ENTERPRISE ARCHITECTURE

(GCC EA)

Version 3.0

March 31, 2022

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DOCUMENT REVISION HISTORY

Version Number	Change Description	Date of Change/Update	Date Inserted
1.0	First Edition	September 1, 2006	September 1, 2006
2.0	Second Edition	November 1, 2011	
3.0	Third Edition	March 31, 2022	

GUAM COMMUNITY COLLEGE
VISION AND MISSION STATEMENTS

GCC Vision Statement

Guam Community College will be the premier educational institution for providing globally recognized educational and workforce development programs.

GCC Mission Statement

Guam Community College is a leader in career and technical workforce development, providing the highest quality, student-centered education and job training for Micronesia.

Sinangan Misión (Chamorro translation)

Guiya i Kulehon Kumunidåt Guåhan, i mas takhilo' mamanaguen fina'che'cho' yan i teknikåt na kinahulo' i manfáfache'cho' ya u na' guáguaha nu i manakhilo' yan manmaolek na tiningo' ni i manmafananågui yan i fina'na'guen cho'cho' para Maikronesiha.

Introduction

Guam Community College (GCC) is located on a 32.75-acre campus in Mangilao, Guam and offers over 50 fields of studies, encompassing 17 Certificate programs and 23 Associate Degree programs, and over 50 trades in the Apprenticeship Training Program. Since its latest accreditation in 2018, GCC has added several new programs either through re-institution of archived curriculum or through substantive change. These include the Bachelor of Science in Career and Technical Education and the distance education Associate of Science in International Hotel Management.

The College was created by the Community College Act of 1977 (Public Law 14-77) with a four-fold purpose: (1) to consolidate and strengthen many of the existing manpower training programs administered by the government of Guam under one governing board; (2) to expand and strengthen career education within the territory; (3) to expand short-term and extension programs in skill training; and (4) to strengthen the formal secondary and post-secondary education program in the vocational-technical fields. With a strong presence in the six public high schools offering ten career and technical education programs, the College also operates postsecondary career and technical education programs, adult and continuing education, community education, and short-term, specialized training. These programs are delivered both on and off campus, in satellite programs, and at businesses locations as needed.

The College also serves as the State Agency for Career and Technical Education, and provides instructional support to the Apprenticeship Training Program of the US Department of Labor. Likewise, the College offers a variety of community service and special programs to prepare students for college experiences including English-as-a-Second Language, Adult Basic Education, General Education Development (GED) preparation and testing, and an Adult High School Diploma program.

In September 2006, GCC completed Version 1 of its Enterprise Architecture (EA) document. Since then, GCC has invested millions of dollars in capital improvement facilities and

technology resources. GCC's technology demand to deliver courses and support business operational systems continue to increase exponentially and drive the need for improvements and a more systemic and strategic approach in technology planning to accomplish its mission of "providing the highest quality, student-centered education and job training for Micronesia."

EA PURPOSE

The EA sets the roadmap for documenting all aspects of the organization to ensure services, processes, applications, information, data, technology, locations, people, events and timelines are all aligned with the college's strategic goals and objectives reflected in the GCC Institutional Strategic Master Plan (ISMP)[1].

The EA is foremost, an agreed to definition of what GCC's information technology (IT) environment will look like, and is agreed upon by all GCC departments and governing bodies. Information technology architecture and a related set of standards are necessary to ensure the compatibility of the current IT environment with all future IT initiatives. For the purpose of this document, IT includes instructional technology whenever it is incorporated into the enterprise architectural environment.

This technology will encompass all of GCC's Information (data, records, documents, etc.), Equipment (computers, networks, cameras, etc.), Applications (operating systems, software, etc.), Support (staffing, skills training, service, etc.) and Management (command, control, and communication). The EA defines the technology environment, for today and for the next 5 to 10 years in support of student learning outcomes.

The EA is not a static document, but in fact, is a living document that should be reviewed at least every 3-5 years and updated as needed to meet changing organizational goals and objectives, policies, evolving technology, changing business processes, and growth and expansion of GCC's student population.

The EA provides a blueprint for the deployment of new information technology all of which must fit within the architecture and the standards.
- The architecture is a description of GCC data and applications as well as the technical environment required to run them, including hardware, supporting software, and networks.
- The standards are prescribed means of doing data modeling, programming, project management, system engineering and testing, documentation, and training.

To realize benefits from GCC's EA, the internal governance structure must use the EA in setting college priorities, technology planning, developing budget forecasts, securing funding, and is in alignment with the college's Vision and Mission statements.

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[1] GCC Institutional Strategic Master Plan (2020-2026)

ORGANIZATIONAL GOVERNANCE

From 2006 to 2017, the established participatory governance structure at GCC incorporated numerous constituent-based advisory committees, a central Faculty Senate, and a College Governing Council (CGC) that advised the college president. Within the former management framework was a College Technological Committee (CTC) that represented a cross-section of GCC's academic, business, administrative, and MIS support stakeholders. The CTC derived its authority and responsibility from GCC's Article VII, Participatory Governance. Committee members were appointed in writing by GCC's President, and each member served no less than three years on the committee. Responsibilities of the CTC included setting the strategic roadmap for IT standards and processes. The committee maintain currency in computer technology and academic applications of computer technology for both students and faculty and also addressed technology planning and distance education needs. The framework of the old participatory governance structure (with the CTC highlighted in yellow) is below:
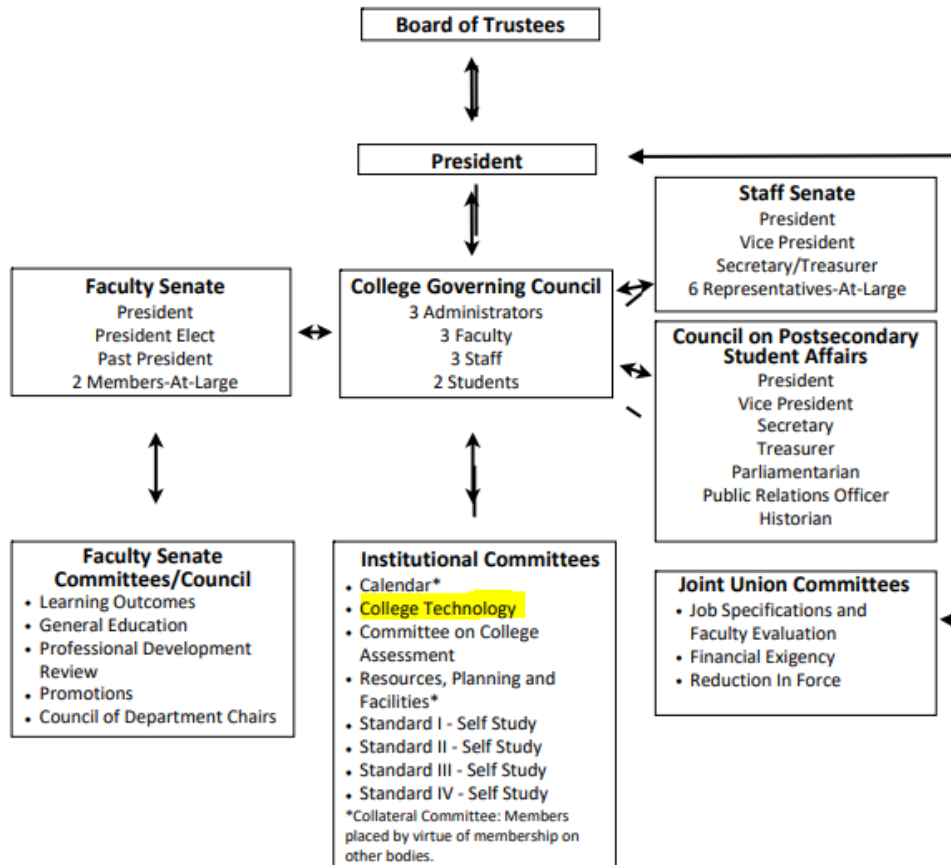
In the fall of 2017, GCC's participatory governance structure was revamped in order to align the structure with the content from the 2017 Agreement between the GCC Board of Trustees and the GCC Faculty Union. As part of this governance restructuring, CTC became an informal advisory

group under the auspices of MIS leadership. The advisory group is now called the Technology Working Group (TWG).

For the new participatory governance structure: *See Appendix B – Article VII Participatory Governance*

For additional background on the participatory governance restructuring, see the "Participatory Governance Structure Handbook in the link below:

https://ifs.guamcc.edu/adminftp/academics/services/aad/aier/participatorygovernancehandbook20172018.pdf

EA OBJECTIVES

The overall objective of the enterprise architecture is to promote the values and provide the benefits inherent in a single, cooperatively defined, information technology architectural standard. It is not the intention of the enterprise architecture to impose restrictions. Rather, it is the stated objective to serve the needs of all students, of each participating department, and of all employees. It is believed that enterprise architecture is the best way to leverage scarce information technology resources for the greater good. It is also believed that the efficiencies and cost savings inherent in such enterprise architecture will ensure that all stakeholders will continue to enjoy the benefits of staying abreast of the latest developments in information technology.

EA SCOPE

The intent of this document is to define the terms, enumerate the current state and status of all IT assets such as data, application, technological, and staffing, and to propose a preferred future state for each. The future state of the GCC EA will one day be the current enterprise architectural environment. As that happens, the GCC EA must be revised to consider emerging technologies, college policy changes, student trending populations, and other internal and external variables to remain and in continuous alignment with the college's ISMP.

The EA is not intended to provide detailed product or configuration information, cost estimates, staffing requirements, project plans, or projected timelines. However, the EA is the basis for the development of all of these follow-on deliverables. The scope of the EA includes all of GCC's IT systems regardless of location.

EA METHODOLOGY

The Enterprise Architecture Methodology is pictured in the figure below. The methodology is to

divide the EA into two levels: strategic and tactical. Both levels are contained in this document. The strategic level starts with an Enterprise Mission and Vision and then explains the general Guiding Principles, Objectives, and Strategies. The tactical level drills down into the specifics of the current architectural environment and proposes the future environment.

