both across Technical and non-technical requirements (see [Annexe II](#)). As done for each Node's total, a "yes" answer is considered 100% complete, a "no" is 0% and "partially" is 50%:

- Steps with 0-25% completion across all Nodes
 - **Compliance and stress tests drafted and refined in the context of 1+MG requirements**
 - **Action:** A workshop was completed during the Pillar II technical workshop in Rome October 9-11. [Results can be found here](#) and were shared with the Nodes to support future progress. Several Nodes have requested a workshop to support decision making here and is planned for after the WP5/Pillar I meeting in March 2024.
 - **Have developed a national genomic plan or similar that secures long-term funding that matches the target implementation level.**
 - **Action:** GDI Coordination and ISCIII are planning a workshop to share experiences once new countries have joined, making use of task 1.6 National mirror groups support. It will be in Q2 2024.
 - **Have deployed and validated an instance or PoC or an upgraded version incorporating additional use cases**
 - **Action:** The detailed explanation of this indicator requires that the proof of concept has been implemented and tested. Most Nodes indicated that they have met most of the requirements, outside of the testing. This matches the fact that no Nodes have completed their drafting of compliance and stress tests as indicated above. Dissemination and implementation of the results of the Rome stress & compliance test workshop should help as well as the upcoming compliance testing online workshop. However, it won't have immediate effects as it requires technical development to take place in each Node. We will keep monitoring progress on this indicator and use the planned



Pillar II meetings of WP3 meetings to reinforce the support to Nodes to complete this step.

- **Security mitigation, management, and reporting system being drafted.**
 - **Action:** Will share best practices from Nodes that have completed this step, both as a document in a private repository and as a presentation in a forthcoming meeting. Organisation for this is underway.
- Steps with 26-40% completion across all Nodes
 - **API use cases considered, specifications drafted and implementation in progress**
 - **Action:** In general, the Nodes are in a state where they are drafting their use cases and what will be required to meet them, with some Nodes working on hiring someone to manage this. The March WP5 face-to-face meeting outcomes will help us understand the needs and expectations of the Nodes to support them in meeting their use cases.
 - **Decision on services and components utilised**
 - **Action:** The October 2023 workshop in Rome moved this forward. The WP4/Pillar I F2F (mentioned above) created outcomes that should support this as well, several countries have mentioned waiting for results from this upcoming meeting before making final decisions.
 - **Load of synthetic data, functionalities demonstrated in development environment**
 - **Action:** Many Nodes have partially completed this, loading the data into a test environment, but functionalities still need to be tested. This follows the above issues of needing to complete compliance testing and will be supported by the incorporation of the output from the Rome workshop.

5. Results

- Use of resources has increased by 10% since last quarter, however still remains low. We will continue to monitor the situation and will make recommendations to the General Assembly after discussion with the Management Board if required.
- Within the Nodes that were expected to have already reached the Onboarding stage, the two most commonly incomplete indicators are the compliance and stress tests and the completion of a National Genomic Plan. Recent outputs, the upcoming compliance testing workshop, and the National Genomic Plan workshop should support advancement in these identified gaps. However, it is not expected to have an immediate effect as it requires technical and governmental activities to take place in each Node and country, so we will keep monitoring the indicators and reinforce the support during the planned Pillar II / WP3 meetings.
- Additional capacity-building actions have been identified.





6. Discussion

While some GDI Nodes have raised questions about the fact that a concrete phase can't be attained without fulfilling both technical and non-technical steps, we understand that this is a stage of the model that would prompt internal discussion within the GDI Nodes, not only at the technical level but at the strategic level too, which is crucial to ensuring the infrastructure can be deployed and operated in the long term.

7. Conclusions & Impact

Use of resources trend needs to be followed up and potential actions in addition to the one included in the preliminary analysis in section [4.1.1](#) could be identified to ensure resources are properly utilised to establish a sustainable infrastructure in case the trend is confirmed in the next two reports.

Identified technical capacity-building actions (section [4.2.3](#)) could be accommodated as part of the current plans for the annual Pillar 2 retreat while non-technical ones would be tackled in a separate workshop organised by the coordinator with the support of the team looking after the national mirror groups in WP1.

8. Next steps

The next gathering of information from Nodes will take place in May 2024.





