

National College of Ireland

**Master of Science in Cloud Computing, Semester 2, 2024-25**

**(MSCCLOUD1\_A & MSCCLOUD1\_B)**

**Due date: 2nd April 2025**

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**Scalable Cloud Programming (H9SCPRO1)**

**CA - Project**

**Weight:** The assignment will be marked out of 100. It is worth 50% of final marks.

**Instructions:** The goal of the assignment is to demonstrate that you can critically analyse architectures and develop scalable applications for the public cloud. You will work individually on this project.

**SUBMISSION DETAILS**:

A ZIP file with the source code, and a report in PDF format must be submitted on Moodle before the deadline. The report should be concise, with the main part of the report (including references and appendix), limited to 8 pages in the standard IEEE 2-column conference proceedings template. Include student name, student ID, and course name at the top of the first page. The PowerPoint used for the presentation/demo also must be uploaded via Moodle before the deadline. Late submissions will not be penalised if the student applied for an extension through NCI360 and it was approved.

**DESCRIPTION**:

Create a cloud application solution which integrates and consumes web application services. The solution consists of:

* A front-end application which must allow user input. The application must be composed of/consume 3-5 different web services:
  1. One web service must be the one written by you.
  2. At least one web service must be written by a classmate of this module.
  3. The additional service(s) could be written by you, written by a classmate of this module, or be a publicly available web service.
* A backend web service with functionality accessible via APIs (e.g. RESTful API, SOAP). Your web service:
  1. Must receive and process the data received, and then send back a meaningful response.
  2. Must be designed to be scalable (e.g. use queues, FaaS, autoscaling, etc.
* Share the API of your service with your classmates (facilitated by the lecturers)
* Implement, test, and deploy the backend application to a public cloud platform.

**Note: You can reuse components from your Cloud DevOpsSec and/or Cloud Platform Programming modules. Reuse MUST be cited properly.**

**The deliverables should be structured as follows:**

1. A project report (6-8 pages, every additional page will incur a penalty of 10%, formatted using the IEEE Conference double-column template[[1]](#footnote-1)) which should include:
   * Abstract – a 150-300-word executive summary of the project and the main results
   * Introduction – motivation for your project and its main objectives
   * Project specification and requirements
   * Architecture and design aspects of your application – critically analyse and justify the selected cloud architecture and design patterns.
   * Implementation
   * Continuous integration, delivery and deployment of your application
   * Conclusions including findings/interpretations – what did you learn and find out? Include a short reflection on developing this project.
   * References – a complete list of academic works and/or online materials used in the project. References should be included as in-text citations using the IEEE referencing style.

The NCI assignment submission coversheet **MUST** be attached to the report, otherwise the submission will be considered invalid, and you will be marked ‘**Absent without Permission’** and will therefore receive **zero** marks. The coversheet pages are not included in the count for the page limit.

1. The source code artefacts submission (a ZIP file) should include:
   * Source code of the application (including comments)
   * Source code of the library (including comments)
   * A readme.txt file that should contain instructions for installing the application.

1. Project presentation and demonstration to be held in class during the submission week as per the CA schedule. It should include the following:
   * A concise presentation of the motivation and high-level description of the project
   * Demonstration – give a demonstration of your application, highlighting the main features.
   * Maximum 4 minutes, every 30 seconds over 4 minutes will incur a penalty of 20%

*Important: You must present and demo your project to get marks for this CA. Those who do not show up, will be marked as “****Absent without Permission****” and will therefore receive* ***zero*** *marks*.

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| **Grade Criterion** | **H1 (> 70%)** | **H2.1 (> 60%)** | **H2.2 (> 50%)** | **Pass (> 40%)** | **Fail (< 40%)** |
| **Front-end application (30%)** | The front-end application has been comprehensively developed, tested, and deployed. Excellent description of the artefacts. | The front-end application has been developed, tested, and deployed to a high degree. A very good description of the artefacts. | The front-end application has been developed, tested, and deployed to some degree. A satisfactory description of the artefacts. | The front-end application was developed, tested, and deployed to a limited extent. Basic description of artefacts. | The front-end application was not successfully developed, tested, or deployed. Artefacts are poorly described. |
| **Backend application (30%)** | The backend application has been comprehensively developed, tested, and deployed. Excellent description of the artefacts. | The backend application has been developed, tested, and deployed to a high degree. A very good description of the artefacts. | The backend application has been developed, tested, and deployed to some degree. A satisfactory description of the artefacts. | The backend application was developed, tested, and deployed to a limited extent. Basic description of artefacts. | The backend application was not successfully developed, tested, or deployed. Artefacts are poorly described. |
| **Technical Report (20%)** | Well written, with no language errors. All figures are well-conceived and easy to read. The report does not exceed the length limits. References are complete, appropriate, and correctly used. | The report has few language and/or style errors. The figures are well presented. Format and length limits are adhered to. References are complete, and correctly used. | The report is readable with some language and/or style errors. Some figures may be hard to read or presented in a suboptimal manner. References are mostly complete and correctly used. | The report is readable, but with many language and/or style errors. Most figures are not clear or easy to read. References are few and/or mostly incomplete. | Littered with typos, and/or poor use of English. The figures are poor and hard to read. References (if any) are probably incomplete and poorly used. |
| **Presentation and demo (20%)** | The presentation and demo clearly outlined the project goals. Slides were error-free and logically presented. The speaker was poised and enthusiastic. Questions were excellently answered. | The presentation and demo somewhat clearly outlined the project goals. Slides were somewhat error-free and somewhat logically presented. The speaker was poised and enthusiastic. Questions were very well answered. | The presentation and demo outlined the project goals. Slides were mostly error-free and mostly logically presented. The speaker was poised and enthusiastic. Questions were well answered. | The presentation and demo provided a limited outline of the project goals. Slides were not error-free and not logically presented. The speaker was poised and enthusiastic. Questions were reasonably well answered. | The presentation and demo were unorganised and unclear. Questions were unanswered/poorly answered. |

1. [IEEE - Manuscript Templates for Conference Proceedings](https://www.ieee.org/conferences/publishing/templates.html) [↑](#footnote-ref-1)