The detailed current and future architecture is divided into four aspects: Data, Application, Technology, and IT Management. These, in turn, are addressed by three separate disciplines: IT Architecture, IT Standards, and IT Training. The detailed future vision of the enterprise architecture is articulated in each of the cells created by the matrix. All of these details are contained in this document.
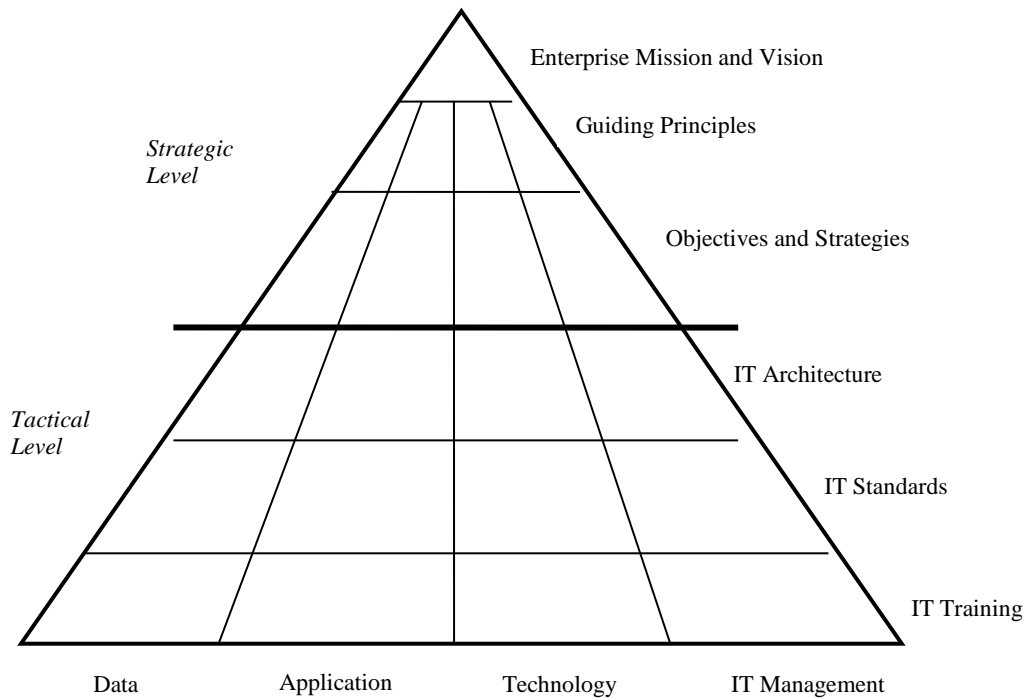
The pyramid is a top-down view of the composition of the architecture starting from the Enterprise Mission and Vision.

GUAM COMMUNITY COLLEGE EA GUIDING PRINCIPLES

GENERAL OVERVIEW

Enterprise Architecture Vision:
GCC will have a unified enterprise architecture encompassing various platforms and infrastructure.

Architecture principles are a foundation for the development of enterprise architecture (EA). The architecture principles define the spirit of the EA in that they are an attempt to capture the thinking behind it. Principles have a timeless quality because they define a value system. While methodologies and technology frequently change, organizational values and culture, as a rule, do not.

GUIDING PRINCIPLES

GCC's overarching EA guiding principle and shared value is unity - Unity of vision, purpose, and practice.

A guiding principle is to avoid the use of custom-built software. The most common type of custom-built software is something that bridges data between two databases or applications. While the initial interface is perhaps easy enough to create, it must be built with the highest standards for design, documentation, and testing. GCC will own the software and have to maintain it with its own or contracted resources. Such interfaces invariably need change overtime, thus the importance of having them well documented. Whenever either side of the interface changes, whenever a change is made to either database, the interface must change also. It is highly preferable to procure systems that support the other systems already present in the architecture.

ENTERPRISE GUIDING PRINCIPLES

1. Promote a holistic or "college-wide" approach while respecting the unique roles within the institution.

   Rationale
   - To promote a holistic approach will assist all by promoting trust and cooperation throughout the extended enterprise.
   - To reduce redundancy and associated complexity
   - To design IT infrastructure with a "college-wide" approach, making its adaptation to facilitate changing business processes easier and quicker.

   Implications

- Must spend a little more initially to obtain long-term goals, at an overall cost savings.

- Consistency will make things work better together and ease integration.

- Must accept that decisions could take longer to make, and solutions could require more time to implement.

- Divisions and departments must occasionally concede their own preferences for the greater benefit of the entire college. Trust will be critical to success.

- A holistic approach will assist all by promoting trust and cooperation throughout the extended enterprise.

- Must ensure the participation, input, and feedback from all levels of the college within the extended enterprise.

2. Business requirements and processes (administrative and academic) must drive the development, adoption, and acceptance of the EA.

   Context
   To ensure the viability of the EA, the EA must accommodate the perspectives of all IT stakeholders (to include but not limited to students, staff, administrators and faculty).

   Rationale
   - To improve productivity, student outcomes and business processes through the combined perspective of an IT system

   - To promote the change of business and instructional processes, in relation to a new technology

   - To avoid the costs of implementing technology for technology's sake.

   Implications
   - Requires good communication between business, academic, and IT professionals.

   - Must interact frequently and at multiple levels throughout the institution.

   - IT investments will be student-focused and aligned with enterprise/business strategic goals.

   Challenges
   - Convening during the winter break or summer months which make collaborative decision-making difficult and non-responsive.

3. IT systems should be designed for adaptability and flexibility, so they can be responsive to changes arising from curricular requirements, business processes, community needs, accreditation requirements or legislation.

   Rationale
   - To enable the infrastructure to support the changes that often occur in business and academic processes within the enterprise

- To make the infrastructure more adaptable to IT changes and IT market forces

- To enable business and academic process improvement

- To make integration of systems easier, and faster, with less process overhaul

- To enable systems to evolve to meet business and academic needs/changes

Implications
- Systems may initially require more time to design and more systemic thinking as transactions cross traditional system boundaries

- Must expect higher initial costs, but less costly integration

- System will have a longer life-cycle; therefore, a higher system return on investment

- A system could be sub-optimal in the short term in order to gain long-term optimization

- Must define performance metrics for flexibility and adaptability

4. To ensure fiscal responsibility with respect to information technology (IT), the college will adopt a formal investment strategy for IT acquisitions.

Context
This investment strategy will clearly articulate the expected life of an IT system. It will consider all phases of an IT system life cycle, including acquisition, support, benefits and associated costs for GCC stakeholders, the diverse communities of Guam, Micronesia, and the Asia-Pacific Rim.

Rationale
- To lead to higher quality solutions

- To enable improved planning and budget decision-making

- To lead to realistic budgeting

- To lead to appropriate system quality decisions (right-sizing)

Implications
- Requires the development of a formalized investment strategy.

- Requires an annual budget, and capital finance planning, processes, and procedures that quantify, audit, and monitor IT allocations and expenditures at the college.

- Must consider what will be the actual lifetime of the system.

- Must create methods for linking IT investments to business and academic needs and aligning with the college's strategic goals.

- Must create methods for linking the IT investment to the strategic planning process.

- Requires more planning and resources to do a formalized investment process.

- Must change the business and academic view of technology to include IT investment strategies.

5. Convergence towards the EA will be encouraged with timing consistent with investment strategy for the enterprise.

   Context
   Convergence towards the EA will take place as new applications are built, technologies are deployed, and old systems are refreshed or retired. Exceptions to the EA may be endorsed in specific cases, where the benefits of consensus for a specific technology solution outweigh the adoption of the EA.

   Rationale
   - For EA to be adaptive and to be able to evolve to accommodate changes in business, academic and technology requirements

   - To avoid abrupt and reactionary conversions, which are very expensive

   - Convergence over time preserves investment while promoting the benefits of the EA.

   Implications
   - Delayed convergence can reduce the benefits of the EA.

   - Requires a realistic and attainable approach to migration to the EA.

   - Requires an explicit transition strategy for existing systems once a target technology is identified.

   - Allows for premature termination of a system, where it makes sense.

   - Does not allow for waiting forever.

   - Requires a business case for exceptions, an exception process, and an exit strategy.

   - Must define temporary or permanent exceptions and exit strategies for temporary exceptions.

   - Requires funding to get out of obsolete technology.

6. The EA may identify more than one target technology solution as a single solution may not be applicable or feasible in all situations. When more than one target technology solution is endorsed by the EA, one bundled solution or program should be designated as the primary target for convergence.

   Context
   The EA should reflect the desire to achieve convergence within the college. However, there may be limitations towards convergence of a single solution. Alternatives may be necessary to meet business and academic needs. Therefore, endorsing primary and secondary technology choices may be necessary to fulfill the need.

   Exceptions to the EA may be endorsed in specific cases, where the benefits of consensus for a specific technology solution outweigh the adoption of the EA. In some cases, a lighter-weight solution may be a primary solution, preferable to an alternative, more robust solution.

   Rationale

- To reduce technology solutions from many to two or significantly fewer, when a single solution is not feasible

- To avoid forcing higher cost when one size does not fit all

- To reduce complexity but fulfill a business or academic need by using primary and secondary solutions

Implications
- Requires the development of impartial rules and decision criteria to distinguish when unique requirements should take precedence over the college-wide approach.

- Must recognize that it is generally more costly to support two systems rather than one.

- Must recognize that designing a repeatable methodology for endorsing primary and secondary technologies may be difficult.

- Must recognize that migration strategies are more complex when primary and secondary technology choices exist.

- Must focus investment on primary technology choices.

- Need to address the impact to the business, academic and IT areas.

MANAGEMENT AND ORGANIZATION PRINCIPLES

1. The management of the EA will be open and transparent to all stakeholders within the enterprise.

   Context
   The TWG (formerly the CTC) is a vital and important component in the development and management of the EA. Communication needs to be open, honest, frequent, and bi-directional between stakeholders and TWG.

   Rationale
   - To engender trust between all parties

   - To encourage buy-in from the stakeholders, resulting in faster and more complete adoption of the EA

   Implications
   - Must have buy-in and support from the College Governing Council and from the established working groups and technology domains

   - Requires a communication plan that must be followed

   - Open review periods will be built into the EA processes

2. The processes for selecting technology must be open and transparent.

   Context
   IT technology decisions must consider input from stakeholders and be open, transparent, and well documented. This requires allowing time for necessary consideration of issues by

stakeholders, technical staff, and management. Once a decision has been reached, unnecessary, unproductive debate should not continue.

Rationale
- To lead to decisions being made in an open manner that will stand up to later scrutiny and audit
- To allow stakeholders and technical staff sufficient opportunity to identify important information regarding potential technology investments
- To ensure that decisions are made according to appropriate investment strategies
- To encourage the necessary analysis of issues without becoming bogged down in details
- To avoid unproductive heckling and back-biting after decisions are made
- To avoid playing favorites with particular vendors or technologies
- To promote a healthy IT culture where the best overall solutions are identified and implemented

Implications
- Decisions must employ and be guided by EA principles
- Decision-making processes must allow ample time and opportunity for productive debate
- Decisions must be well documented so that all parties know when the time for debate has ended

3. Promote formal methods of IT systems engineering.

Context
Systems engineering includes all aspects of IT - application projects, infrastructure projects, and hardware projects. However, GCC's current MIS staff and capabilities defer IT systems engineering to industry. Systems analysis and design activities are developed through out-sourcing. GCC will require vendors to utilize an industry-standard, Systems Life Cycle (SLC) or Systems Development Life Cycle (SDLC) methodology by which systems being developed for GCC can be monitored, tracked, and measured.

