

Course / Programme:	BEng Software Engineering BSc Computing
Module name and code:	Computing Infrastructure (SWE4202)
Tutor:	Francis Morrissey Dr Mohammed Benmubarak
Assignment Number:	1
Assignment Title:	Infrastructure Proposal for Suretide
Weighting	40% of overall module grade
Issue Date:	06/03/2023
Submission Deadline:	31/03/2023@ 2355
	For late submission, see Assessment Regulations for Undergraduate Programmes: https://www.bolton.ac.uk/assets/Assessment-Regulations-for-Undergraduate-Programmes-2022-23-V8.pdf

Learning Outcomes assessed:

1. Explain the features of systems hardware and software in addition to services provided.
2. Apply networking principles and protocols to solve a given problem.

Scenario

2022 marked unprecedented increases in the cost of energy worldwide due to a myriad of reasons including a surge of demand after economies emerged from the Covid-19 crises and Russia's invasion of Ukraine resulting in soaring gas prices (Guardian, 2022).

The United Kingdom (UK) has been especially affected due to an inordinate reliance on fossil fuels in comparison to its neighbours in Europe (Guardian, 2022). Statista.com (2023) reports that 78% of households depend on gas for central heating, and 41.9% of electricity has been generated using gas over the past year (grid.iamkate.com, 2023). This issue has been compounded by excessive 'heat loss' since houses in the UK lose heat 'three times faster than houses in Norway and Germany' (tado.com, 2022) thereby resulting in increased energy consumption.

In this contrived scenario, the UK government has promoted the use of renewable energy and has made significant concessions accessible to firms in this sector. Their hope is that by 2030, the majority of energy used in the UK will be generated from renewable sources instead of fossil fuels. Suretide, a new player in the UK market, would like to position themselves as the leader in tidal energy.

As SysOps Lead for Suretide, you have been tasked with determining the appropriate infrastructure for this venture. You have been given the following details:

- Offices have been established in major cities across the United Kingdom including London, Manchester, Leeds, Liverpool, Bristol, Cardiff, Edinburgh and Belfast.
- There is currently no IT infrastructure in place.
- Time to provision infrastructure is constrained to three (3) months.
- Each office is to be provisioned for sixty (60) systems to be used by scientists, data analysts and administrators.
- Crucial staff who are unable to commute to the aforementioned cities will work remotely but will require access to all systems and data.

- Each office will have a conference room area to facilitate visiting consultants. Consultants will not require access to the firm's systems and data.
- An option for 'white space' to house on-premises equipment has been made available (if necessary).
- Business processes are digitally-enabled; therefore, high-availability and operational performance is essential for the firm's operations.
- The popular Open-Source Linux distribution RedHat has been customised to support bespoke applications for business functions including statistical analyses, visualisation, and Machine Learning. However, run-of-the-mill applications for productivity purposes such as word-processing and e-mail are also required.
- Significant data will be generated to determine the most suitable locations for positioning turbines around the British Isles. Due to the voluminous nature of the data, a Data Lake will be required. The volume of data is expected to grow considerably during the life cycle of the initiative as more data is garnered and generated.

Instructions

Produce a 4000-word report (+10% and -10% tolerances are acceptable).

The report should detail and justify the proposed systems' hardware and software, including related features to support the firm's digital services. Furthermore, a reasonable networking strategy should be included with details of principles and protocols to support digital services. A network diagram must be included and discussed in this section.

It is expected that you will make your own assumptions due to the lack of specificity in the scenario; however, all assumptions should be reasonable and explicitly stated in your report.

A thorough discussion of alternative solutions and models including justification of your chosen strategy should be included.

Submission

Submission of report should be made to Turnitin via Moodle before the deadline using the file naming convention below:

SWE4202_A1_IDnumber. For example, if your ID Number is 210000, then your file name in Turnitin should be SWE4202_A1_210000.

Secondary Research Requirements

Secondary research support is expected should be correctly cited using Harvard Referencing for both in-text citations and Reference Structure (further details are below). Level HE4 - It is expected that the Reference List will contain between five and ten sources. As a MINIMUM the Reference List should include one refereed academic journal and three academic books.

Grading

A percentage mark will be provided based on *General Assessment Guidelines for Written Assessments*. Grading is as follows:

A:	70 - 100%
B:	60 - 69%
C:	50 - 59%
D:	40 - 49%

Marks below 40% will be classed as fail.

Specific Assessment Criteria:

(Please note that the General Assessment Criteria will also apply).

