UNIVERSITY OF MARYLAND
GLOBAL CAMPUS
OFFICE OF THE CHIEF ACADEMIC OFFICER

April 1, 2021

James D. Fielder, Jr., PhD
Secretary of Higher Education
Maryland Higher Education Commission
6 N. Liberty St.
Baltimore, MD 21201

Dear Dr. Fielder:

On behalf of Gregory Flower, President of University of Maryland Global Campus, I appreciate the opportunity to respond to Morgan State University's objections to our proposal for a Bachelor of Science in Cloud Computing Systems. I believe you will find the enclosed document fully responsive to the objections.

My colleagues and I will be pleased to provide any additional information you may require in support of our original proposal, to clarify any information presented herein, and to address any further questions or concerns that may arise on this matter.

Sincerely,

Blakely R. Pomietto, MPH
Senior Vice President and Chief Academic Officer

CC: Dr. Gregory Fowler, President, University of Maryland Global Camps
Dr. Antoinette Coleman, Associate Vice Chancellor for Academic Affairs University System of Maryland
Dr. Emily Dow, Assistant Secretary for Academic Affairs, MHEC
Ms. Trish Gordon-McCown, Director of Academic Affairs, MHEC
Ms. Karen King-Sheridan, Associate Director of Collegiate Affairs, MHEC

Enclosure

University of Maryland Global Campus Response to Morgan State University Letter of Objection Regarding a New B.S. in Cloud Computing Systems

April 1, 2021

The University of Maryland Global Campus (UMGC) has reviewed the objection letter from Morgan State University (Morgan) regarding our recent proposal to create a B.S. in Cloud Computing Systems. In their letter Morgan details several objections to our proposal and asserts that the proposal represents unreasonable program duplication that would harm Morgan. Respectfully, we disagree with Morgan's principal allegation and with each of the specific ancillary objections.

While we will address each of the specific objections in detail, we do not believe that Morgan's letter meets the regulatory standard for a justified objection according to COMAR 13B.02.03.27, which requires that the objection be accompanied by detailed data and information supporting the reasons for the objection. Further, Morgan's letter does not address most of the evidentiary criteria in the October 1, 2020 guidance letter from the Secretary to support the claim of "unreasonable program duplication which would cause demonstrable harm to another institution."[1] For example, Morgan's letter does not include:

- Data on current student enrollment in their program;
- Evidence and a thorough analysis that the Morgan and UMGC programs have similar curriculum and course offerings;
- A side-by-side comparison of courses and course objectives;
- Evidence and analysis that their existing program meets market demand; or
- Evidence that tuition costs (including fees), admission requirements, and graduation requirements are duplicative between the two programs.

In short, Morgan's letter does not provide any relevant evidence to support their position that UMGC's program would cause demonstrable harm to their existing B.S. in Cloud Computing program. This has put us in the challenging position of responding to a series of general claims about Morgan's program that were unsubstantiated with data or information. For these reasons, we respectfully assert that Morgan's objection is not justified.

Additionally, we seek to address an overarching question raised by Morgan's objection and transcending any of its specific statements: what does it mean for an institution to fulfill its mission and mandate with respect to academic program offerings? UMGC seeks to offer a fully online, globally distributed, asynchronously delivered bachelor's degree in cloud computing systems. The decision to pursue this degree proposal is the result of careful analysis of the career fields most closely aligned to the specific student population we serve based on our institutional identity.[2] By legislative mandate and institutional mission, UMGC is the open access institution for the state of Maryland, making educational opportunities and choices available for all students within and beyond Maryland, including new college majority populations – especially military affiliated and working adults most often left behind by higher education.[3] The average age of the school's student population is 31, 77% of students are working full-time, and 79% are enrolled part-time. On average, UMGC students transfer 38 credits to the university; 43% of students transfer between 30-59 credits and approximately 36% transfer between 60-89 credits. And UMGC's global reach means nearly 60% of students in the School of Cybersecurity and Information Technology live outside Maryland, including those enrolled overseas. Wherever they are located, UMGC's students present a very different profile than that of a Morgan student – by design. Unlike Morgan's more traditionally aged student population (72% of Morgan's students are between 18 and 24 years old),[4] who

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[1] See Guidance Regarding Objections for In-State Academic Program Review

[2] UMGC has not submitted a new bachelor's degree proposal since 2013 in Health Services Management, Nursing, and Public Safety Administration.

[3] See Institute for Women's Policy Research. "Understanding the New College Majority: The Demographic and Financial Characteristics of Independent Students and their Postsecondary Outcomes."

[4] For Morgan enrollment data, see Morgan's undergraduate and graduate enrollment data warehouse.

take all or most of their coursework for a degree at Morgan, often as a residential learner, our students enroll at UMGC often having already studied at one, two, three, or more institutions and having not been successful. They are overwhelmingly working adults seeking to advance or change their careers, and they look to us for accessible learning in the fields that will help them find, keep, or move up in a job quickly.