Rationale
- To lead to measurement points that, in turn, lead to benchmarks

- To enable improved quality assurance

- To enable repeatability and consistency

- To lead to right-sizing

Implications
- Must minimize impacts upon the college

- Must agree on system engineering practices and methods

- Must identify the formal methods for particular areas of technology

- Must follow up for quality assurance

- Must confirm that ROI is what was expected

- Must use a disciplined, repeatable approach to development

- Need a resource that will identify and document principles

- TWG must develop the formal processes

4. As new contracts and outsourcing agreements are established, these contracts and agreements will reflect and incorporate EA principles.

Context
This is one of the mechanisms by which we keep EA aligned with operations. Outsourced work should not lead to exceptions to the EA just because they are outsourced. The EA should drive the standards expected in an outsourced effort. As industry and technologies evolve, the EA should be updated to reflect current industry standards and hold true to its principles.

Rationale
- To be successful, the EA must be integrated with all facets of IT system design, planning, and acquisition.

Implications
- Requires EA training for non-IT professionals in areas such as procurement.

- Need partnerships and good communications between program areas, procurement, contract management, and IT departments to obtain the benefits of EA.

- Must include EA-based requirements when IT procurements are part of non-IT contracts.

- Must change the view of institutional investments to include IT requirements.

- Must audit IT procurements and provide feedback mechanisms for EA.

- Must include EA-based requirements in procurement documents and contracts.

5. The success of the EA will depend upon consensus and trust among the stakeholders within the enterprise.

Rationale
- To have a balance: divisions must be ready to act unselfishly, and the enterprise must mitigate the burdens that solutions impose on divisions.

Implications
- Achieving consensus will require collaboration to satisfy stakeholders when they are negatively affected by the implementation of the EA for the greater good of the enterprise.

- Must manage costs and benefits so that overall equity is achieved across the enterprise.

- The return on investment (ROI) for each project must identify its costs and savings.

6. The EA will promote technology equalization among stakeholders, as not all entities within the enterprise are funded at the same level.

   Rationale
   - Information technology automation often reduces program costs and provides rapid service delivery mechanisms; however, not all new programs have adequate funding for information technology

   - When collaboratively constructed to reflect the vision and mission of the institution, project and programs in support of GCC's IT infrastructure are justified for the purpose of seeking funding and support

   Implications
   - Must develop funding mechanisms to support this type of initiative

   - Must develop processes to promote cross-division sharing of technical expertise

   - Must perform gap analysis to find opportunities for technology equalization

7. Training programs and consulting services must be provided to stakeholders to promote convergence and the effective application of the EA

   Context
   Consulting services may take the form of mentoring staff, assisting project teams in defining their business/academic and technical requirements; providing project management guidance; and providing procurement, acquisition, or contract/vendor management support.

   Rationale
   - A well-trained organization is critical to the success of the EA
   - Every effort should be made to ensure technology training is provided to maintain and support GCC's ever-growing and more complex IT environment
   - Training and an internal outreach campaign to promote GCC's EA and its purpose will make for more informed long-term IT decisions
   - Train and promote the EA as a roadmap

   Implications
   - Requires the development of a comprehensive training program

   - Must foster mentoring

   - Must identify how training and consulting will be funded and managed

8. The EA should encourage professional development for permanent, full-time equivalent, (FTE) staff.

   Rationale
   - Staff is our greatest resource

   - To reduce dependence upon long-term contracted staff

Implications

- Must ensure that funding designated for technical training is not eliminated in times of fiscal crisis

- Must include professional development plans in annual performance reviews

- Must make a commitment to staff to provide opportunities for professional growth

- Must ensure access to cost-competitive training alternatives

- Must ensure that succession and knowledge transfer plans are developed and implemented for both permanent and contract staff

- Must have greater opportunities for combined training

TECHNOLOGY PRINCIPLES

1. EA technology choices will be based on criteria including extensibility, interoperability, flexibility, adaptability, portability, and appropriate scalability.

   Context
   The principle applies to how GCC selects a target technology for the EA.

   Rationale
   - To more quickly adapt to changing business and academic requirements

   - EA technology choices will promote the integration of technologies based upon interfaces that utilize open standards where available

   Implications
   - Criteria for the selection of EA target technologies will require evaluation with respect to extensibility, interoperability, flexibility, adaptability, portability, and scalability.

   - EA technology selections must balance division versus enterprise interests and needs

2. Reduce complexity and enable integration as much as possible to realize business process improvements within the enterprise.

   Context
   Customization taken too far increases cost and reduces adaptability.

   Rationale
   - Complex application systems with many data and transactional functions are difficult to manage, making change risky

   - To avoid dependency failures resulting from applications that are tightly coupled

   - To implement applications that are accessible, perform well, and account for network and other dependencies

   Implications
   - Must promote and facilitate component-based applications

- Must keep to a minimum the number of vendors, products, and configurations, allowing for maximum flexibility in implementing changes

- Must avoid overly complex configurations of components and discourage undue custom tuning, or customization of hardware and software based on transient, local, or other conditions

- Must maintain configuration discipline, sacrificing performance and functionality in some instances.

- Must account for resource constraints

3. Support pervasive standards and technologies under appropriate conditions.

   Context
   Using pervasive standards makes sense if:

   - Reliance upon a single vendor is proactively managed

   - Market forces are considered

   - Cost of a pervasive proprietary standard is balanced with the cost to migrate to an open standard in the future

   - The cost to migrate to interfaces that employ open standards is considered

   Rationale
   - To avoid dependence on weak or under-performing vendors

   - To allow the enterprise to influence and stay current with industry standards and trends

   - To encourage flexibility and adaptability in product replacement

   - To avoid dependence on proprietary standards that become isolated

   Implications
   - Must establish criteria to identify weak or under-performing vendors and products.

   - Must assess the architectural fit of proposed solutions.

   - Modify work practices and business workflow to increase standards compliance.

   - Must manage dependencies on proprietary vendor technologies.

4. In order to maximize integration throughout the enterprise, systems should incorporate standards that promote system interoperability.

   Context
   Where applicable, incorporate best practices based upon open standards, best practices from like organizations, or pervasive standards based upon a vendor's or provider's market position.

   Rationale
   - To have systems that include application interfaces based upon open standards

   - To promote application module reuse

- To support leveraging innovations developed by other enterprise entities

Implications
- To avoid reinventing the wheel, must research what is currently within the marketplace and how others approach similar business issues.

- Must define what we consider to be an open standard application interface.

- Must be careful not to constrain innovation.

- Must have a component repository in order to identify opportunities for application module reuse.

- Must look for alternative funding sources that will foster innovation.

- Must write modules that are reusable.

5. Use open source software (OSS) where a sound decision model and investment strategy is present.

Rationale
- Open source is a viable alternative to commercial, off-the-shelf technology products and should be considered when making a technology selection.

- Open source applications can provide innovations that are not available in the commercial marketplace.

Implications
- Training and documentation may be limited, thereby increasing costs.

- Product technical support may be limited, thereby increasing costs.

- Must consider whether the migration cost might be high even though initial costs might be low.

- Must consider how well supported a solution is in the industry.

6. Approach the development of systems from a cross-functional, horizontal institutional perspective and implement systems in such a way that promotes technology reuse.

Rationale
- If institutional services are thought of at a higher level, systems can be designed with reduced complexity and designed to promote technology reuse

- To achieve high-efficiency development and to lower costs of support, training, and testing through the creation and reuse of standard elements

Implications
- Requires a different level of abstraction than what government traditionally uses

- Might run into "turf" issues

- Might find difficulty funding something from a functional rather than an agency perspective

- Implementation requires a high degree of communication and integration across the enterprise
- Must create incentives for participation in the component repository
- Must make contributions to and use of the component repository easy

APPLICATION DELIVERY PRINCIPLES

1. Promote application consolidation, standardization, and integration where significant benefits can be realized through the sharing and reuse of data, information, and applications.

   Rationale
   - To avoid the creation of additional silos of data and applications.
   - To avoid redundant efforts within the enterprise.

   Implications
   - Requires communication and knowledge of activities within the enterprise.
   - Requires a shared application portfolio.
   - Requires a component repository.

2. Embrace a formal methodology for IT portfolio management within the enterprise.

   Context
   IT portfolio management comprises a number of sub-disciplines, including IT asset management (ITAM), application portfolio management (APM), project portfolio management (PPM) and application component management.

   Rationale
   - To have an accurate inventory of systems applications and data within the enterprise
   - To identify opportunities for sharing and reuse
   - To strengthen management of IT investments

   Implications
   - Must view IT portfolio horizontally and vertically for opportunities

3. The goal for the design and implementation of systems should be of adequate technical quality to meet the business and academic requirements, and not excessively more.

   Context
   Systems should be designed and implemented to be good enough to meet the need, without superfluous features and capabilities, lest more effort be spent on the extra functionality than was required for the necessary functionality. Systems should be designed with sufficient foresight into future use of the system so as to provide adequate flexibility and adaptability to changes.

   Rationale

- To avoid unjustified complexity and cost

Implications
- Must determine how to know when a system is good enough.

- May require business process reengineering.

- Requires scope management.

- Must develop a good business case before designing a system.

USER INTERFACE PRINCIPLES

1. The enterprise information technology systems must be accessible to all GCC constituencies.

   Rationale
   - The enterprise entities have a responsibility to provide services to all users and address their specific access requirements.

   - To be responsive to the increasing diversity of the college.

   Implications
   - Must pursue "universal design" within the context of technology, which includes the design of products, systems, processes, and environments.

   - Services must be widely accessible without being cost-prohibitive.

   - Must comply as necessary with Section 508 of the Americans with Disabilities Act (ADA).

2. Support appropriate client delivery channel preferences for accessing enterprise services.

   Context
   Systems must be designed with the knowledge and understanding of the population the system will be serving.

   Rationale
   - To ensure that guidelines for user interfaces are not constrained by narrow assumptions about location, language, systems training, or physical and cognitive capabilities

   Implications
   - Products and services may be accessed in a variety of ways, but must be available to users in a consistent, accessible fashion.

   - Strive for a common look and feel, and consistent service, regardless of choice of delivery channel.

   - Must comply with standards for privacy and security.

SECURITY PRINCIPLES

1. IT systems must be implemented in adherence with government security, confidentiality, privacy policies, and laws.

   Rationale
   - To enhance public trust

   - To protect government assets

   - To enable compliance with requirements for public funding and grants

   - To protect privacy of students, GCC employees, and other partners

   Implications
   - Must identify, publish, and keep applicable policies current.

   - Must periodically audit/follow up on IT systems such as Health Insurance Portability and Accountability (HIPAA).