First class (70-100%):

Students will demonstrate an excellent breadth of knowledge related to Computing Infrastructure including hardware and software components used to enable digital services that support business processes in enterprise applications. Further, students will have an excellent knowledge of networking principles and protocols. A range of contemporary and relevant reference sources selected and drawn upon. Sources cited accurately in both the body of text and in the Reference List/Bibliography. Writing style is clear and appropriate to the requirements of the assessment

Second class (60-69%):

Students will demonstrate a thorough breadth of knowledge of Computing Infrastructure including hardware and software components used to enable digital services that support business processes in enterprise applications. Further, students will have a sound knowledge of networking principles and protocols. A range of appropriate reference sources selected and drawn upon. Sources cited accurately in the main in the text and in the Reference List/ Bibliography. Writing style is clear and appropriate to the requirements of the assessment.

Second class (50-59%):

Students will demonstrate a sound breadth of knowledge of Computing Infrastructure including hardware and software components used to enable digital services that support business processes in enterprise applications. Further, students will have a reasonable knowledge of networking principles and protocols. Relevant reference sources selected and drawn upon. Writing style is mostly appropriate to the requirements of the assessment.

Third Class (40-49%)

Students will demonstrate a sufficient breadth of knowledge of Computing Infrastructure including hardware and software components used to enable digital services that support business processes in enterprise applications. Further, students will have some knowledge of networking principles and protocols. Some relevant reference sources selected and drawn upon. Writing style is occasionally not appropriate for the assessment.

Fail (39% and below):

Students who do not meet the requirements of a third-class grade will not successfully complete the assessment activity.

Guidelines for the Preparation and Submission of Written Assessments

1. Written assessments should be word-processed in Arial or Calibri Light font size 12. There should be double-spacing and each page should be numbered.
2. There should be a title page identifying the programme name, module title, assessment title, your student number, your marking tutor and the date of submission.
3. You should include a word-count at the end of the assessment (excluding references, figures, tables and appendices).
4. Where a word limit is specified, the following penalty systems applies:
 - Up to 10% over the specified word length = no penalty
 - 10 – 20% over the specified indicative word length = 5 marks subtracted (but if the assessment would normally gain a pass mark, then the final mark to be no lower than the pass mark for the assessment).
 - More than 20% over the indicative word length = if the assessment would normally gain a pass mark or more, then the final mark will capped at the pass mark for the assessment.
5. All written work should be referenced using the standard University of Bolton referencing style– see: <https://libguides.bolton.ac.uk/resources/referencing/>
Harvard Referencing should be used for this assignment.
6. Unless otherwise notified by your Module Tutor, electronic copies of assignments should be saved as word documents and uploaded into Turnitin via the Moodle class area. If you experience problems in uploading your work, then you must send an electronic copy of your assessment to your Module Tutor via email BEFORE the due date/time.

7. Please note that when you submit your work to Moodle, it will automatically be checked for matches against other electronic information. The individual percentage text matches may be used as evidence in an academic misconduct investigation (see Section 13).
8. Late work
 - Late work will be subject to the following penalties:
 - Up to 7 calendar days late = 10 marks subtracted but if the assignment would normally gain a pass mark, then the final mark to be no lower than the pass mark for the assignment.
 - More than 7 calendar days late = This will be counted as non-submission and no marks will be recorded.
 - Late submission of assessments on refer and those which are graded Pass/Fail only, is not permitted unless an extension is approved. See below.
9. Extensions
 - In the case of exceptional and unforeseen circumstances, an extension of up to 14 days after the assessment deadline may be requested using the standard University Extension Request Form. For approval there would need to be an explanation and evidence of relevant circumstances. Longer extensions for individual projects and artefacts may be granted, at the discretion of the Programme Leader.
 - Requests for extensions which take a submission date past the end of the module (normally week 15) must be made using the Mitigating Circumstances procedure.
 - Some students with registered disabilities will be eligible for revised submission deadlines. Revised submission deadlines do not require the completion extension request paperwork.
 - Please note that the failure of data storage systems is not considered to be a valid reason for an extension. It is therefore important that you keep multiple copies of your work on different storage devices before submitting it.

Academic misconduct

Academic misconduct may be defined as any attempt by a student to gain an unfair advantage in any assessment. This includes plagiarism, collusion, commissioning (contract cheating) amongst other offences. In order to avoid these types of academic misconduct, you should ensure that all your work is your own and that sources are attributed using the correct referencing techniques. You can also check originality through Turnitin.

