

	Vraag	Answer
1	What are the SAP data flows for the AIP solution, GIS connection to be implemented?	Mainly the following: SAP: Asset hierarchy, project data, financial data, asset data, deviation notifications (meldingen). GIS: geographical data Other systems: external data, process data
2	The risks/anomalies must be integrated with GIS, is the geolocalization for the risk required or not?	Yes, geo-localisation is (sometimes) required for risk assessment, or for plotting identified risks on a map.
3	Risk Scenario/Assessment Template is a generic template, or does each risk scenario have its own personalized template? Is it possible to access a sample risk scenario?	Generic risk analyses have a generic structure. Specific bottlenecks in an asset are discussed with specialists en judged with respect to risks. An example of 2 risk scenarios is : 'excavation activities --> rupture of pipe --> gas emission' and 'excavation activities --> rupture of pipe --> fire'
4	Do you have an internal model that needs to be integrated for the risk assessment or does this model need to be developed or revised during the project?	Currently, a risk matrix is being used. Our idea is to replace this risk matrix with models per risk scenario, through which we can calculate risk per asset as a monetary value. These models are not yet available. Values / parameters which are used in the risk matrix should be re-used in the models. The risk matrix itself can continue to play a role in situations where a manual risk assessment is necessary. For this purpose, it is not necessary to integrate the risk matrix in the system, but it could be added for reference. For pipes and valves, models are already available. These could be integrated, if it is feasible to do so.
5	What is the methodology/software currently used for risk assessment?	Generic risks assessments are carried out with standard BowTie and HAZOP software. For QRA's SAFETI.nl and CAROLA are used. Specific ageing/ maintainability issues are managed through written system policy plans (Word).
6	How is the deviation translated into the system: via notification, findings, bow-ties and/or another methodology?	Currently, BowTie studies are carried out for asset categories. The assumption is that the assets comply with internal and external requirements. In case of deviations each bottleneck is judged with respect to additional risks (on top of risks identified in BowTie). Both types of risks are registered in a separate central database. Start and end date (completion of a project) of these risks are monitored
7	What are the KPIs tracked on assets: downtime, mtbf, mtbr, availability, etc.? How are MTBR and MTBF indicators calculated today? Automatic or not.	For most asset categories general availability KPI's are formulated. The MTBF/ MTBR of equipment is calculated in Excel with SAP downloads
8	Is there a CBM solution or PI database?	No, this is not available
9	Is it possible to share the project preview for each project type?	Example of risk driven projects is the renovation of valve stations. This is based on risks of internal/ external leaks and high torque. An example of a compliance project is the replacement of regulators/ slam shut valves. The replacement of gas driven actuators is a management decision driven project in order to reduce the emission of methane. Examples of a third party requests are new gasconnections to industries or the rerouting of existing pipelines near new building developments. An example of new infrastructure is the development of the Hydrogen backbone
10	From the document it is not clear if two platforms AIP and APM are connected, and what is the extent of that connection. Especially in frame of risk procedure used. When APM is supposed to have all required detailed data for all assets which will allow to calculate risks and generate list of mitigations and inspections, which risks will be used in AIP platform? Will these risk values and proposed mitigations be inherited from APM for particular classes of assets? Or will risk assessment in AIP be something completely different from APM, closer to purely qualitative? There were some questionnaires mentioned in the text. Is there a defined workflow for the assessment and generic work process which would demonstrate the flow of work between the two systems (indicating specific points at which assessments and tasks migrate between the systems)?	Gasunie is looking for a solution for both AIP and APM, which together should form a logical whole. However, we haven't clearly defined yet how AIP and APM should work together. We would like to see what possibilities the market offers, to help us further with this issue.
11	There is a list of physical asset types. They describe general classes of entities, which consist of many other types of assets. What is the minimal gradation of Assets for assessments? Is it required to do risk assessment for all included assets and aggregate "individual risks" in a general asset risk (for example, armature, compressors, pressure vessels, heat exchangers risks aggregated to the particular compressor station risk) or risk for compressor station (for example) will be calculated as whole based on some very qualitative risk model (for example, BowTie). This question is the same for AIP and APM.	The asset hierarchy can be up to 5 levels configured in SAP. All levels can be relevant for risk assesments. The role of the asset is more relevant for assesment than the level in the hierarchy. For example: some assesments are typically done on station level (level 1 in hierarchy) while other assessments are executed on object type (level 5 (TAGs) in hierarchy). We do not per se want to do a risk assessment for all assets and underlying components on each level. We want to do risk assessments for specific assets / components that are interesting from a risk perspective, regardless of the level. Some interesting risks scenarios may be identified on level 1, for instance through a BowTie. For instance the risk of a gas leak due to vandalism. The occurrence of these scenarios is quantifiable and therefore not qualitative. We want to be able to also model such risk scenarios. Last, we would like to aggregate all 'underlying' risk values (of interesting risk scenarios we assessed) to one value on the 'level 1 asset', and to aggregate the individual (level 1) asset risks to one value per asset category.