For UMGC to fulfill its mission to serve these students, we must be able to offer programs that align to the most sought-after learning for reskilling and upskilling in a technology-driven economy. In business, industry, government, and the military, cloud computing technology is now widely recognized as the driving force behind what is often called "the fourth industrial revolution" – a "convergence of new technologies including robotics, AI, 3D printing and the IoT [Internet of Things], all powered by the cloud computing" that is transforming almost every aspect of the economy, politics, society, defense, and security.[5] The constellation of new technologies powered by the cloud are increasingly so common and interwoven into the fabric of life and work that it is impossible for all sectors of critical infrastructure to operate without the cloud computing systems on which these technologies and operations rely.

The ubiquity and criticality of cloud computing systems within the military, national security, and U.S. Department of Defense (DoD) administration makes UMGC's cloud proposal particularly aligned to and essential for us to fulfill our mission and role. As UMGC described in its original proposal, UMGC's enrollments overseas are part of longstanding contracts UMGC has with the DoD to provide career-relevant programs to servicemembers and their dependents in the U.S., Europe, Asia, and the Middle East. This foundational relationship with the military in UMGC's history and identity that began in 1949 and has grown ever stronger in the decades since as a result of our intentional program design and delivery model that meets adult learners where they are, whether through asynchronous online courses or on military bases in Germany, Italy, Japan, Korea, Guam, Colorado, Virginia, and many other military facilities around the world. Our ability to continue to provide the most in-demand and employment-friendly programs of study to military affiliated students around the world is a critical to UMGC's ability to fulfill its mission in service the nation's frontline warrior forces.

We believe the ability to live out the institution's missional obligation and commitment is fully contemplated by the controlling laws and regulations for academic program approval in Maryland and supports UMGC's repudiation of Morgan's objection. But the stakes of Morgan's objection go well beyond their potential impacts on UMGC. What would it mean to all institutions of higher learning currently operating within Maryland if Morgan's objection is upheld, and an institution is prohibited from fulfilling its academic mission – as mandated by the state for universities operating within the University System of Maryland and as enforced by our regional or national accreditors? What would it say to prospective students for whom Morgan is not the right fit but who seek to study in Maryland and pursue a program to which Morgan asserts unique and unilateral rights? Morgan's objection focuses heavily on arguments about diversity and equity, but what signal does it send about Maryland higher education's commitment to diversity, equity, and inclusion if students can only access certain programs of study at only one Maryland institution, limited to that one institution's student demographic and modality for learning? Finally, what message will policy makers, employers, and potential funders receive about Maryland's seriousness to compete in and build the workforce of the future in a digitally driven economy if bachelor's-degree attainment in cloud computing is limited to one university that has indicated a large-enrollment program for them is about 300 students – when there are over 6,300 cloud jobs in the DMV region (with more than 3,200 of them requiring a bachelor's degree) and more than 50,000 in the U.S. (with more than 23,000 requiring a bachelor's degree)?[6]

Morgan's failure to meet the regulatory standard for a justified objection according to COMAR – combined with the criticality of **all** institutions' ability to fulfill their missions and the staggering scope and scale of the gap between the vast and growing demand for a job-ready cloud workforce and the insufficient supply of cloud-educated graduates – constitute sufficient grounds for MHEC to set aside Morgan's objections.

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[5] IBM: "Future of Fourth Industrial Revolution will Be Powered by Cloud."

[6] For Morgan's representations about what constitutes large enrollment, see Morgan's B.S. Cloud Computing MHEC proposal. For market demand data, see UMGC's B.S. Cloud Computing Systems MHEC proposal.

However, should MHEC elect to examine Morgan's claims in detail, we also posit that a close inspection of each objection individually fails to make the case for Morgan's claims of unreasonable duplication or harm.

UMGC RESPONSE TO MORGAN'S SPECIFIC OBJECTIONS

In its objection letter, Morgan offers a detailed list of six grievances in this matter, and below are our specific responses to each.

Morgan Objection No. 1

> Morgan State University received approval from MHEC to offer a B.S. in Cloud Computing degree program on-campus and via distance education (online) on 1/23/2020. Since the approval, Morgan has invested tremendous resources in developing a workforce-oriented curriculum working with industry partners (including Amazon AWS, Microsoft Azure, Google, Oracle, etc.) [1]. Morgan began offering courses [2] in January 2020 and formally launched the Cloud Computing program in fall 2020. **The proposed new B.S. degree program in Cloud Computing Systems at UMGC will do demonstrable harm to Morgan State University** [emphasis original].

UMGC response

This objection does not actually provide an explicit description of – or data demonstrating – what harm UMGC's proposed program would have to Morgan's. Morgan's MHEC approval to offer its B.S. in Cloud Computing did not include affordances or guarantees that no other institutions in the state would be approved for programs in this area, so the fact of MHEC approval by itself does not constitute evidence of harm. Neither does the fact that Morgan predictably followed MHEC approval with action to implement the program establish a prima facie basis for harm from UMGC's proposal. Though Morgan began offering its program in Fall 2020, the Morgan objection does not indicate how many new students have enrolled or how many students may have changed majors in order to pursue the new cloud program. Similarly, although Morgan notes in this objection that it has approval from MHEC to the offer its cloud program online, nowhere in this or any other part of its objection does Morgan indicate if its program is actually being offered online, in what modality (hybrid, fully synchronous, fully asynchronous, etc.), and to what extent.