Please note that penalties apply if academic misconduct is proven. See the following link for further details:

<https://www.bolton.ac.uk/student-policy-zone/student-policy-zone-2022-23/academic-misconduct-regulations-and-procedures-2022-23>

Bibliography

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Zettelmeyer, J. et al (2022) Beating the European Energy Crisis [Online]. Available at:

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GENERAL ASSESSMENT GUIDELINES – LEVEL HE4

	Relevance Learning outcomes must be met for an overall pass	Knowledge and Understanding	Analysis, Creativity and Problem-Solving	Self-awareness and Reflection	Research/ Referencing	Written English	Presentation and Structure
Class I (Exceptional Quality) 85% - 100%	Work is directly relevant and expertly addresses the requirements of the brief. Learning outcomes are met.	Demonstrates breadth of knowledge and understanding of theory and practice beyond the threshold expectation for the level. Demonstrates excellent understanding of key concepts in different contexts.	Presents an excellent and cohesive appraisal of findings through the critical analysis of information. Draws clear, justified and thoughtful conclusions. Demonstrates creative flair, originality and initiative. Demonstrates a critical understanding of problem-solving approaches and applies strong problem-solving skills.	Provides insightful reflection and self-awareness in relation to the outcomes of own work and personal responsibility.	A wide range of contemporary and relevant reference sources selected and drawn upon. Sources cited accurately in both the body of text and in the Reference List/ Bibliography.	Writing style is clear and appropriate to the requirements of the assessment. An exceptionally well written answer with competent spelling, grammar and punctuation. For example, paragraphs are well structured and include linking and signposting. Sentences are complete and different types are used. A wide range of appropriate vocabulary is used.	The presentational style and layout are correct for the type of assignment. Evidence of planning and logically structured. Where relevant, there is effective placement of, and reference to, figures, tables and images.
Class I (Excellent Quality) 70% - 84%	Work is relevant and comprehensively addresses the requirements of the brief. Learning outcomes are met.	Demonstrates an excellent breadth of knowledge and understanding of theory and practice for this level. Demonstrates in-depth understanding of key concepts.	Presents an excellent and cohesive discussion of findings through the interpretation and evaluation of information sources. Draws clear, justified and thoughtful conclusions. Demonstrates clearly creativity and initiative. Applies excellent problem-solving skills.	Provides excellent reflection and self-awareness in relation to the outcomes of own work and personal responsibility.	A range of contemporary and relevant reference sources selected and drawn upon. Sources cited accurately in both the body of text and in the Reference List/Bibliography.	Writing style is clear and appropriate to the requirements of the assessment. An excellently well written answer with competent, spelling, grammar and punctuation. For example, paragraphs are well structured and include linking and signposting. Sentences are complete and different types are used. A wide range of appropriate vocabulary is used.	The presentational style and layout are correct for the type of assignment. Evidence of planning and logically structured. Where relevant, there is effective placement of and reference to, figures, tables and images.
Class II/i (Very Good Quality) 60% - 69%	Work is relevant and addresses most of the requirements of the brief well. Learning outcomes are met.	Demonstrates a thorough breadth of knowledge and understanding of theory and practice for this level. Demonstrates very good understanding of key concepts.	Presents a perceptive and cohesive discussion of findings through the interpretation and evaluation of information sources. Draws clear and justified conclusions. Demonstrates creativity and initiative. Applies strong problem-solving skills.	Provides justified reflection and self-awareness in relation to the outcomes of own work and personal responsibility, as required by the assessment.	A range of appropriate reference sources selected and drawn upon. Sources cited accurately in the main in the text and in the Reference List/ Bibliography.	Writing style is clear and appropriate to the requirements of the assessment. A very well written answer with competent spelling, grammar and punctuation. For example, paragraphs are well structured and include linking and signposting. Sentences are complete and different types are used. A range of appropriate vocabulary is used.	The presentational style and layout are correct for the type of assignment. Evidence of planning and logically structured in the main. Where relevant, there is effective placement of figures, tables and images.
	Relevance Learning outcomes must be met for an overall pass	Knowledge and Understanding	Analysis, Creativity and Problem-Solving	Self-awareness and Reflection	Research/ Referencing	Written English	Presentation and Structure