Annex I. GDI Node general progress indicator table - Onboarding Summary

M15 Reporting Complete	Operational Phase (2026)	GDI Node	Expected Phase	Vanguard Node	Progress indicator: (Yes =1, Partially =0.5)	Change since previous quarter	Onboarding Overall Progress	Onboarding Tech Progress	Onboarding Non Tech Progress
yes	Operational	Belgium	Onboarding	Yes	25%	-3%	68%	69%	67%
yes	Operational	Czech Republic	Onboarding		19%	1%	50%	44%	67%
yes	Operational	Denmark	TBD		37%	0%	77%	75%	83%
yes	Operational	Estonia	TBD		13%	0%	41%	38%	50%
yes	Operational	Finland	Onboarding	Yes	43%	4%	91%	94%	83%
yes	Operational	France	Onboarding		26%	6%	64%	50%	100%
yes	Operational	Germany	TBD		25%	3%	68%	63%	83%
yes	Operational	Italy	Onboarding		26%	6%	64%	56%	83%
yes	Operational	Luxembourg	Onboarding	Yes	21%	0%	64%	56%	83%
yes	Operational	Portugal	Onboarding		37%	0%	86%	94%	67%
yes	Operational	Slovenia	Onboarding		18%	1%	55%	50%	67%
yes	Operational	Spain	Operational	Yes	25%	25%	59%	56%	67%
yes	Operational	Sweden	Onboarding	Yes	44%	0%	95%	94%	100%
yes	Operational	The Netherlands	Onboarding	Yes	35%	0%	68%	75%	50%
yes	Operational	Norway	TBD	Yes	32%	4%	77%	81%	67%
yes	Deployment	Bulgaria	TBD		9%	4%	27%	25%	33%
yes	Deployment	Latvia	TBD		12%	3%	36%	25%	67%
yes	Deployment	Lithuania	TBD		10%	0%	32%	13%	83%
yes	Onboarding	Croatia	TBD		9%	0%	27%	25%	33%
yes	Onboarding	Ireland	TBD		13%	10%	41%	19%	100%
no	Onboarding	Cyprus	TBD		3%	3%	9%	13%	0%
no	Onboarding	Hungary	TBD		0%	0%	0%	0%	0%
no	Onboarding	Malta	TBD		6%	6%	18%	6%	50%
no	Onboarding	Romania	TBD		0%	0%	0%	0%	0%
100%						3%	60%	55%	72%



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Annex III. GDI Node general progress indicator table - Deployment

	GDI Node Operational Readiness	Step Phase Type						2.1.1	2.1.2	2.2.1	2.2.2	2.3.1	2.3.2	2.4.1	2.5.1	2.6.1	2.7.1	2.8.1	2.9.1	
		Operational Phase	GDI Node	Expected Phase	Progress indicator: (Yes = 1, Partially = 0.5)	Change since previous quarter	Deployment Tech Progress	Deployment Non Tech Progress	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment
									Non Technical	Non Technical	Technical	Non Technical	Non Technical	Technical	Technical	Technical	Technical	Technical	Technical	Technical
M15 Reporting Complete	Operational Phase	GDI Node	Expected Phase	Progress indicator: (Yes = 1, Partially = 0.5)	Change since previous quarter	Deployment Tech Progress	Deployment Non Tech Progress	Storage and network capacity needs achieved ad hoc by hosting institution	Common software development best practises employed	Minimal set of APIs for the five functionalities	Have built national capacity (ELSI, data quality, data standards, technical infrastructure functions) for the deployment of the 1+MG node	Network and storage meets reliability, robustness, performance, security, and capacity requirements	Deployment of 1+MG national node for connection to the staging environment with synthetic data loaded	Implementation & successful performance of compliance and stress tests of node in isolation	Have completed the initial data load of synthetic data and linking to staging version of 1+MG European Infrastructure	Deployment of 1+MG national node but it is not yet connected to the 1+MG Infrastructure	Communication established with user portal and 1+MG Infrastructure	Have finalised the initial deployment of national 1+MG production node enabling data access across borders in a staging environment	Production version ready to be deployed within the wider GDI	
yes	Operational	Belgium	Onboarding	25%	-3%	6%	13%	Partially	No	Partially	No	No	No	No	No	No	No	No	No	
yes	Operational	Czech Republic	Onboarding	19%	1%	0%	25%	Partially			Partially									
yes	Operational	Denmark	TBD	37%	0%	0%	75%	Partially	Yes	No	Partially	Yes	No	No	No	No	No	No	No	
yes	Operational	Estonia	TBD	13%	0%	0%	0%	No	No	No	No	No	No	No	No	No	No	No	No	
yes	Operational	Finland	Onboarding	43%	4%	19%	75%	Yes	Yes	Yes	Partially	Partially		Partially	No	No	No	No	No	
yes	Operational	France	Onboarding	26%	6%	0%	50%	Partially	Partially		Partially	Partially								
yes	Operational	Germany	TBD	25%	3%	6%	13%	Partially			Partially									
yes	Operational	Italy	Onboarding	26%	6%	0%	50%	Partially	Yes		Partially			No						
yes	Operational	Luxembourg	Onboarding	21%	0%	0%	0%	No	No	No	No	No	No	No	No	No	No	No	No	
yes	Operational	Portugal	Onboarding	37%	0%	19%	38%	Yes	Partially	Partially	No	Yes	No	No	No	No	No	No	No	
yes	Operational	Slovenia	Onboarding	18%	1%	0%	0%	No	No	No	No	No	No	No	No	No	No	No	No	
yes	Operational	Spain	Operational	25%	25%	0%	50%	Partially	Yes	No	Partially	No	No	No	No	No	No	No	No	
yes	Operational	Sweden	Onboarding	44%	0%	13%	88%	Yes	Yes	Partially	Partially	Yes	No	No	No	Partially	No	No	No	
yes	Operational	The Netherlands	Onboarding	35%	0%	25%	63%	Yes	Yes	Partially	Partially	No	No	No	Partially	No	Yes	No	No	
yes	Operational	Norway	TBD	32%	4%	13%	38%	Partially	Partially	Partially	No	Partially	No	No	No	Partially	No	No	No	
yes	Deployment	Bulgaria	TBD	9%	4%	0%	0%													
yes	Deployment	Latvia	TBD	12%	3%	0%	0%	No	No	No	No	No	No	No	No	No	No	No	No	
yes	Deployment	Lithuania	TBD	10%	0%	0%	0%	No	No	No	No	No	No	No	No	No	No	No	No	
yes	Onboarding	Croatia	TBD	9%	0%	0%	0%	No	No	No	No	No	No	No	No	No	No	No	No	
yes	Onboarding	Ireland	TBD	13%	10%	0%	0%													
no	Onboarding	Cyprus	TBD	3%	3%	0%	0%													
no	Onboarding	Hungary	TBD	0%	0%	0%	0%													
no	Onboarding	Malta	TBD	6%	6%	0%	0%													
no	Onboarding	Romania	TBD	0%	0%	0%	0%													
100%				3%	5%	5%	29%	17%	25%	4%	0%	8%	4%	0%	0%	0%	4%	0%	0%	
								50%	63%	71%	67%	79%	96%	96%	96%	92%	96%	100%	100%	
								33%	13%	25%	33%	13%	0%	4%	4%	8%	0%	0%	0%	