The latter point is particularly important in weighing the merits of Morgan's claim of harmful duplication, given UMGC's cloud proposal specifically indicates its proposed program will be launched in a fully online asynchronous modality worldwide. MHEC approval to offer a program online by itself does not mean that Morgan has actually launched any course offerings in an online format. Moreover, the most recently available NC-SARA enrollment data strongly suggests that any eventual online offerings in cloud at Morgan will have an initially modest enrollment footprint: in Fall 2019, according to Morgan's Bear Facts data set, Morgan enrolled 219 students in online courses across a total of 15 programs offered online at the university (172 from Maryland) – less than 1% of its total population in that term (7763).[7] Whatever the case may currently be, UMGC views the prospect of Morgan offering its cloud program online as mutually complementary to our proposed offering, both of which are necessary if Maryland is to effectively respond to the scale of the demand for job offerings in this area based on recent enrollment data.

UMGC launched a foundational course in cloud computing (CMIT 326, Cloud Technologies) as part of its offerings in our existing B.S. Computer Networks and Cybersecurity program in Fall 2020 and enrolled 1,039 students in that single term (an additional 1,327 students have enrolled in this course during the Spring 2021 term). The strength of this single offering – far from suggesting harmful duplication – tracks with what we know and have documented above about the large and rapidly growing demand for a cloud-educated workforce. Enrollments at UMGC only represent those students whose life circumstances and professional situation align to our learning modality and offerings. What of the students who seek cloud instruction at a Maryland institution for whom Morgan's approach may well be the best fit for them? In

[7] See Morgan State Bear Facts, NC-SARA data files and Morgan's undergraduate and graduate enrollment data warehouse.

short, cloud computing is a rapidly rising employment tide that lifts all institutional vessels with offerings in this area.

Finally, Morgan's objection states that it has developed a "workforce-oriented curriculum working with industry partners (including Amazon AWS, Microsoft Azure, Google, Oracle, etc.)". This approach is commendable and tracks with an established consensus within technology-oriented higher education about the criticality of partnering with industry-leading employers whose development and uses of foundational technologies such as cloud computing helps ensure currency and relevance in the curriculum. UMGC's longstanding investments in career-relevant, technology-oriented curriculum has similarly involved partnerships, collaborations, and curriculum co-construction projects of various kinds with each of the organizations Morgan indicates and many others besides. This widely accepted curriculum-development practice is possible in cloud-technology education not least because cloud-technology companies such as AWS and Microsoft have dedicated educational-development arms within their organizations that actively cultivate curriculum partnerships with hundreds of colleges and universities in the U.S. to grow the cloud workforce development pipeline. Far from indicating programmatic uniqueness that another Maryland program might harmfully duplicate, Morgan's stated collaboration with industry partners documents its offering of a cloud program that aligns to what is jointly recognized by higher education and industry as the most effective way to design complementary cloud-technology programs extant across a network of institutions encompassing a range of missions, roles, and modalities to generate a job supply at the scale of the workforce demand.

In sum, Morgan has not provided data and information in this "objection" to support its assertion that UMGC's program represents a demonstrable harm to Morgan.

Morgan Objection No. 2

> In Section D, "Reasonableness of Program Duplication," of the UMGC proposal, UMGC proposes a "conceptually distinct" cloud computing program (p12), but Table 6 (p13-14) has no obvious evidence to support the claims. **Morgan State University affirms that this new program would be unreasonably duplicative** [emphasis original].

UMGC response

This objection's unsupported assertion that the conceptually indistinguishable nature of the programs is "obvious" simply restates the assumption that the programs are unreasonably duplicative without supporting it with any specific examples or analysis.

Here is a summary of distinctions fully documented and supported in UMGC's original proposal.

- Morgan's program requires 70 credits of coursework overall (51 credits in the core, and 19 in required electives), whereas UMGC's requires 33. This is fundamentally distinct conceptual programmatic architecture that reflects the distinctive differences in institutional mission and student populations served. A program requiring 70 credits of overall coursework primarily assumes a student who takes most or all of the program at the degree-granting institution, and this tracks with Morgan's focus on more traditional-aged students who enroll full time. In contrast, 43% of UMGC undergraduates transfer in between 30-59 credits and 36% transfer in between 60-89 credits. These data strongly underscore the need for our programs to be tightly constructed and focused within the area of study rather than expansively designed to provide disciplinary breadth and specialization as is the case with the Morgan cloud program. This is also the reason our program is designed so that students have multiple ways to obtain credit for a course at UMGC – including not just transfer credit but the ability to obtain credit by having industry certification instruction directly in the course or earning credit for the course if the student already has the certification.
- The two programs have distinct academic calibrations: UMGC's program focuses tightly on the administration and management of cloud systems. Of the 11 courses in UMGC's proposed major, 8 address cloud directly; the other three directly address cloud-related technology (Networking, Virtualization, and Linux). Cloud content in Morgan's program is more broadly dispersed, with the core containing two courses, and two others in the electives. Additionally, Morgan's requirements

in math and computer science are extensive and aligned to computer science and information technology curriculum. In UMGC's program, College Algebra is the only required math.