Class II/ii (Good Quality) 50% - 59%	<p>Work addresses key requirements of the brief. Some irrelevant content.</p> <p>Learning outcomes are met.</p>	<p>Demonstrates a sound breadth of knowledge and understanding of theory and practice for this level.</p> <p>Demonstrates sound understanding of key concepts.</p>	<p>Presents a logical discussion of findings through the interpretation and evaluation of information sources.</p> <p>Draws clear and justified conclusions.</p> <p>Demonstrates some creativity and initiative.</p> <p>Applies sound problem-solving skills.</p>	<p>Provides valid reflection and self-awareness in relation to the outcomes of own work and personal responsibility, as required by the assessment.</p>	<p>Relevant reference sources selected and drawn upon.</p> <p>Some sources accurately cited in both the body of text and in the Reference List/Bibliography.</p>	<p>Writing style is mostly appropriate to the requirements of the assessment. Grammar, spelling and punctuation are generally competent and minor lapses do not pose difficulty for the reader. Paragraphs are structured and include some linking and signposting. Sentences are complete. A range of appropriate vocabulary is used.</p>	<p>The presentational style and layout are largely correct for the type of assignment.</p> <p>Logically structured in the most part.</p> <p>Where relevant, effective placement of some figures, tables and images.</p>
Class III (Satisfactory Quality) 40% - 49%	<p>Work addresses the requirements of the brief, although superficially in places. Some irrelevant content.</p> <p>Learning outcomes are met.</p>	<p>Demonstrates a sufficient breadth of knowledge and understanding of theory and practice for this level.</p> <p>Demonstrates a sufficient understanding of key concepts.</p>	<p>Presents a valid discussion of findings through the interpretation and evaluation of information sources.</p> <p>Draws justified conclusions.</p> <p>Demonstrates creativity and initiative in places.</p> <p>Applies sufficient problem-solving skills.</p>	<p>Provides some reflection and self-awareness in relation to the outcomes of own work and personal responsibility, as required by the assessment.</p>	<p>Some relevant reference sources selected and drawn upon.</p> <p>Some weaknesses in referencing technique.</p>	<p>Writing style is occasionally not appropriate for the assessment. Grammar, spelling and punctuation are generally competent, but may pose minor difficulties for the reader. Some paragraphs may lack structure, and there is limited linking and signposting. Some appropriate vocabulary is used.</p>	<p>The presentational style and layout are largely correct for the type of assignment.</p> <p>Adequately structured.</p> <p>Inclusion of some figures, tables and images but not always relevant and/or clear.</p>
Borderline Fail 35% - 39%	<p>Work addresses only some of the requirements of the brief. Irrelevant and superficial content.</p> <p>One or more learning outcomes have not been met.</p>	<p>Demonstrates limited knowledge and understanding of theory and practice for this level.</p> <p>Demonstrates a lack of understanding of key concepts.</p>	<p>Presents a limited discussion of findings through the interpretation of information sources.</p> <p>Draws some irrelevant conclusions.</p> <p>Creativity and initiative are lacking.</p> <p>Problem-solving skills are lacking.</p>	<p>Provides limited reflection and self-awareness in relation to the outcomes of own work and personal responsibility, when required.</p>	<p>Sources selected are limited and lack relevance.</p> <p>Poor referencing technique employed.</p>	<p>Writing style is unclear and does not match the requirements of the assessment in question. Deficiencies in spelling, grammar and punctuation makes reading difficult and arguments unclear in places. Paragraphs are poorly structured.</p>	<p>For the type of assignment the presentational style, layout and/or structure are lacking.</p> <p>Figures, tables and images included when required but these lack clarity and relevance.</p>
Fail <34%	<p>Work does not address the requirements of the brief. Irrelevant and superficial content.</p> <p>One or more learning outcomes have not been met.</p>	<p>Demonstrates inadequate knowledge and understanding of theory and practice for this level.</p> <p>Demonstrates insufficient understanding of key concepts.</p>	<p>Presents a limited discussion of findings with little consideration of the quality of information drawn upon.</p> <p>Draws irrelevant conclusions.</p> <p>Creativity, initiative and problem-solving skills are absent.</p>	<p>Provides inadequate reflection and self-awareness in relation to the outcomes of own work and personal responsibility, when required.</p>	<p>There is an absence of relevant sources.</p> <p>Poor referencing technique employed.</p>	<p>Writing style is unclear and does not match the requirements of the assessment in question. Deficiencies in spelling, grammar and punctuation makes reading difficult and arguments unclear. Unstructured paragraphs.</p>	<p>For the type of assignment the presentational style, layout and/or structure are lacking.</p> <p>Figures, tables and images are absent when required or lack relevance/clarity.</p>