   - Must formulate minimum standardized security policies.

   - Must allot sufficient time and resources for security policy development.

   - Must consider indirect implications of security policy, for example, staffing to perform audits or check for vulnerabilities

2. Data must be protected against unauthorized access, denial of service, and both malicious and accidental modification.

   Context
   Data includes paper records, scanned images, printouts, microfiche, as well as digitally stored information. Sensitive and confidential information should not be accidentally provided or published.

   Rationale
   - To minimize improper use or loss of data, either of which can have serious business and legal consequences

   - To minimize security violations, which impair integrity and jeopardize the viability of government

   - To limit opportunities for unauthorized access, so that people are less likely to do inappropriate things

   Implications
   - Must implement approaches/policies to minimize improper use of data.

   - Must implement approaches/policies to minimize security violations.

   - Must establish follow-up procedures for security alerts.

   - Must regularly examine logs and alerts and execute follow-up procedures.

- Must not secure data to the point that responding to open records requests becomes prohibitively expensive.

- Must consider implications of defining a Resource Description and Access (RDA).

- Must design and account for Open Records requirements.

- Must provide staffing and resources to perform the functions and duties outlined above.

3. There must be accountability for security, which includes the appropriate design and use of audit functions and system monitoring tools.

   Rationale
   - To enhance public trust

   - To have accountability, there must be auditing

   - To avoid data loss or data corruption

   - To ensure data is credible

   - To identify inappropriate access

   - To prevent security breaches, which have harmful and expensive consequences

   Implications
   - Require monitoring compliance.

   - Must design audit functions and cross-checks into systems.

   - Must provide resources to monitor. Monitoring is resource-intensive.

   - Must define processes for following up if potential security problems are found.

4. A well-defined security policy promotes sharing by removing uncertainty.

   Rationale
   - To enhance public trust

   - To provide a clearly articulated policy for use of information

   - To prevent destruction of and avoid mishandling of security information, for example, demonstrating chain of custody for evidence

   Implications
   - Must make security, confidentiality, and privacy requirements clear

   - Additional expenses may be required

   - Need training to comply with policies

   - Must consider implications of defining a resource description and access (RDA)

   - Must obtain advice from legal counsel as appropriate

   - Must institute policies that ensure appropriate background checks for employees

   - Must provide education for staff that works with sensitive or confidential information

SYSTEM MANAGEMENT PRINCIPLES

1. IT must plan, design, and construct appropriately for growth and expansion of services across the enterprise.

   Rationale
   - To be more cost effective
   - To reduce maintenance costs
   - To enable quicker response to growth and change

   Implications
   - Must make a culture shift towards planning for adaptation
   - Must develop processes to collect information and ways to predict growth from historical trends
   - Must promote capacity planning
   - Must recognize the tradeoffs between the increasing high costs of labor and decreasing costs of technology

2. Formal methodologies for IT change management must be established and followed.

   Rationale
   - To improve the quality and availability of our systems
   - To ensure repeatability and consistency of system management processes

   Implications
   - Minimizes negative impact upon partners
   - Must agree on practices and methods and follow them
   - Must develop and document well-defined system management processes
   - Must develop a process to monitor for compliance and follow that process
   - Following system management processes may be cumbersome and slower in the beginning
   - System management requires advance planning

3. Promote the use of common systems for IT problem resolution.

   Rationale
   - To enable improved quality assurance and system availability
   - To enable the development of a knowledge base for problem resolution
   - To provide communication to our users when problems occur

   Implications

- Staff must use problem resolution systems.

- Problem resolution systems must be efficient for the staff to use.

- A view of the problem resolution system should be available to users.

- Must establish and monitor performance metrics for IT problem resolution.

- IT problem resolution has to be more general than would be appropriate for any individual division. (For example, rights management services [RMS] would need improvements if it were to be an enterprise solution for IT problem management/resolution.)

4. Implemented infrastructure must be robust, responsive, and reliable with appropriate redundancy.

Context
Infrastructure must be appropriately scalable and services must be structured appropriate to the differing needs of the divisions. Appropriate redundancy requires balancing the investment made for high availability against the defined business/academic needs (i.e., to seek right-sizing). Robustness means that the infrastructure design must take into consideration likely points of failure and provide backup and redundant components where required.

Rationale
- To adequately protect against system failure while not wasting resources

- An enterprise approach would be the best way to leverage the necessary IT capital investments to ensure high availability.

- To avoid excessive infrastructure and support service costs

- To leverage economies of scale where appropriate

Implications
- Need to consider cost, risks, time redundancy, and the context, for example, disaster recovery is different from business continuity

- Must define and discover business requirements for system availability and successfully test against those requirements.

5. Service providers must address and facilitate business continuity, security, and disaster recovery. These services should be provisioned in a manner appropriate to the criticality of the data and applications involved.

Rationale
- The enterprise provides many essential services that, especially in times of crisis, must continue to be available upon demand, and recovery must occur within a compressed timeframe.

Implications
- Must identify and prioritize critical business/academic functions.

- Must ensure that communications systems are available, especially in times of crisis.

- Must define acceptable recovery times.

- Must develop and test disaster recovery and business/academic continuity plans.

- Must periodically review and update test disaster recovery and business/academic continuity plans.

- Must balance costs against risks.

- Must promote awareness in order to provide funding.

DATA MANAGEMENT PRINCIPLES

1. Each individual data item has a single steward or authoritative source, clearly defined locations, and is accessible. Authoritative data must be accessible and available for reuse by any entitled systems or business/academic processes.

   Rationale
   - Reducing duplication requires that there be an authoritative source for information about that data

   - More effective decision-making requires increasing the integrity and relevance of data, which requires having an accurate inventory of where the data is stored.

   - Data is a strategic asset that must be shareable and accessible to gain maximum value.

   Implications
   - Must have time and resources to identify and specify authoritative sources.

   - Must establish institution wide procedures to manage data access and ensure data security and integrity.

   - Must define stewards and their role.

   - Need a consolidated metadata repository for the enterprise.

2. Data stored in information repositories within the enterprise should be widely available and accessible by all entities within enterprise.

   Rationale
   - Information that is shared will maximize the effectiveness of business/academic decision-making.

   Implications
   - Must create and define standards and processes for unifying data and information management.

   - Must establish data warehouses to facilitate information availability for decision-making.

   - Need a consolidated metadata repository for the enterprise.

   - Must provide resources to establish and maintain a single metadata repository.

- Must have an access mechanism for information repositories.

3. Data is an asset that must be managed for the benefit of the enterprise. Data must be shared to the maximum degree possible, without jeopardizing security and confidentiality.

   Rationale
   - The value of information is not always realized when it remains in isolated pockets.
   - Required security and privacy cannot be sacrificed and may sometimes result in the inability to publicly share information.

   Implications
   - Must restructure data for easy access and management.
   - Must organize business/academic systems and databases according to subject matter, not by department, division, or unit.
   - Must maintain data in its most appropriate format.
   - Can share data by integrating systems rather than by sharing data directly.
   - Data warehouses must be multimedia-capable to access and manipulate all forms of data stored in them.
   - Must design network infrastructure to efficiently and cost-effectively transmit all forms of data adequately to meet business and performance requirements.
   - Must make data and applications accessible via a variety of media.

4. Data is collected, protected, and maintained in accordance with appropriate standards and guidelines.

   Rationale
   - The enterprise must comply with applicable policies, statutes, and federal requirements, for example, Family Education Right to Privacy Act (FERPA)
   - Data is more likely to be shared when the standards and guidelines for sharing and protecting that data are documented and understood.

   Implications
   - Must provide training and education so that individuals are aware of standards.
   - Must have communication plan to build awareness.
   - Must define and document the appropriate standards and guidelines.

5. Records in electronic format must be preserved, maintained, and remain accessible for their designated retention period.

   Context
   Records must be appropriately disposed of once the designated retention period has expired.

   Rationale

- Proper record maintenance is statutorily required.

- Keeping records longer than required is costly and wastes space and resources.

Implications
- Must provide resources for records identification and disposition.

- Must establish policies for record retention.

- Must establish systems to automate the record retention processes.

- Must establish an audit process.

- Must establish a process to destroy records in an appropriate manner.

- Must define and implement a process for monitoring records handling.

- Must create a communications plan to promote awareness of policies for records retention and disposition.

GUAM COMMUNITY COLLEGE EA OBJECTIVES AND STRATEGIES

General Overview

GCC's information technology objectives are to fully support the college's mission:

"Guam Community College is a leader in career and technical workforce development, providing the highest quality, student-centered education and job training for Micronesia."

- It will deliver integrated enterprise information systems and infrastructure that improve public access to GCC functions and information, streamline business processes to simplify college-public interactions and reduce costs, and meet the legal and business needs of the college.

- GCC will create and operate services on-line available to the diverse communities of Guam and Micronesia

- GCC will develop cost-effective means for providing 'niche' training and services, and for providing training and education not in the college curriculum.

- GCC will provide a unified, secure, efficient and reliable IT infrastructure to address current and future needs.

- GCC will provide sufficient and cost-effective bandwidth to meet current and future needs.

THE PRESENT

CURRENT GCC ARCHITECTURE ASSESSMENT

CURRENT DATA ENVIRONMENT

General Overview
The current picture of the Data Environment is now mostly integrated. While there is some data existing in separate systems such as the COMPASS, Simply ID, Library's Symphony, Improve (formerly TracDat), and specialized academic systems (PLATO MATH, CHOICES, CASAS) the real problem is in fully integrating all and in maintaining the Integrated Database Management System (IDMS) with considerably insufficient resources in manpower, overall system capacity, and in money for desperately needed cloud computing resources, Internet bandwidth, hardware and software upgrades, and maintenance.

Data Entry
Data integration and sharing is continually being addressed since the implementation of the Ellucian BANNER system and the MyGCC portal in which most critical operational or administrative and academic activities are now using an integrated system. The MyGCC portal, through its single-sign-on feature, allows students and employees to access the database for self-service applications such as registering for a class or checking a departmental budget. This system now allows for greater accuracy and consistency of the data being used that comes out of an integrated database versus the fragmented systems of previous years.

Pseudo-Applications
A former concern that is no longer a major issue is in regards to the risk of using other data gathering and reporting tools or applications in the fulfillment of an office's mission. More so now than ever, many standard internal and external reports are coming out of the IDMS with the use of Evisions' ARGOS reporting system than from other forms such as those created and maintained using applications like Microsoft Access, Microsoft Excel, or even Google Sheets.

Information can now be gathered in the usage of the portal by individual student logins and their activities; however, this only relates to portal activities. Lab workstations are still not issued unique accounts and are not being captured. Discussion on ending this practice has taken place and may change in the future with the implementation of an Identity and Access Management System (IAMS) that will bring stricter security policies into place.