- UMGC's program is designed to accelerate time to degree and supports career advancement or career changers in cloud well before the degree is completed. Our program does this in multiple ways:
    - First, it is structured in a straight-line pathway so that students come into and move through the program with a clear navigation plan for what to take first, second, third, and so on. This straight-line configuration responds directly to what we know about the specific needs of most UMGC students, who are more likely to be first-generation learners from marginalized and underserved populations that do not bring the privilege of already possessing the socioeconomic and cultural capital to navigate higher-education curriculum. Straight-line curriculum eliminates the potential for confusion and wrong turns in navigating the curriculum, and so speeds the pathway to graduation.
    - Second, 10 of the 11 courses in UMGC's major directly address cloud-related certifications. This is also an intentionally designed accelerator for degree production because it aligns to the learning science about the metacognitive value adult learners attain from making verifiable, incremental progress toward professionally leverageable accomplishment as they progress toward a college degree.[8] At the same time, the alignment of UMGC's curriculum with industry certifications gives adult learners powerful industry-recognized, incremental validation of upskilling or reskilling that they can apply toward professional advancement while they continue to pursue the bachelor's degree. In contrast, Morgan's program includes electives, a design feature more aligned with a program designed for full-time, residential populations of traditionally aged students. Additionally, Morgan's cloud classes do not indicate a direct alignment to industry credentials in cloud computing, which tracks with the strong bias against certifications that Morgan indicates elsewhere in their objection (we discuss this issue more on pages 9-10).

  These design features of UMGC's program are directly responsive to the *2017-21 Maryland State Plan for Postsecondary Education* in the following ways.
    - Access: a straight-line curriculum improves access by making postsecondary learning more coherent, navigable, and so, more responsive to needs of and welcoming to working-adult populations that are UMGC's primary learners. Straight-line design also supports students' ability to plan for the timing and cost of degree completion – a critical component of access. Additionally, aligning courses to industry certifications also widens the potential pathways to higher education for underserved populations in and beyond Maryland by giving them a fast lane to degree completion, since industry certifications aligned to our cloud computing program will receive transfer credit into UMGC's B.S. in Cloud Computing Systems.
    - Success: similarly, these two features – clearly marked pathways through the curriculum and the ability to both apply industry certifications on the job while in the program and receive credit in the program for certifications earned outside the classroom – create greater momentum in support of persistence and student success, and ultimately degree production for adult learners.
    - Innovation: Morgan's forceful repudiation of aligning curriculum to industry certification is a regrettably powerful reminder of how such curriculum-design features remain innovations in access and attainment that have not been widely adopted in higher education's more traditional sectors. In this regard, the differences between the two institutions to the design of their cloud computing programs again emphasizes the complementarity of our respective approaches.

Taken together, what this summary shows is that two programs with similar names may nevertheless take distinct, complementary approaches to the same subject matter. In this case, the differences

[8] See U.S. Department of Education, "Making Skills Everyone's Business: A Call to Transform Adult Learning in the United States."

appropriately and intentionally reflect the universities' individual missions, the different student audiences that each institution seeks to serve, and the universities' distinct orientations toward how to design for access, success, and innovation. Far from unnecessarily duplicating Morgan's program, UMGC's program complements the options and pathways students in Maryland and beyond have to enter a cloud workforce in which there is far more demand and need than there are educated cloud practitioners able to fill the roles.

Morgan Objection No. 3

> The proposal states, "No single institution is going to adequately respond to the scale of this unmet demand (p12)." Regardless of whether this ultimately proves to be true, introducing a second cloud computing program at this early stage would deny Morgan the opportunity to establish and develop its program.

UMGC response

In this objection, Morgan suggests that a supply-demand gap in cloud-educated workforce is a potential future problem that waits to be seen. This is not the case. UMGC's original proposal objectively and extensively documents the current, vast, and growing demand for cloud practitioners. We do not need to – and cannot – wait to see if this problem "ultimately proves to be true." It is already upon us. Granting Morgan's request will mean that Maryland continues to fall further and further behind in preparing the cloud workforce of the future, and the many students UMGC's program would have served around the world will be denied access to affordable, transformative higher education that the vast majority will only ever be able to attain through a global, online university. Further, Morgan fails to provide evidence or data to quantify or in any other way document the harm it asserts in relation to UMGC's proposed degree. Rather, Morgan seeks regulatory approval to monopolize certain program areas. We believe the evidence and data we provide in this response convincingly documents that Morgan's assertion to a singular claim to undergraduate cloud computing degrees in the state will make it difficult to impossible for Maryland to meet the cloud-computing workforce needs UMGC documented in its original proposal. We also believe that granting Morgan's request will exacerbate the educational attainment gaps that Maryland institutions of higher education are called to close by the goals laid out in the 2017-21 State Plan.