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Annex IV. GDI Node general progress indicator table - Operational


M15 Reporting Complete	GDI Node Operational Readiness	Step Phase Type						3.1.1	3.2.1	3.3.1	3.4.1	3.5.1	3.6.1	3.7.1	3.8.1	3.9.1	3.7?	3.7?	
		Operational Phase (2026)	GDI Node	Expected Phase	Progress indicator: (Yes = 1, Partially = 0.5)	Change since previous quarter	Operational Tech Progress	Operational Non Tech Progress	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational
									Technical	Technical	Technical	Technical	Technical	Technical	Technical	Technical	Technical	Non Technical	Non Technical
								Periodic review of security of existing infrastructure to make sure it complies with current best practice	APIs assessed against users needs and feedback, updates scheduled	Periodic auditing and revision of network and storage capacity to ensure stakeholders needs are met	Compliance and stress tests regularly reviewed to ensure correspond to updated requirements and use cases	Deployment of national 1+MG Infrastructure node (production) enabling data access across borders when agreement allowing it are in place	Continuous support to Node interoperability, development, and security	Continuous 1+MG infrastructure developments to meet use cases needs	Evaluate and support technical solutions tested and proposed by pillar III based on explicit use cases requirements	Node meets technical KPIs	Continuous Capacity building at European level	Continuous support to EU users via node helpdesk (ELSI, data quality, data standards, technical infrastructure functions)	
yes	Operational	Belgium	Onboarding	25%	-3%	0%	0%	No	No	No	No	No	No	No	No	No	No	No	No
yes	Operational	Czech Republic	Onboarding	19%	1%	0%	0%												
yes	Operational	Denmark	TBD	37%	0%	11%	0%	Yes	No	No	No	No	No	No	No	No	No	No	No
yes	Operational	Estonia	TBD	13%	0%	0%	0%	No	No	No	No	No	No	No	No	No	No	No	No
yes	Operational	Finland	Onboarding	43%	4%	0%	0%												
yes	Operational	France	Onboarding	26%	6%	0%	0%												
yes	Operational	Germany	TBD	25%	3%	0%	0%												
yes	Operational	Italy	Onboarding	26%	6%	0%	0%												
yes	Operational	Luxembourg	Onboarding	21%	0%	0%	0%	No	No	No	No	No	No	No	No	No	No	No	No
yes	Operational	Portugal	Onboarding	37%	0%	0%	0%	No	No	No	No	No	No	No	No	No	No	No	No
yes	Operational	Slovenia	Onboarding	18%	1%	0%	0%	No	No	No	No	No	No	No	No	No	No	No	No
yes	Operational	Spain	Operational	25%	25%	0%	0%	No	No	No	No	No	No	No	No	No	No	No	No
yes	Operational	Sweden	Onboarding	44%	0%	0%	0%												
yes	Operational	The Netherlands	Onboarding	35%	0%	0%	0%												
yes	Operational	Norway	TBD	32%	4%	0%	0%												
yes	Deployment	Bulgaria	TBD	9%	4%	0%	0%												
yes	Deployment	Latvia	TBD	12%	3%	0%	0%												
yes	Deployment	Lithuania	TBD	10%	0%	0%	0%	No	No	No	No	No	No	No	No	No	No	No	No
yes	Onboarding	Croatia	TBD	9%	0%	0%	0%	No	No	No	No	No	No	No	No	No	No	No	No
yes	Onboarding	Ireland	TBD	13%	10%	0%	0%												
no	Onboarding	Cyprus	TBD	3%	3%	0%	0%												
no	Onboarding	Hungary	TBD	0%	0%	0%	0%												
no	Onboarding	Malta	TBD	6%	6%	0%	0%												
no	Onboarding	Romania	TBD	0%	0%	0%	0%												
100%				3%	1%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
								96%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
								0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%