Records Management
The college has institutionalized a document scanning and capturing system as part of the overall solution to address the paper-based driven process into a more paperless environment. Together with the implementation of the all-in-one scanning-printing-copying-faxing solution, GCC now has in place Ellucian's Banner Document Management System (BDMS) that allows different

users and sections of the college to electronically archive documents for safe-keeping, storage, sharing, and retrieval. Despite the training provided to key personnel, mainstream usage of this system is not yet realized, but more and more users are discovering the benefits of moving into or using this solution.

Data Formats:
- **Additional formats not previously included:**
    - Video
    - Audio other than voice
    - Film/Negatives
    - Online Contents

Data Users:
- **Additional users not previously included:**
    - Board of Trustees Members
    - Foundation Board Members
    - Anonymous Patrons
        - Library
        - Online visitors on GCC websites
        - Guest and customers at functions and events
        - Bloggers
    - "Artificial Users"
        - BOTS (automatic or programmed content/data "harvesters")
        - Spammers / Phishers
        - Hackers
        - Drones / Hoverers
        - Scanners/Sniffers (Wired & Wireless Network prowlers)

Data Architecture and Standards Justification

These areas of improvement support the need for the architecture and standards recommended in this document.

Opportunities	Comment
More database integration, sharing and storing of common data or files in a single place.	Ellucian's Banner ERP addressed most of this, but more can be done with other systems for data or file sharing.
Manual entry of duplicate data from one database to another is diminished.	Manual data entry is prone to error and means that the data is not only stored in two places but was entered twice.
Not capturing data from IT users (via unique individual logins) on their usage patterns.	This is vital important that is necessary for a properly functioning IT environment.
Official data is derived from the databases but not stored in the databases.	Official databases become repositories of data but cannot provide the final answers.
Duplication of data in different media within the same organizational unit has been reduced. Banner ERP and BDMS addresses most of these issues.	Banner ERP and BDMS addresses most of these issues. More on-line forms are becoming more prevalent.
Records Management: Wide spread use of paper forms to capture data that then must be entered into a database.	Need to eliminate the use of paper forms and use data entry forms that are accessible to the originating person. Google Forms and Docs are addressing these.
Records Management: Those paper documents which must be retained and stored should be digitized and stored electronically.	By imaging/scanning the original paper documents they can be stored electronically. Then, with legal authorization, the paper copies may be discarded.

CURRENT APPLICATION ENVIRONMENT

General Overview
Guam Community College has a large investment in applications primarily in the Academic Affairs and Finance and Administration Divisions. It is noteworthy the college has very few applications custom built for the college. No in-house application development is being done and most applications are being used straight out-of-the-box. There are also discussions on replacements or upgrades of some applications.

Ellucian (formerly SunGard Higher Education)
In 2006, Ellucian replaced GCC's two largest applications, NIAS and Dynalogic and provides a suite of software and processing applications for financial services, higher education and the public sector. This new system effectively addressed challenging problems associated with NIAS and Dynalogic. Ellucian provides advanced query and reporting capabilities in a single integrated database application combining NIAS and Dynalogic functionality into a single repository and eliminated the need for user-built tools. The Ellucian application is built upon the latest hardware and operating systems using state-of-the-art system and database design architectures, and will serve the college well for the foreseeable future. Since 2006, GCC has significantly expanded its portfolio of Ellucian products and services to include analytics, mobile, imaging, data warehousing and messaging to name just a few. The current portfolio of Ellucian applications currently licensed for use at GCC are:

Application or Service Name	Next Renewal Date
Application Hosting Services Banner	30-Sep-23
Banner - Accounts Receivable	30-Sep-23
Banner - Channels	30-Sep-23
Banner - CSS Profile	30-Sep-23
Banner - Document Management Integration Component	30-Sep-23
Banner - Employee Self-Service	30-Sep-23
Banner - Enterprise Data Warehouse	30-Sep-23
Banner - Faculty and Advisor Self-Service	30-Sep-23
Banner - Finance	30-Sep-23
Banner - Finance Self-Service	30-Sep-23
Banner - Financial Aid	30-Sep-23
Banner - Financial Aid Self-Service	30-Sep-23
Banner - General	30-Sep-23
Banner - Human Resources	30-Sep-23
Banner - Integration for PayNetExchange	30-Sep-23
Banner - Luminis Data Integration LDI	30-Sep-23
Banner - Operational Data Store Oracle	30-Sep-23
Banner - Position Control	30-Sep-23

Banner - Student	30-Sep-23
Banner - Student Self-Service	30-Sep-23
Banner - Web General	30-Sep-23
Banner - Web Tailor	30-Sep-23
Cross Product - Enterprise Data Warehouse	30-Sep-23
Cross Product - Operational Data Store Oracle	30-Sep-23
Cross Product - SEVIS Transfer Adapter	30-Sep-23
Degree Works - Degree Works	30-Sep-23
Degree Works - Transfer Equivalency	30-Sep-23
Electronic Data Interchange - EDISmart	30-Sep-23
Ellucian - Analytics	30-Sep-23
Ellucian - Messaging Adaptor	30-Sep-23
Ellucian - Messaging Service	30-Sep-23
Ellucian - Mobile	30-Sep-23
Ellucian - Mobile Platform Edition	30-Sep-23
Ellucian - Solution Manager	30-Sep-23
Ellucian - Theme Editor	30-Sep-23
Evisions Corporation - Argos Advanced Features	30-Sep-23
Evisions Corporation - Argos Enterprise	30-Sep-23
Financial Aid - FM Need Analysis	30-Sep-23
Luminis - Basic	30-Sep-23
Luminis - LDI Common	30-Sep-23
Luminis - Platform	30-Sep-23
OpenText - ApplicationXtender Desktop	30-Sep-23
OpenText - ApplicationXtender Image Capture	30-Sep-23
OpenText - ApplicationXtender Web Access .NET	30-Sep-23
OpenText - ApplicationXtender Web Services	30-Sep-23
OpenText - ISIS PixTools Runtime	30-Sep-23
OpenText - ISIS Scanner Driver	30-Sep-23
Oracle - Database Diagnostics Pack	30-Sep-23
Oracle - internet Application Server Enterprise Edition	30-Sep-23
Oracle - Internet Developer Suite	30-Sep-23
Oracle - Programmer	30-Sep-23
Oracle - Relational Database System	30-Sep-23
Oracle - Tuning Pack	30-Sep-23

IT Applications

Another finding is how few applications are available to Administrative Services and MIS. In the case of MIS, there are time consuming tasks being performed manually. This manual effort could be greatly reduced if MIS were provided with proper software tools. As examples, the complex GCC network does not enjoy the benefits that load-balancing software would provide and PC or computer cloning is highly manual. Even the simple task of remote PC troubleshooting or common desktop applications deployment, installation, and maintenance are still being conducted physically.   Yet, mature software applications and technician system tools exist that could greatly automate these processes and greatly improve staff efficiency through remote access.

The adoption of any new applications is not a simple matter of procurement and installation. The introduction of new applications mandates more user and technical training, new policies and procedures, revised job assignments and skills requirements. The replacing of old applications or the incorporation of new ones must be a thoroughly planned undertaking. Each new or replacement system implementation is a major project undertaking that will require the active support of all those involved.

Distance education (DE)
In July 2010, GCC adopted a Distance education policy to deliver educational services either through instruction or support services to students who are not physically co-located with the individuals providing the service *(See Appendix C- Distance Education Policy).* The platform GCC currently utilizes to support DE is the Moodle Course Management System, a course management system designed to help educators deliver quality online courses. Moodle is open source software and is used all over the world by universities, schools, companies and independent teachers.

DE includes the use of computer and Internet-based educational services as well as video and audio services. Institutions use Internet technologies to bring students educational programming in either synchronous (students and the service provider are interacting on line at the same time) or asynchronous modes (students and the service provider not interacting on line at the same time). Educational interactions delivered through these means may occur on campus as well as off campus. DE can be a convenient, flexible, and effective means of providing education. Nearly half of all the college students in the country are of the age group once thought of as nontraditional. They are working adults or adults seeking first educational credentials or retraining. Many working adult students with multiple demands on their time find DE to meet their needs better than campus-based education and is also an opportunity for the college and the students to contribute to environmentally-friendly practices. Courses that run through DE reduce the use of paper and copying, as resources are available digitally. In addition, students commute to campus less frequently than traditional courses, lessening the use of gas and related emissions

into the environment. In addition to working adults, the traditional-aged college students come to campus with extensive experience using digital technologies in their personal and school lives. For these students, DE involves the use of Internet, web casts, text messaging, and other digital media that are comfortable and familiar. As technology continues to expand world-wide, participation in DE assists students in preparing for the workforce.

The Associate of Science in International Hotel Management is GCC's first 100% distance education program. Additionally, in response to the ongoing COVID-19 pandemic, GCC delivers limited courses through DE using the official Learning Management System, Moodle, and complemented by other learning platforms such as Google Classroom, Microsoft Office 365 for Education, Ellucian's LUMINIS Course Studio within MyGCC portal, and Cengage, just to name a few. ***Application Architecture and Standards Justification***
These areas of improvement support the need for architectural standards recommended in this document.

Opportunities	Comment
Not all systems combine or present information in the way necessary to satisfy some reporting and management requirements.	This drives users to create MS Excel and MS Access reports or continue with legacy approaches. Unfortunately, there is important additional and derived information that then only resides in pseudo-application and not on the parent systems.
There are several useful applications that can be used for: • A highly automated network/PC User Login system • A network load-balancing application • PC-cloning application • Desktop Central / Endpoint Management System • Multi-threat Security Bundle (MTSB)	With the addition of these automated systems, GCC will enjoy additional functionality for all of its users, reduced workload in MIS, increased efficiency of existing resources (personnel and technology).
There should be, as much as possible, a single login application for GCC. Users should be able to access their applications without having to login to each one separately. The application should allow for the capture of information in one place and shared throughout.	Although the college now enjoys an expanded level of Single-Sign-On (SSO) login procedure through the use of MyGCC portal, there are still systems that require separate logins for access. Additionally, a student's name and address should only be entered at one point in the virtual application rather than once per application. Progress has also been made in the wireless environment.

Applications should be treated the same as computer hardware and have their own replacement plans.	Application lifecycles are typically longer than PC hardware lifecycles, but either they must be constantly kept up to date or replaced after a reasonable length of time
Different types of user interfaces such as Windows 7, Windows 10, iOS for Mac/Apple, and Unix/Linux OS.	Increased end-user support costs in the area of training due to diversity of interfaces.

CURRENT TECHNOLOGY ENVIRONMENT

General Overview

The current Guam Community College technology environment is typical for the size and complexity of the functions it serves. Most of GCC's systems are on updated and supported hardware, software, operating systems, and networking protocols. Much work has been done over the past several years to improve technological connectivity on campus and to the internet. The primary hardware platform in use is the Windows-based PC computer. There is evidence of many state-of-the-art technologies in use on campus. Devices such as electronic whiteboards, video and audio teleconferencing, digital cameras, and multimedia presentation devices are in common use.