As the State Plan reminds us, failure to close these gaps has real and significant implications for the state. Maryland has been a long-term net exporter of college students, as documented by the National Center for Education Statistics in its longitudinal reports on student migration patterns.[9] According to enrollment data reported by NC-SARA, in Fall 2019 almost 37,000 Marylanders were studying online at an out-of-state institution.[10] The top eight out-of-state institutions enrolling Maryland students online are all direct competitors of UMGC: Strayer University, Liberty University, University of Phoenix, Southern New Hampshire University, Western Governors University, American Public University System, Grand Canyon University, and Capella University. Collectively, these eight out-of-state institutions alone enrolled almost 15,000 Maryland students online in Fall 2019. As a Carnegie-classified R2 "high research activity" doctoral institution, Morgan is not competing for the same undergraduate students who are considering an open-access institution like UMGC or one of our out-of-state competitor institutions. A brief side-by-side comparison helps illustrate this reality:

[9] National Center for Education Statistics (2020). The Where of Going to College: Residence, Migration, and Fall Enrollment. https://nces.ed.gov/blogs/nces/post/the-where-of-going-to-college-residence-migration-and-fall-enrollment.

[10] NC-SARA Fall 2019 Distance Education Enrollments Data File. https://nc-sara.org/resources/fall-2019-distance-education-enrollments.

Undergraduate Enrollment – Fall 2018*	UMGC	Morgan
Total headcount	47,253	6,419
% Full-Time	20.3	90.8
% Part-Time	79.7	9.2
% MD residents	36.9	70.1
Age 25+	35,692	998
Age 25+ as % of total UG enrollment	75.5	15.5
Age 25+ as % Full-Time	20.0	69.0
Age 25+ as % Part-Time	80	31
Community College Transfers	1,627	264

* MHEC Data Book - 2020

Among other things, this snapshot is a reminder of the diversity of students who seek higher education in Maryland – a highly valuable diversity far too prismatic for any one institution to serve exclusively. We believe that Marylanders are more likely to enroll in-state if they have access and choice among multiple high quality, affordable in-state program options, regardless of the field of study. In the case of cloud computing, there is sufficient differentiation in the respective missions of our institutions and the students we serve – coupled with rapid growth in market demand – to support robust and complementary undergraduate programs at both Morgan and UMGC. If Maryland institutions are not positioned or permitted to expand their program offerings in high demand areas such as cloud computing, then the out-of-state institutions mentioned above, and others, will step in to meet these needs.

Finally, it is important to acknowledge that some degree of program duplication in higher education is necessary and justified. Students should have the opportunity to pursue degree and certificate programs that best align with their learning needs and goals, whether that be on campus or online, at a standard or accelerated pace, or in a course-based or competency-based format. The State of Maryland's growth trajectory in cybersecurity programs illustrates these principles clearly. UMGC was one of the first institutions in Maryland to launch degree and certificate programs in cybersecurity. Now, almost 15 years later, 27 Maryland institutions (14 four-year institutions and 13 community colleges), including Morgan, offer degrees and/or certificates in cybersecurity. UMGC has not objected to these developments at other institutions because we realize that even with our capacity, no single institution could meet the workforce demands in cybersecurity, and any attempts to monopolize the market would be a disservice to students and the state. We appreciate MHEC's leadership and rational approach for supporting continued program expansion in cybersecurity and urge that a similar approach be taken when evaluating the merits of proposals in related high-demand fields such as cloud computing.

Morgan Objection No. 4

> As for the CIP code, the proposal seems to use a different code than Morgan's, but when reading the details, both programs cover computing systems, hardware and software components, software, and databases [3]. In fact, the UMGC proposal's designation of computing as one of more than ten major study areas within the program is flawed. The notion that cloud computing is a broader area that includes computing itself is logically inaccurate.

UMGC response

This objection offers no explanation, analysis, or amplification of its claim that UMGC's proposal is logically inaccurate and makes flawed designations, rendering it impossible to know what is meant precisely by – or how to respond directly to – such characterizations. A plain reading of the empirical differences between the two CIP-code descriptions tells a clear story of what distinguishes the two programs.

UMGC's proposal "seems to use a different code than Morgan's" because the two programs do in fact use two different CIP codes. This is not a coincidence, incidental, or superficial on the part of UMGC's decision to use 11.0902, compared to Morgan's use of 11.0103. It intentionally reflects the distinctive academic, intellectual, and curricular differences between our proposed program and Morgan's. The CIP

taxonomy itself was designed to articulate and categorize such distinctions in instructional programs. The fact that periodic reviews are undertaken, stakeholders across higher education and industry can provide input, and new CIP codes are added suggests that as a nation, we are becoming more aware of and sensitive to differentiation within fields and skills sets. While both 11.0902 and 11.0103 focus on technology systems, 11.0902 specifically indicates a focus on "enterprise software systems," including "cloud computing," and instruction in the implement[ation] and "management" of such systems, which aligns to the focus in UMGC's cloud program on career-readiness for cloud professionals. The UMGC program emphasizes operations (including security), administration, and management of cloud technology, distinct from software development, which is dominant in both the CIP code Morgan chose and in Morgan's program itself. Morgan's use of 11.0103 indicates a broader focus on "computing systems" and emphasizes instruction in the "principles of computer hardware and software components [and] algorithms." Given this focus, it makes sense that Morgan's program is housed in its Computer Science department and requires courses in Data Structures, Computer organization, Operating systems, Databases, Software Engineering, and Artificial Intelligence. Each of these is a course with a "COSC" (that is, Computer Science) prefix. The program core (51 credits) is constituted as follows: Computer Science courses (24 credits), Math (15), Cloud (9), Business (3). The elective choices are also dominated by computer science courses (24 courses).