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Annex V. Timelines for implementation according to target phase as

 Onboarding: Croatia, Cyprus, Hungary, Ireland, Malta, Romania <i>Addressing national challenges for deployment</i>	Support
Involvement in 1+MG initiative (2024-Q4): <ul style="list-style-type: none"> - MS representatives participate in 1+MG MS meetings and Pillar I (GDI) - National experts are named and participate on the 1+MG WGs meetings (National implementation, ELIS, Sequencing, Standards, Infrastructure, Healthcare implementation, Health economics, Rare Diseases, Cancer, Common and complex (icl. Population genomics and Pharmacogenomics, infectious diseases) 	EC & Project coordination
Establishment of National Mirror groups (2025-Q2) National mirror group is in place (replicating 1+MG WG structure) and have regular meeting (e.g quarterly) to drive national implementation and adoption of 1+MG Roadmap and 1+MG Framework	EC & Project coordination
National genomic plan or equivalent (2026-Q4) Secure multi year funding to support the national operations of the 1+MG infrastructure (=> Workshop being planned for 24/4/2024 registration to be open)	EC & Project coordination
Deployment of GDI products in test environment (2025-Q4) Deployment of synthetic data and starter kit products on test environment (first release on 2023-Q3) and connected to test services (e.g. Test Beacon Network)	Pillar II WP3 & WP5 Project coordination

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Deployment (in addition to Onboarding): Bulgaria, Latvia, Lithuania <i>Operational at the national level, not connected to EU operations</i>	Support
Deployment of GDI products in test environment (2024-Q4) Deployment of synthetic data and starter kit products on test environment (first release on <u>2023-Q3</u>) and connected to test services (e.g. Test Beacon Network)	Pillar II WP3 & WP5 Project coordination
Deployment of GDI products or interoperable solutions in pre-production environment (2025-Q3) Decision has been made on products that would be part of the national node and they are deployed in pre-production environment to join countries that has implemented Milestone 7 Data access governance demonstrator	Pillar II WP3 & WP5 Project coordination
National GDI node up up running in production environment providing services to the national community (2026-Q2) Deployment node realised	Pillar II WP3 & WP5 Project coordination




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 Operations (in addition to Deployment): Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Italy, Luxembourg, Portugal, Slovenia, Spain, Sweden, The Netherlands, Norway <i>Fully deployed national node Interconnected to EU services, able to provide access to data across borders following 1+MG Governance</i>	Support
Deployment of GDI products in test environment (2024-Q2) Deployment of synthetic data and starter kit products on test environment (first release on <u>2023-Q3</u>)	Pillar II WP3 & WP5 Project coordination
Deployment of GDI products or interoperable solutions in pre-production environment (2024-Q4) Decision has been made on products that would be part of the national node and they are deployed in pre-production environment to join countries that has implemented Milestone 7 Data access governance demonstrator	Pillar II WP3 & WP5 Project coordination
National GDI node up up running in production environment providing services to the national community (2025-Q3) Deployment node realised	Pillar II WP3 & WP5 Project coordination
National GDI node connected to EU level services and providing across border access (2026-Q2) Operational node realised	Pillar II WP3 & WP5 Project coordination

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