Technology Replacement Plans

Commendably, there is a plan for the orderly replacement of aging hardware. Each piece of new equipment, for example, has an expected lifecycle, a length of time before it is obsolete. This lifecycle is on the order of five or more years for a server computer, but three to five years for a PC. Printers and other peripheral devices have even shorter lifecycles. Each year, the plan calls for the replacement of the oldest equipment and software. With this yearly replacement plan in place, the users are assured of always being supplied with current technology. Some will be newer than others, but all will be replaced in accordance with a plan instead of as an emergency procurement. While past budgetary constraints have limited the college's ability to comply with the yearly replacement plans, the College has made strides to update its technology whenever possible.

However, even in the midst of these positive outcomes, there are many different technologies in use with more being added. Each of these technologies requires specialized training to be able to use and support, may require separate maintenance contracts, and skilled staff.

Technology Support

There are two types of technology in use on campus. There is technology intended to (1) serve the needs of the GCC community be they faculty, staff, or student and (2) technology specific and unique to a class or curriculum. While the more prevalent GCC-wide technology is carefully controlled, the opposite is true of technology used to support a particular class or curriculum. The benefit of this arrangement is that teachers have the latitude to introduce new tools and technologies into a classroom setting without having first to place it under the strict controls of the enterprise architecture. However, the teacher in this case is fully responsible for the installation, use, and removal of these ad-hoc technologies. In this way, course instruction is best served without adding new burdens to the rest of the IT structure. Of course, should a class or curriculum need a new technology as a standard part of all future classes, then it must first be placed under the appropriate controls in the infrastructure.

Networks
Recognizing that there were many campus shortcomings in GCC's network design, MIS embarked upon an improvement strategy that started in 2011. The multi-year three phase approach was designed, nearly fully executed, and mostly now being maintained or upgraded to continuously address issues such as:

- Network broadcast storms and bottlenecks that negatively impact network performance
- Reduction in the use public IP addresses for cost savings and to improve security
- Firewall upgrades and other security and surveillance devices to protect the enterprise
- Bandwidth utilization performance monitoring to address capacity and consumption rates
- Expanding and improving WIFI availability and authentication
- Resilience and reliability of network through hardening of network infrastructure with fiber optic cables and more advance cabling grade

Over the course of more than 10 years, these efforts resulted in the improved and secure college network backbone.

PC Imaging
The number of computers and the variability of their hardware configuration pose a significant challenge. Nearly a thousand computers are in the environment in classrooms, offices, and in mobile or portable labs. New ones are added regularly to replace obsolete ones, in accordance with a planned replacement schedule. Occasionally, new computers are added to the total number. For each computer there is a standardize hardware and software settings that must be applied. This standardized configuration is known as an "image." Computers for different purposes have different images depending on who they are for, where, and how they will be used. Those used by staff differ from those that are setup for students in a lab. Therefore, there are numerous standard images.

What makes the process more cumbersome is the variety of hardware configurations. A slight difference in one of the computer's internal components can mean a revised image must be created. Thus, there are standard images for each functional use but scores of additional versions of these images caused by hardware differences. Number of images exist and it require approximately 20 hours to create a new and about 80 manhours to deploy and re-image most lab settings. This process occurs every semester and is very time-consuming.

There are several factors as to why this imaging process exists. One of the factors is a policy which states all software that are bundled with a purchased computer is replaced with site-licensed software. Rather than tracking the software licenses on each computer, the extra step is taken to remove these licensed products. Once imaged, all PC's are covered under site-licenses. This makes it easier to know what computers are licensed but at a considerable cost.

What must be addressed is the creation and maintenance of so many different images. This is a time-consuming process for someone who just wants a computer for MS Office and an Internet browser. Additionally, the process of re-imaging computers should be highly automated over the network.

The image and current configuration with the suite of software on a lab and most employee computer systems can be found at https://guamcc.edu/MIS-Standards.

Email
GCC uses Google's Gmail for college Email as part of its GSuite applications. Users at this time are assigned unlimited space to store their GCC email messages in Gmail. Some employees have also chosen Microsoft Outlook email client on their desktop with their messages being downloaded from Gmail.

Employee and Student User IDs
Through the use of GCC's Banner system now as the point-of-entry for student and employee records, the IDs and accounts provisioning process includes user email accounts to be added, modified, and removed more easily.

Technology Architecture and Standards Justification

These areas of improvement support the need for the architecture and standards recommended in this document.

Opportunities	Comment
The GCC network can be improved to more adequately serve the needs of the college.	The network is now more robust and can support more web-based applications.
The GCC network is not equipped with load balancing software. Currently has a 100 mbs – 1GB backbone.	MIS staff must constantly monitor the network and upgrade to remedy problems.
Heterogeneous computer hardware configurations make it difficult to maintain hard-drive "images" for ease of restoring corrupted computers.	It takes upwards of a week for a newly arrived PC to be ready for deployment. While there are many reasons for this, a principle cause is the variability of hardware components.
There is a mixture operating systems because certain applications can only be supported by specific versions.	Most systems are standard and with current or up-to-date versions of applications and operating systems. Unsupported technologies on campus are becoming rare.

GCC is well equipped in many of the latest technologies.	Thanks to the initiative taken by MIS, CTC, and other faculty related groups.
Student Login IDs are not provided for instructional and open labs. Portal access will facilitate gathering statistics on student usage.	Being able to track technology utilization is necessary for future planning. Student logins would greatly enhance policy enforcement.
Technology at the high school level leaves room for improvement. Classes are being offered in technology skills or using PCs and the internet; however, the reliability of the infrastructure is inadequate.	Determine realistic goals and objectives for courses offered at the high schools and then take necessary steps to meet those goals.

CURRENT IT MANAGEMENT ENVIRONMENT

General Overview

The current Guam Community College Information Technology (IT) Management environment has been steadily improving over the years. However, the size of the MIS organization has remained at ten full-time employees. This fixed number of ten employees has barely kept pace with the expansion of the overall IT environment and the level of centralized control undertaken. The number of computers and other IT technologies on campus has grown at a more rapid pace than MIS has been able to match. It has insufficient expertise in some technologies while being well positioned in others, particularly in the number of people trained in networking. This lean toward network skills is illustrative of the types of problems most often encountered. When a single PC or printer has a problem, only a few people are impacted. When the network is down, this has the potential to impact large segments of the college population or in a catastrophic network outage, the entire college is impacted. Therefore, MIS has justifiably focused considerable attention on preparing and responding to networking problems.

Low Tech

Unfortunately, this growth in the size and complexity of the IT environment is now causing a new set of problems. With MIS staff virtually consumed by networking, PC troubleshooting, and PC imaging issues, it does not have the capacity to delve into new issues of critical importance to GCC, or to address lingering problems. For example, MIS lacks the capacity to undertake important GCC issues such as creating and maintaining individual student logins for shared open and classroom lab computers, developing a more robust means of creating PC hard-drive images, and of maintaining these images. The industry standard ratio for estimating the size of an IT staff is one resource for every 100 computers. However, MIS needs to more fully automate many of its tasks before planning to request increased staffing. This will release MIS staff from tedious work and allow them to gain and use more advanced technical skills.

Decision-making

Operational Decisions

The MIS manager has decision-making authority to conduct day-to-day operational matters with a pre-determined spending limit to make necessary purchases for the maintenance, operational up-time, and reliability of assigned IT assets. For example, MIS should continue to provide oversight and guidance on the hardware and software standards for computer procurement. MIS should continue to maintain centralize control over the GCC infrastructure. An infrastructure is the bedrock suite of technologies and standards upon which the rest of GCC can add the technologies it needs. What is important to have in place is a means whereby necessary changes to the infrastructure are planned with sufficient lead-time to accommodate the addition of new technologies. For decisions outside the MIS manager's authority, the governance structure and

process previously mentioned establishes a review process and makes recommendations to higher governing bodies within the GCC organization.

Strategic Decisions

Decisions outside the authority of the MIS manager are deferred for TWG review and action. This formal review ensures an initiative or requirement is thoroughly reviewed and validated as a benefit to the college to support, fund, and implement. For example, MIS should not arbitrarily decide whether MS Word will be the GCC standard. Establishing an enterprise functional standard that crosses all disciplines should be decided by the TWG. Decisions above the TWG group are elevated to College Governor's Council, Faculty Senate and ultimately the college president for decision.

Project Management

Prior to the decision to implement the Banner ERP system, there was perhaps, little need for a commitment to project management. The assessment of IT skills shows that even those who are now tasked with project management responsibilities have received insufficient project management training. Project management, or rather the lack of it, is also the single most important cause for project failures. Project management is a skill upon which other technologies can build and be successful. GCC should permanently adopt project management training, methodologies, standards, and tools as part of its core values and a key component of its infrastructure. The practice of project management must become pervasive. Therefore, staff and faculty members who are assigned to work on a project must be trained in this discipline. It is not enough to have a trained project manager, project team members, likewise, need to understand the methodologies and their role in achieving project objectives.

IT Management Distribution and Staffing Level Table

GCC's MIS staff of ten individuals is challenged with different systems, applications, databases, and servers to maintain, monitor, upgrade, and replace. To efficiently utilize and track the proficiency of the MIS staff, a MIS Tasks, Roles and Responsibilities matrix is used to track individual specialties and identify areas for training opportunities.

Today, GCC's MIS staff of ten individuals are maintaining and supporting all of GCC's on-premises hardware and software applications inventory regardless of whether its information or instructional technology. Cloud-based systems which are supported mostly by Ellucian and other outsourced technical and professional companies have restrictions that do not allow MIS personnel to fully control management of these resources; however, in-house or on-premises support, as well as vendor-liaison activities, for all these systems are still the responsibility of MIS. Although gradual increases in the inventory of computers has increased (even to at one point over 1,500), MIS staff level has remained at ten for the past 10 years. Also, in areas where instructors are supposed to maintain their own environment, MIS only gets involved when these

locations require network or other resources and expertise beyond the instructor's realm or level. The computerized labs for the CISCO Academy is an example of this. The primary MIS support for these locations is making sure they have network and Internet access and approving technology purchases. While this is an admirable gesture on behalf of these individuals with IT backgrounds, the IT work they perform is outside the normal scope of their duties and responsibilities. MIS will ultimately be held responsible for all IT support in these areas if these individuals choose to defer this work to the MIS department.

This table shows the IT Management distribution and staffing level situation.