12	Is deviation a general notion or a measurement/value variations backed up by data for assessment? How and where are they registered and how do they link into risk assessment workflow?	It can result from both general notions and direct measurements. In either case it will trigger a task in SAP. If a repair requires a project a risk assessment is carried out, before the project is approved.

13	For example, API 581 for static equipment, semi-quantitative of fully quantitative (like Muhlbauer 4 or others) for pipelines (HTL, RTL)? Pure qualitative, like BowTie? Any custom Gasunie driven risk assessment algorithms?	For pipelines and installations a quantitative risk assessment is required. The general methodology is published in PGS-3 (Guidelines for quantitative risk assessment). Specific software is used: SAFETI.nl (installations) and CAROLA (pipelines). More detailed analyses are carried out with custom built tools. However, in the AIP/ APM tools we are interested in degradation models that will <u>allow us to assess increasing risks.</u>
14	While APM functionality can be assumed as a description of general, more or less standard, integrity management process when asset data is available and risk/mitigation models established, AIP functionality looks like very specific and customer driven task. Is Gasunie ready to provide Detailed Functional Specification for this particular part or ready to do this part in similar to agile process? If no off-the-shelf solution is available.	We are looking for AIP (and APM) functionality that is readily available in the market. We would like to learn and make use of the expertise of accomplished partners in this specific area (AIP). Hence, we have a strong preference to buy this functionality and not to specify / build it.
15	You indicate that you want to optimize and digitize the Asset Management (hereinafter AM) chain. A digital platform is part of an (Asset) Management System (the AM chain) in which, among other things, the organization of the organization (people and resources), the processes and other applications form a joint whole. - Can you paint a broader picture of your AM/AM System chain and what level you are currently at and where you want to grow and how you intend to get there? https://theiam.org/knowledge-library/the-big-picture/ - Do you see the need to also collaborate on the optimization of the AM chain during the implementation of the platform?	Currently asset management is distributed across several departments, which all have their own areas of responsibility. Performance requirements are set up in one department, the optimization of maintainance and preventive replacements is done in another department and lastly, there is a department managing the portfolio. With the new platform we aim to improve collaboration between these departments. With this, we foresee some organizational issues. However, we currently do not foresee the need for advisory services regarding these organizational issues.
16	In chapter 5.1. represent your company values. One of these is Financial loss readiness. Would you like to explain in more detail what you mean by this business value, perhaps with a small example?	"Financiele Schadebereidheid" is utilised to assess the financial consequences for Gasunie, of certain risk scenarios. Examples of these consequences are claims or penalties that are issued because gas is not delivered or insufficiently delivered. Also, damage to physical assets of Gasunie, for instance due to a fire, is an <u>example.</u>
17	In chapter 5.4. you indicate that you wish to take into account long delivery times of necessary critical materials in the tactical portfolio optimization. Can you give some examples of how long these delivery times are and of what kind of critical materials.	Delivery times can be up to a year. Examples of critical materials are: valves, pressure regulators, gas meters etcetera.
18	In chapter 5.6 you indicate that the maintenance costs are not included in the current maintenance optimization and that you want to do this. To what extent are the maintenance costs of the assets known? Is finding out/estimating the maintenance costs (developing standard costs, for example) also <u>part of the implementation of the platform?</u>	Realized maintenance costs (excluding overhead) are available in SAP and are being reported via PowerBI. Standard costs (normkosten) are currently indicated in SAP by OI/OL departments.
19	In chapter 5.6 you indicate 4 factors for the TCO calculation. One of the factors is "depreciation expense". From an AM point of view, this is normally not part of a TCO calculation of an Asset. Can you indicate why you see this as part of a TCO calculation? And have you developed standards in which the depreciation <u>costs are linked to the assets?</u>	The TCO calculation does not contain depreciation costs. But in case an item is replaced before the depreciation period has ended it will have financial consequences. Also, the deprication period influences the Net Present Value of the <u>financial risk.</u>
20	Which asset classes are tracked in GIS and which in SAP?	In SAP all asset classes are available but for some asset types geo info is required. Those asset types (like: pipelines, station locations, cathodic protection and valves in transport network) are also maintained in the GIS systems.
21	How is the hierarchy configured for assets maintained in SAP and which hierarchy levels are relevant for risk assessments and planning?	The asset hierarchy can be up to 5 levels configured in SAP. All levels can be relevant for risk assesments. The role of the asset is more relevant for assesment than the level in the hierarchy. For example: some assesments are typically done on station level (level 1 in hierarchy) while other assesments are executed on object <u>type (level 5 (TAGs) in hierarchy).</u>
22	Do asset classes include pressurized equipment and/or piping?	Yes
23	Who is the supplier of the GIS system used by Gasunie? Which version is used?	G/Technology 10.3.0100.04002 on Oracle 12c Enterprise Edition and ArcGIS Enterprise 10.8.1 on Microsoft SQL Server 2016
24	Does Gasunie already have a risk methodology available for all asset classes? If not, which asset classes do not yet have a risk methodology?	Currently, the risks of all categories can be judged with the risk matrix. However, our idea is to develop asset specific risk assessment models. A detailed model is available for pipelines, which calculates risk on the basis of specific characteristics of pipeline sections. For other asset categories we want to develop comparable <u>models.</u>
25	Is Gasunie considering consultancy services for changing/developing an existing risk methodology together with the software?	We currently do not foresee the need for advisory services regarding risk methodologies.