Contrastingly, UMGC's program is tightly focused on the specific knowledge, skills and abilities required for entry into cloud-computing jobs – primarily system management, operation and administration, as opposed to the ground-up design of cloud-based systems. This design choice is critically important in order to minimize the amount of required coursework in highly technical KSAs and intense computer-science instruction that can be barriers to access and student success in technology-based career-relevant education. While UMGC students are trained in fundamental knowledge of networking, virtualization, security, and system management, they are not trained to write the code which underlies cloud-based systems.

Aligning a program with the 11.0103 CIP code ("Information technology" as Morgan's program is) requires that the program include instruction in algorithms, hardware and software components, human interface design, and databases, among other topics. Hence the need to include courses such as COSC 111 Introduction to Computer Science I, COSC 112 Introduction to Computer Science II, COSC 220 Data Structures and Algorithms, COSC 241 Computer Organization, and COSC 354 Operating Systems in the core courses. Other courses listed include courses which form the core of any traditional Computer Science program (COSC 238 Object Oriented Programming, COSC 239 Java Programming, COSC 281 Discrete Structures, COSC 320 Algorithm Design and Analysis, COSC 385 Theory of Languages and Automata, COSC 383 Numerical Methods and Programming).[11]

In contrast, CIP Code 11.0902 ("Cloud Computing"), to which UMGC program is aligned, is specifically focused on preparing students to design and implement systems that rely on distributed computing and service-oriented architecture. The UMGC program trains students in mastering fundamental concepts in cloud computing, including security, followed by exposure to the cloud systems offered by selected leading vendors. Students in this program are not engaged in writing the same kind of code which is traditionally written by students pursuing a B.S. in Computer Science or a cloud degree aligned to a computer-science CIP code, as is the case with Morgan's program. In fact, not a single course from UMGC's Computer Science (CMSC) program is required in the proposed Cloud Computing program.

Morgan Objection No. 5

> The UMGC program proposal purports to have a better pedagogy and learning model with a "learn by doing" approach (p14). The approved Morgan proposal describes its learning approach as a: "Project-based hands-on learning approach that integrates the latest cloud computing tools, services, and methods" (section A.1 of the Morgan proposal). **Morgan State University affirms that this new program would be unreasonably duplicative** [emphasis original]**.**

[11] A full program description is here.

This objection cites a reference in isolation from our B.S. Cloud Computing Systems proposal in ways that could give the impression of pedagogical approaches and philosophies that are identical or nearly the same. This is not the case, and the difference matters not because one institution's approach to teaching and learning is superior to the other. Rather, as we have emphasized throughout our original proposal and this response, it is a matter of intentional alignment of mission, role, and service to distinct student populations that informs and differentiates Morgan's and UMGC's respective approaches. This commitment to supporting the diversity of institutional missions and types was clearly articulated by MHEC in the *2017-2021 State Plan for Postsecondary Education*, which included strategies for serving both traditional and non-traditional students, providing options to facilitate prompt degree completion, and continuing to "ensure equal educational opportunities for all Marylanders by supporting all postsecondary institutions."

UMGC is the largest public online university in the U.S. and has been among the first and leading innovators in online learning. UMGC's learning model, curriculum design, and course development process reflects specific, intentional choices, drawn from learning science, about how to best serve the unique student population of working adults through authentic online learning.[12] Distinct from remote teaching, authentic online education is fundamentally different from courses and programs originating at traditional institutions and taught remotely in the same way as face-to-face classes. Instead, authentic online education is an intentional educational architecture designed for virtual teaching, learning, and assessment, with technology tools strategically deployed for engagement and outcomes, as well as wraparound services that provide support throughout the online student life cycle. Adult working professionals desire to learn and complete coursework at times that work for their demanding schedules while incorporating their personal and career experiences into their learning, to solve problems and to reason in the context of their current positions, and they desire to use what they learned (perhaps immediately) in their jobs.[13]

Online learning at UMGC is designed to meet the asynchronous learning needs of adult working professionals through the inclusion of curated and chunked content/videos that are made accessible with captions or transcripts, and are consumable at any time, with options to review them again. Additionally, scaffolded assignments with specific instructions/expectations that include resubmission opportunities, detailed rubrics, group interactions/work, peer reviews, and varied assessments that often include learner choice are elements of intentional design as well. Tailored, quality instructor feedback, and regular communication, provided in a cadence and modality that appeals to the working professional is foundational in UMGC online courses. Online learners are encouraged to spend time thinking about, researching, and drafting discussion responses before posting responses, at times that allow them to balance concentration on coursework with other life demands. A learner-centric approach that carefully considers the adult working professional's needs as well as diverse and inclusive content and activities are foundational to online course design at UMGC. Learning is encouraged and supported for anyone, anytime, anywhere.