Department	Total # of IT Staff	# added in last 5 years	# lost in last 5 years
MIS	10	4	3

IT Management Architecture and Standards Justification
These areas of improvement support the need for the architecture and standards recommended in this document. The term "staff" does not mean only MIS personnel but staff fulfilling IT roles regardless of organization.

Opportunities	Comment
Applications and technology continue to proliferate.	IT staffing levels and skills are not keeping pace.
New applications and technology are more complex.	IT staff training is not keeping pace.
Insufficient training in critical skill areas.	Many IT staff members have not been formally trained in the important skills required of them.
Level of Service Agreements not established between IT support staff and users.	Users are not assured of a timely resolution to their work request. A charter was created; however, not all departments have signed this document.
Insufficient capture and control of MIS customer service and support work.	No true IT Help Desk function in place that specifically receives, assigns priorities, assigns resources, monitors and tracks each IT incident and closes out the incident. IT trouble calls are currently tracked with E-Maint, a database used primarily for facilities work orders.

Analysis of work requests is not conducted.	Unable to identify systemic problems but rather continue to address each problem individually.
GCC should be allocating budget and resources in accordance with performance measures.	The easiest place to begin this discipline is with IT. The ability to measure performance and equate it to dollars is an important tool that will enable more accurate budgeting.
The MIS staff is too heavily relied upon for even the simplest technology problem.	Users need to be trained to handle a defined set of routine problems in their workspace.
Communication between IT staff and users is unstructured.	Users should be made aware of upcoming IT staff activities in their areas before the work begins and should be notified of the outcome of the work. All such communication should be in writing.
IT strategic planning has been done, but needs updating. Most decisions are tactical and reactive.	The adoption of the EA and ITSP are major organizational breakthroughs for developing strategic planning and processes. The roadmap and governance is in place.
GCC should greatly expand the use of work-study students, part-time employees, volunteers, and third-party providers.	Majority of the most tedious, low-level, reactive technical support issues can be done by these types of individuals, freeing up full-time employees to work more complex issues.
IT staff should be trained in all of the common disciplines and not only in those that cause the most problems. IT staff will never be able to lead in technology innovation if they do not have the training and skills of these other disciplines.	GCC should invest in training people in the areas of systems analysis and design, quality assurance and testing, customer service and support, database administration, applications specialist, and project management.
All IT staff should be involved in planning sessions about the future of technology at GCC.	Such involvement will provide more and better ideas and will help communicate GCC's IT goals to the employees.
The TWG must be given sufficient influence over IT decisions to be effective. If the majority of its decisions are ignored or overturned, the TWG will cease to be effective.	The TWG must have several early successes. It must demonstrate that it is respected and its recommendations are taken seriously.

THE FUTURE

FUTURE GUAM COMMUNITY COLLEGE ARCHITECTURE

INTRODUCTION

The future architecture will be described in four areas used in the current assessment sections of this document: data, application, technology, and IT Management. For each area, the IT Architectural boundaries and constraints will be spelled out, as will the new supporting IT Standards and IT Training.

- Where there is considerable redundancy of data, the future will show an environment where Data is stored once, in one location, and shared by all.
- Where there is a problem with the proliferation of technology or applications, the future will show a world where there is widespread commonality, or at least a severely limited number of choices.
- And where the staffing levels, training, skills, and expertise of the IT Management function is dangerously at risk, the future vision will show an organization that is properly staffed, adequately trained, highly motivated, and expertly managed.

As is obvious from the above, it is nearly impossible to completely separate Data from Application, or Application from Technology, and, of course, IT Management must be involved in all three. Therefore, in order to maintain a clear view of the way ahead, recommendations for the future of each of the four components will be expressed as three types of requirements: IT Architecture (Data, Application, and Technology), IT Standards, and IT Training. In the end, the GCC EA will identify the future Architectural constrains, the future Standards in force, and the future Training (and staffing) requirements.

IT Standards are documents that spell out policies, guidelines, checklists, procedures, rules and regulations, roles and responsibilities, accountabilities, lists of Do's and Don'ts, requirements, processes, methodologies, and programming protocols. These standards also may be supported by tools that help to implement and/or evaluate compliance.

IT Architecture is the hardware, software, networking, operating systems, communication protocols, tools, devices, and the like that will make up the Guam Community College Enterprise Architecture. The components of architecture are those things that usually require a purchase order to obtain. The IT Architecture mainly speaks to those things that will have part numbers, serial numbers, licensing agreements, and user manuals. The IT Architecture in this document does not provide this level of detail, of course, but it is the necessary guidance for selecting the appropriate types of these products.

IT Training means formal training. It is training on components making up the IT Architecture: software, hardware, applications, and technologies. It is training on IT Standards so individuals

are aware and know how to be in compliance. And lastly, it is training in the principles and disciplines of IT Management proper.

With the future expressed in these three planes, it will be a simple matter to move forward with the necessary implementation plans. Of course, each implementation will require detailed planning, staffing and funding, agreement with all stakeholders, strong project and configuration management, and a long-term commitment.

The GCC EA is a diagnostic document, identifying the problems facing Guam Community College. It is a justification document, spelling out the potential impacts of the problems left unresolved. Finally, the GCC EA is a prescriptive document, showing which problems must be addressed immediately.

In the prior sections, the problems were clearly identified. In the remaining sections of this document, their solutions will be defined in terms of IT Architecture changes, IT Standards changes, and IT Training changes. Also, the relative severity and priority of the problem will be judged. With this information, informed decisions can be made about how best to implement the new solutions that the Guam Community College Enterprise Architecture needs.

Future GCC EA Reference Labels:

Each Future requirement will use a referencing system. For example, the reference for those requirements that have to do with the <u>D</u>ata IT <u>A</u>rchitecture will start with a "DA" and those for <u>T</u>echnology IT <u>S</u>tandards will start with a "TS."
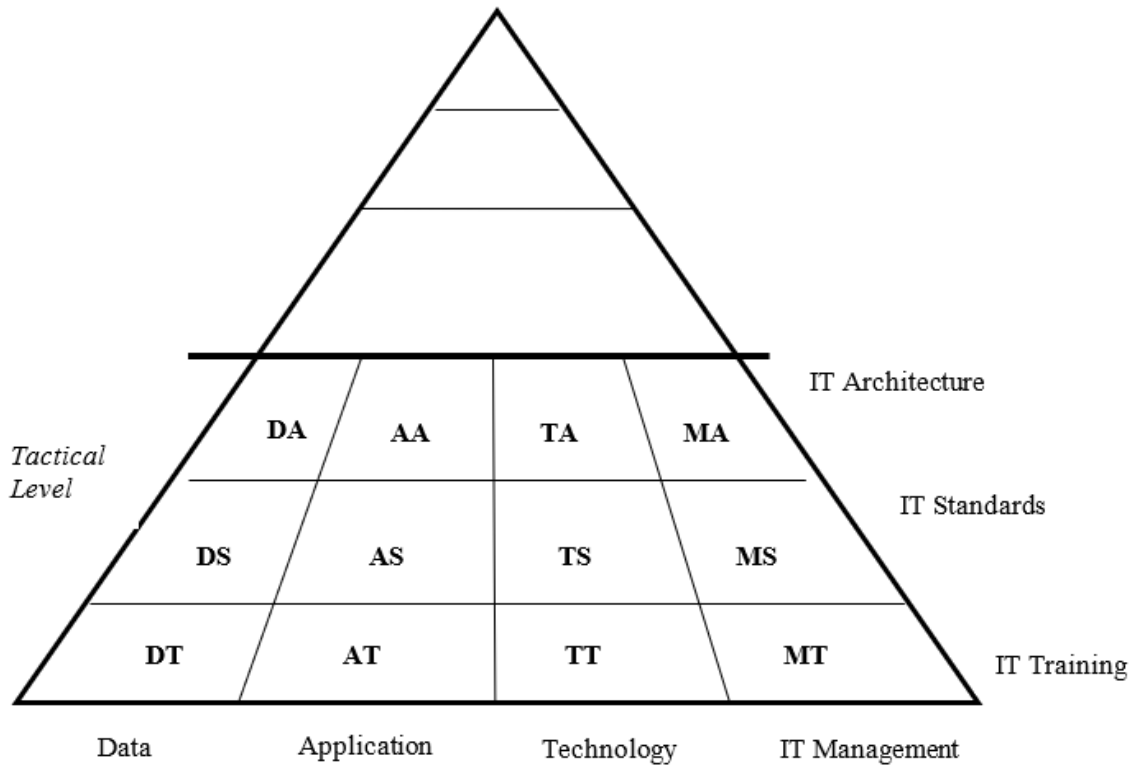
FUTURE DATA ENVIRONMENT

Data IT Standards (DS)
The Data Environment will comply with these standards.

DS001	Ownership	All data is owned by Guam Community College. Therefore, it need only be captured once and stored at one location, but shared with the rest of Guam Community College. The place at which the data is first captured and stored will be called the Data custodian.
DS002	Custodianship	A Data custodian will be the most logical department for the capture and preservation of a type of data. This will mean that only the assigned data custodian may change, add, or delete the data assigned to them. It also means that access to this data will be available to all who need it. There will be more than one Data custodian due to the nature of the data.
DS003	Formatting	All Data will comply with a data formatting standard. These standards will include such things as data type, data length, data display format, and data validation rules.
DS004	Collection	Data will be captured once, as close to the source as possible, then shared. This collection point will most often be with the Data custodian.
DS005	Sharing	Data will be accessible by all authorized users, both internally and externally.
DS006	Duplicating	Data will be stored once. The duplication of data will be allowed only under the most pressing of circumstances and will be allowed only until the circumstance can be resolved. The long-term duplication of data is a serious matter that will not be tolerated.
DS007	Storage	All data that can be stored electronically will ONLY be stored electronically. It is a violation of the Duplicating standard to maintain duplicate copies of data in any form, including filed hardcopies.
DS008	Security	Data security is the highest priority and the prime standard. No other standard shall be used as grounds for jeopardizing the security, integrity, and privacy of data.
DS009	Business vs. Technology	Data will be managed in accordance with business needs and not technology constraints. Decisions as to whether and when to dispose of old data or to archive it will be based solely upon the dictates of the business. This also means that data will be disposed of or archived as soon as there is no longer a business need for it.
DS010	Safety	All Data will be properly protected from loss and corruption. At a minimum, regular backups will be made of all data regardless of its location (server or desktop). All backups will be conducted in accordance with an approved Data Safety and Recovery procedure that will stipulate the frequency and type of backups performed. The procedure will also describe the frequency for testing the recovery of a database after a simulated failure.

Data IT Architecture (DA)

All databases and repositories will comply with these standards.