26	Are buildings and land also assets that are subject to risk assessment and optimization planning or are they just assets that should be considered as part of a risk assessment for the more technical asset classes?	Yes, autonomous risk assessment for buildings and terrains.
27	How does Gasunie decide on nonconformities found?	Via the governance process.
28	What are Gasunie's KPIs?	For most asset categories general availability KPI's are formulated.
29	Does Gasunie have a definition of parameters and their sources that are used to calculate preservation costs (assuming the risk value comes from risk assessment)?	Yes, this is available.
30	Is SAP the central place for the portfolio? If not, what is used?	The financial aspects of the portfolio are managed through SAP. Project Online is used for manageing project proposals and the agreed milestones. Reports are <u>generated with Power BI.</u>
31	When a portfolio is created, does it have default projects?	What is meant by 'default projects'?
32	How is a portfolio organized?	We work with different portfolios, e.g.: replacement (vervanging), extension (uitbreiding), routing (verlegging), adjustment (aanpassing). Each of them operate within a yearly cycle.
33	Does a strategy portfolio automatically become a tactical portfolio based on planned data? Or does a strategic portfolio contain a series of tactical portfolios?	Strategic portfolio is about long term planning. At Gasunie the outlook is 10 years. The tactical portfolio is based on the strategic portfolio and is positioned between the strategic portfolio and the actual implementation.
34	Is the methodology for the optimization algorithms available within Gasunie or will Gasunie also tender consultancy services in addition to software?	No, this methodology is not yet available. We currently do not foresee the need for advisory services regarding optimisation algorithms. We expect this functionality to be supported by the software package.
35	Can the market consultation also be answered in English?	Yes, communication in English is possible.

36	Can you give examples of the digitization of the asset management chain?	The question is not clear for us, but maybe the following examples provide an answer: Deviation notifications (meldingen van afwijkingen) and asset condition data are entered manually by field engineers. The data could be processed and used automatically to 'feed' an asset riskmodel. Also, manual risk assessment could (largely) be replaced with automated risk assessment using risk models
37	What kind of technical standards can we think of? In the context of optimization and digitization, do you also see the observation and registration automated? (because we are talking about various officials within Gasunie).	The technical standards are internal standardization documents and most of them refer to international standards (ISO, EN, API, ASME etc)
38	Can you give examples of condition data?	Corrosion measurements, asset operability, deviation notifications (SAP BA meldingen), leakage measurements, cathodic protection measurements etc.
39	Where are different types of data (asset data, failure data, condition data and measures) collected?	SAP
40	What definition is used at Gasunie for an asset category and an asset group?	Asset category is defined as a group of main network components with the same main function. The whole network can be divided in 10 different asset categories, which are listed in section 5.1 (subsection 'Fysieke assets') in the document. Asset category is a term which has the same meaning throughout Gasunie. An example of an asset category is 'valves'. Asset group, however, is a term which (in the project context) is specifically used for risk management/ risk modelling purposes. It specifies a group of assets of a specific type, which have the same or comparable characteristics, and for which the same model can be used for risk assessment of these assets. For example, within asset category 'valves' 2 asset groups can be distinguished: 'remotely operated valves' and 'locally operated valves'. Remote operation poses specific risks and therefore the risk assesment modelling for both asset groups is different. Please note that an asset group does not have a fixed level in the asset hierarchy; it can contain assets / network components on which we want to do a risk assessment, from any hierarchy level.
41	Gasunie indicates that it wants to export data. Whence this need and where to?	For the purpose of building reports in other applications / BI platform.
42	It is desired that some tooling is developed using MS PowerBI. Is the assumption correct that the (private) SaaS appl. (PaaS, or whatever form) should be given a position within Gasunie's Azure application landscape? Or is it an AWS (oid) environment?	The preference is that the requested product is placed in Gasunie's Microsoft Azure environment unless this is not possible for technical or other reasons. If this is the case, an alternative can be sought, in consultation. The preference is that the product works as a PaaS service in the Gasunie Azure environment. The requested product (AIP & APM) must offer an option to make all data available so that we can build the reports we need, with PowerBI. Gasunie uses Microsoft Azure Cloud including PowerBI. Gasunie is receptive to SaaS providers, provided that all European and local laws and regulations, privacy and security measures are complied with. Gasunie does not intend to use other Cloud services such as AWS in the future.