Furthermore, central to authentic online learning architecture is the inclusion of higher-order thinking skills that offer learners the opportunity to analyze, evaluate, create, and perform tasks virtually and asynchronously, at any time, through hands-on, "real world" authentic work, unique to the student and industry.[14] Student participation in authentic online learning occurs in UMGC courses through activities such as asynchronous situated learning or service learning and apprenticeship within the students'

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12 Merriam, S., & Bierema, L. (2014). Adult learning: linking theory and practice. San Francisco: Jossey-Bass.; Wiggins, Grant. (1998). Ensuring authentic performance. Chapter 2 in Educative Assessment: Designing Assessments to Inform and Improve Student Performance. San Francisco: Jossey-Bass, pp. 21 – 42.

13 Lave, J., & Wenger, E. (1991). Situated learning: Legitimate peripheral participation. Cambridge, United Kingdom: Cambridge University Press.; Merriam, S., & Bierema, L. (2014). Adult learning: linking theory and practice. San Francisco: Jossey-Bass.

14 Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, United Kingdom: Cambridge University Press; Wiggins, Grant. (1998). *Ensuring authentic performance. Chapter 2 in Educative Assessment: Designing Assessments to Inform and Improve Student Performance.* San Francisco: Jossey-Bass, 21 – 42.

chosen discipline or career field.[15] Adult, working professionals need to demonstrate learning through asynchronous discussion interactions and self-reflection in order to increase engagement and motivation for learning, and they can benefit from scaffolded assignments to assist them in managing time available to dedicate to coursework.[16] For example, well-designed online learning encourages students to spend more time reading and reviewing content as it is always available and portable (i.e. videos, learning resources, and discussions), and because of the asynchronous nature of online learning, the content and course structure/pacing and facilitation/instruction are carefully designed with consideration to meet adult learner needs. According to Herrington, Reeves, and Oliver, in an examination of authentic tasks online, foundational to authentic learning design are analyses of the learner, task, and technology where synergies between the three were found to contribute to learner success in the online environment.[17] Authentic assessment of performance more readily indicates what students have successfully learned, and it can point to areas where students need further learning in order to demonstrate skills.[18]

Neither Morgan's original MHEC proposal to create the bachelors in cloud computing nor their objection to UMGC's proposal offers any indication that Morgan can provide an institutional approach to educating working adults online that is equivalent to the andragogically oriented architecture of an end-to-end virtual and sustained engagement between the learner and the university that is central to UMGC's delivery of authentic online learning.[19] This makes sense, given that Morgan's primary commitments have been to serve as Maryland's preeminent public urban research university and to lead the state and nation in serving underrepresented minority students in STEM disciplines. This means that the overlap is exceedingly slim between the student who seeks authentic online learning in a fully asynchronous modality that comports with the life demands of working adults, and the student who seeks to study at a research-intensive university such as Morgan.

Morgan Objection No. 6

> "Ten of the 11 UMGC courses in the major directly address cloud-related certifications" (p14). While connections between courses and certificates are good, most scholars across academia agree that using certificates to replace a rigorous curriculum is disadvantageous, as students learning under such circumstances lack foundational knowledge. The Morgan cloud computing program has close ties with the certificates but does not use certificates to replace learning the fundamentals. For example, at an AWS conference in Seattle, a high school female student was featured for her self-taught approach and passed all three AWS certificates. Even so, she never learned the basics of operating systems, networks, or databases, not to mention enterprise software architecture as required by the UMGC proposal. Those three certificates are three courses in the proposal CMIT 326, CCS 356, and CMIT 426 (p18-19). The so-called "uniqueness" and "advantages" of the proposed program demonstrate a lack of rigor.

The central role that industry certifications and other microcredentials play in technology-oriented and career-relevant education is well established.[20] Notably, the American Council on Education (ACE) has

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[15] Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, United Kingdom: Cambridge University Press

[16] Merriam, S., & Bierema, L. (2014). *Adult learning: linking theory and practice.* San Francisco: Jossey-Bassl Rolim, V., Ferreira, R., Lins, R. D., & Gasevic, D. (2019). A network-based analytic approach to uncovering the relationship between social and cognitive presences in communities of inquiry. *The Internet and Higher Education, 42*, 53-65. doi: 10.1016/j.iheduc.2019.05.001

[17] Herrington, J., Reeves, T.C., & Oliver, R. (2007). *Authentic tasks online: A synergy among learner, task, and technology. Distance Education, 27(2)*, 233-247. doi:10.1080/01587910600789639

[18] Wiggins, Grant. (1998).

[19] Merriam, S., & Bierema, L. (2014). Adult learning: linking theory and practice. San Francisco: Jossey-Bass.

[20] See, for example: APLU: "Embedding Certifications in Bachelor's Degrees: Certification-Degree Pathways Project"; Chronicle of Higher Education: "Why Isn't it a No-Brainer to embed 'certifications' into bachelor's degrees?"; New America Foundation: "Building Better Degrees Using Industry Certifications"; WorkCred: "Aligning and Embedding Industry Certifications with Bachelor's Degrees"; Evolllution [sic]: "Embedding Industry Certifications in Degrees

maintained nationally adopted standards and processes for evaluating workplace learning and corporate training programs for college credit that institutions across the U.S. apply toward their courses and credentials, including the kinds of career-relevant knowledge, skills, abilities, and dispositions that are assessed in industry certifications. Certifications themselves are especially prominent in technology fields, and a growing number of higher-education institutions focused on career-relevant learning align their curriculum to certifications' KSAs. The Lumina Foundation has researched the alignment of industry certifications into associate's and bachelor's degrees and found that "it enable[s] students to earn valuable industry and academic credentials at the same time. It also help[s] the colleges and universities to align their curricula with prevailing industry standards, and to strengthen their partnerships with area businesses and industry associations."[21] The positive impact on access and student success documented by this and many other studies and initiatives is why UMGC focuses on maximizing alignment between its curriculum and industry certifications wherever practicable. Industry certifications are the way industry arbitrates and normalizes consensus KSAs in rapid-change-cycle fields such as cloud computing. Thus, aligning higher education curriculum to certifications ensures that employers and educators are speaking the same language about what it means for learners to be able to continuously reskill to change careers or upskill to advance their careers while they progress toward a degree.

Morgan's objection here gives the impression that alignment to certifications comes at the expense of rigorous learning in foundational skills. This is not borne out by the research in industry certifications aligned to undergraduate coursework or by UMGC's extensive experience with such alignments in existing programs in cybersecurity technology, cybersecurity management and policy, cyber operations, and digital forensics and cyber investigation.[22] At UMGC, teaching and learning in foundational skills is incorporated throughout the required coursework for a 120-credit bachelor's degree, including first-year courses, general education requirements, and electives. Students demonstrate attainment of these skills through successful completion of these courses at UMGC or through evaluated transfer credit earned at other accredited institutions. In stridently repudiating curriculum design aligned to industry certifications, Morgan's objection here makes clear one dimension of the fundamental distinction between the two programs and helps establish a key basis for the complementary co-existence of multiple cloud B.S. programs in Maryland.

CONCLUDING OBSERVATIONS

In formulating our response to Morgan's letter of objection, we noted the way three crosscutting forces intersected and transcended the specific dispute in question here: longstanding regulatory language in COMAR, twenty-first century technology education, and MHEC's role in approving and providing guidance to Maryland postsecondary institutions about new academic programs. Specifically, we noted this language in COMAR 13B.02.03.09:

> Ordinarily, proposed programs in undergraduate core programs consisting of basic liberal arts and sciences disciplines are not considered unnecessarily duplicative. Unreasonable duplication is a more specific concern in vocational/technical, occupational, graduate, and professional programs which meet special manpower needs.

The most common understanding and application of this language has been to support a robust liberal-arts general education, encompassing a circumscribed group of programs in which duplication is allowable. These allowably duplicable programs form the basis on which institutions build specific majors from disciplines in a far more open-ended group of programs within which the Commission may deem duplication unallowable. At the time these regulations were promulgated, in the waning years of a mostly pre-digital, analog world, technology education clearly existed within the regulation's latter category –

Critical to Maintaining Long-term relevance"; Lumina: "Embedding Industry and Professional Certifications within Higher Education"

[21] See U.S. Department of Education, "Making Skills Everyone's Business: A Call to Transform Adult Learning in the United States."

[22] For complete program descriptions and course-level alignments to industry certifications in this programs, see UMGC Catalog 2020-21

programs teaching to technology for specific computer applications or industrial/vocational tools that were narrowly focused on particular functions or operations. This is no longer the case. Instead, twenty-first century technology education focuses on providing students with technical, operational, managerial, and problem-solving skills for continuous growth, discovery, and advancement, versus a highly specialized, narrowly defined set of skills and competencies of an analog age. We believe that a field such as cloud computing provides a compelling use case where Maryland postsecondary institutions would benefit from more contextualized, forward-looking guidance from MHEC. While these programs may have been historically placed in the regulation's latter category of duplication concerns, MHEC should now be in the position of encouraging and incentivizing more Maryland colleges and universities, not fewer, to offer these programs.

In closing, we want to reiterate that given our differences in mission, role, and service to distinct student populations, our respective program offerings in cloud computing are not unreasonably duplicative. In their objection letter, Morgan did not provide any evidence that UMGC's program would cause demonstrable harm to their program. There is more than sufficient workforce demand for bachelor's prepared professionals in cloud computing, both in Maryland and nationally, for Morgan's and UMGC's programs to grow and flourish simultaneously. Therefore, we respectfully request that MHEC set aside Morgan's objection and approve UMGC's B.S. in Cloud Computing Systems.