DA001	**Data Security**	Nothing is more important than the security, integrity, and privacy of the data contained within the Guam Community College Enterprise. Yet, consolidating data and making it highly available presents some architectural challenges. While the data must be easy to access and use it also must be completely secure and private. Only the proper person should be able to view or change their own personal data. Yet, this person should be able to view and change their personal data when relative ease. This level of functionality and accommodation will require a considerable investment in the Data Security Architecture.
DA002	**Relational Database**	The way data is stored, managed, and accessed electronically is an important cornerstone to the information architecture. The information models are characterized by the use of relational database technology to facilitate the deployment of several architectural models, client/server, data warehousing and decision support models. Data will be stored in a relational database which has tabular or matrix structures. The data is grouped into tables with rows and columns that have a relationship to each other. Relational approaches to data provide better performance, flexibility, security and management opportunities.
DA003	**Enterprise Data Dictionary**	The data being collected within Guam Community College is plentiful and varied, but at the same time there is a substantial amount of duplication. To help reduce the duplication of data or allow for access (sharing), an enterprise data dictionary will be developed to establish and maintain data standards for data at the enterprise level. This means defining how data is captured, stored, and presented. For example, is there a single Student Name field or several fields (First Name, Middle Name, Last Name, Suffix, or Prefix)? How long should the Last Name field be (20 or 50 characters)? Once the Enterprise Data Dictionary is in place then all applications will be able to use the shared data (See DA004), knowing where to find it and how to use it.

DA004	Enterprise Database	Some types of data are extremely common and therefore duplicated within every stand-alone system in the GCC Enterprise. The obvious example of this is the Personal Name and Address data. There is no reason for this duplication other than convenience for the various applications using it. Yet, the storing of this common information, everywhere, wastes costly resources. Further, the existence of these many redundant sources of same data causes confusion. When someone changes their address, they must tell the change to each application they come in contact with. In short order, the various databases have different information about the very same person. Should one application wish to reference the person in another application, the disjointed data causes problems. The existence of a single Enterprise Database, as defined by the Enterprise Data Dictionary, accessible by all applications, solves this problem. There may be other domains of data than Personal Name and Address data that would benefit from incorporation into the Enterprise Database as well.
DA005	Data Location Transparency	With the future direction of greater access to governmental information via the web, it becomes important to address the Data Location Transparency issue. What is needed is a simplified access application that provides a "view" of a financial data, for example, while also showing other pertinent information without having to gain access to several applications. A simplified view of data is possible with a Data Location Transparency architecture. It shields the user from having to know where data comes from. Any web-based solution that does not provide this must be considered an obsolete solution from the very start.
DA006	Data Availability	There is a risk in having an Enterprise Database which contains vital information that all other applications need. That risk is to its constant availability. A single Enterprise Database is also a single point of failure that must be addressed as part of its initial creation and implementation. What is needed is an instantaneous or near instantaneous fault recovery architecture. If the computer housing the Enterprise Database should suddenly loose power or its network connection, the architecture must be able to sense this failure and immediately route to a backup Enterprise Database. This type of survival architecture ensures that the gains won by implementing the Enterprise Database are not lost the first time there is a catastrophic failure of that database.
DA007	Safety	All Data will be properly protected from loss and corruption. Database backups will be accomplished via the network at prescribed times of lowest user activity. The backup media shall be stored in a remote physical location away from the college.

Data IT Training (DT)
All data staff will be fully trained and highly skilled in these areas.

DT001	**Data Security**	Data staff shall be highly trained at securing, preserving, safeguarding the integrity of, and protecting the privacy of all data.
DT002	**Data Modeling**	Data staff shall be highly trained in understanding the data needs for all GCC applications, their inter-relationships and dependencies, and able to model the most logical and efficient data structures.
DT003	**Database Design**	Data staff shall be highly trained in designing and implementing self-validating, space efficient databases that still offer high performance, impeccable security, and easy access.
DT004	**Data Performance**	Data staff shall be highly trained in implementing databases that perform well, able to satisfy the conflicting needs of rapid access with robust security safeguards.

FUTURE APPLICATION ENVIRONMENT

Application IT Standards (AS)
All applications will comply with these standards.

AS001	**Simplicity**	All new and modified applications will be easier to use, support, and maintain than their predecessor.
AS002	**Common User Interface**	All new and modified applications will present a common look and feel to avoid confusion and reduce user training. To the greatest extent possible, the user interface of choice will be a web browser.
AS003	**User Focus**	All applications will be of the highest quality, responsive to user demands, adaptable to changing user needs and easy to use. The purpose for the application is to make the user more productive. Therefore, all new and modified applications will place a premium on the user's needs.
AS004	**Methodology**	A common application selection and implementation methodology will be used throughout GCC to manage the selection, procurement, and implementation of new applications. In the rare case when GCC undertakes to build a custom application on its own, a common system development methodology will be used.
AS005	**Openness**	All applications will adhere to industry standards for Openness. Overly proprietary applications will be avoided.
AS006	**Security**	Data security is vital but not enough. All applications will also be protected from unauthorized use while still being user friendly and easily accessible by authorized users.
AS007	**Buy versus Build**	The preference will be to Buy rather than Build any new applications. The preference will be to buy vendor-produced enhancements and improvements in existing applications rather than to build custom ones.
AS008	**Office Automation and Utility Services**	GCC will select and mandate a single set of office automation applications such as word processing, spreadsheets, query/reporting and graphic tools, as well as common utility services, such as electronic mail, messaging, and file transfer throughout the technology infrastructure for streamlining operations support.
AS009	**No Early Adopter**	GCC will not be an early adopter of new, emerging applications or technology. The standard shall be to never purchase anything newer than the 2nd version or release of a product. While the college as a whole is limited by this standard, the EA does not preclude research and development activities or restricts experimentation in a classroom setting. As Early Adopters, the academic arena desires "academic freedom" and will not be subjected to these exemptions.

Application IT Architecture (AA)

All applications will comply with this architecture.

AA001	Primacy of the GCC EA	The GCC Enterprise Architecture is the foremost determiner of what applications may be added into the architecture. The availability of special funding or grants to procure specific applications does not mean that it will be approved for use. All new applications must be compliant with the GCC EA.
AA002	Access Portals	As much as possible, the preferred method for full compliance with the standards shall be to provide access to existing applications through web-based portals. This will leave the individual applications undisturbed while still enabling the realization of the future architecture. As applications become obsolete they can be replaced without significant changes to the user interface (i.e. the portal).
AA003	Wireless	All new or modified applications shall incorporate wireless technology to the fullest extent possible.
AA004	Portable	All new or modified applications shall be compliant with, and take full advantage of, the portable workstation technology requirement.
AA005	Single Solution	No applications shall be purchased/built (to include MS Excel and MS Access programs and reports) to improve functionality without first determining that an acceptable solution does not already exist in a GCC application.
AA006	Openness	All new applications shall have the capability of being accessed via the web by any authorized user.

Application IT Training (AT)

All application staff will be fully trained and highly skilled in this area.

AT001	**Requirements Definition**	Application staff shall be highly trained at defining application requirements that can be used for procurement purposes or for application designs.
AT002	**Web Programming**	Application staff shall be highly trained at programming websites using skills such as HTML, DHTML, XML, MySQL, PERL, PHP, ASP, JAVA, CGI.
AT003	**Connectivity**	Application staff shall be highly trained at analyzing, designing, and building database and application connectivity and interface software.
AT004	**Portal Development**	Application staff shall be highly trained at developing information access portals, via the web, to allow all users access to applications and authorized data.
AT005	**Wireless & Portable Development**	Application staff shall be highly trained at developing and defining (for procurement purposes) applications that take full advantage of portable and wireless computing devices.
AT006	**Programming**	Application staff shall be highly trained at designing application solutions that will be modular, shareable, and re-useable to the greatest extent possible.
AT007	**Application – IT Interface**	Application staff shall be highly trained in the business functionality and capabilities of GCC applications and not just in the underlying infrastructure. They will know how the users do their jobs so as to reap all the benefits of the application.

FUTURE TECHNOLOGY ENVIRONMENT

Technology IT Standards (TS)

All technology will comply with these standards.

TS001	**Connectivity**	All GCC facilities, offices, and locations shall be interconnected via the Internet.
TS002	**Security**	All technology assets shall be physically protected from unauthorized access or loss.
TS003	**Network**	The GCC network shall be highly available and reliable, responsive, redundant, and transparent to the user.
TS004	**Automation vs. Manual**	GCC shall maximize the use of automated tools for performing routine tasks. A premium shall be placed on the IT staff's skills and time. Whenever a task can be done with an automated tool it shall be.
TS005	**Policy vs. Technology**	GCC shall strive to have no policy that causes undue manual work on the part of the IT staff. It shall be policy to adopt technology wherever it can help eliminate routine and/or tedious manual work.
TS006	**Hardware Standards**	The standard end-user computer and server shall be current industry standard.
TS007	**Operating System Standards**	The standard operating systems shall be Windows and Mac OS, but SCO-Unix, Redhat, Linux, etc. are authorized within the limits of their current use.
TS008	**Openness**	Technology purchase decisions shall be based toward those products that comply with industry standards, with a preference for vendor-neutral components.
TS009	**Availability**	GCC technological assets shall be highly available. Availability means having information accessible and having a means of accessing it. Availability also means a high percentage of "uptime." An application or network connection that is functional only 80-percent of the time is not available. The goal shall be 99-percent availability. Striving for 100-percent is unrealistic and too costly to attempt.
TS010	**No Early Adopter**	GCC shall not be an early adopter of new, emerging technology. The standard shall be to never purchase anything newer than the 2nd version or release of a product. While the college as a whole is limited by this standard, nothing in this standard precludes research and development activities or restricts experimentation in a classroom setting.

Technology IT Architecture (TA)
All technology will comply with this architecture.

TA001	Power	The architecture will assume that main power will be lost every day. The architecture will provide for the routine continuation of operations regardless of the source of power.
TA002	Servers	Servers with current industry standards are the standard platform for all GCC applications and databases. While the college as a whole is limited by this architecture, the architecture still fully supports research and development activities, experimentation in a classroom setting, and the use of other platforms for instructional purposes.
TA003	Portable PC Workstation	The preferred workstation of the future will be a Wi-Fi enabled laptop. This laptop workstation will provide all of the speed and disk storage capabilities of today's desktop without the need for cables, special desk space, or UPS.
TA004	PC Configuration	Each PC shall have a standard configuration. This "image" shall be stored on the network. Automated software tools shall be used to periodically evaluate the status of each PC on the network. If a PC is in need of "re-imaging" it will be scheduled for an appropriate time and handled via the network. (See TA0012)
TA005	Laptop Configuration	Each Portable PC Workstation shall be procured and its hard drive backed up as an imaged. If the laptop's configuration is new, then MIS will create a "master" image which will be used for re-imaging, as needed.
TA006	Primary and Secondary Servers	To protect against the loss of an application server, for each primary application server there will a secondary server. A single secondary server may shadow or mirror one or more applications. All applications will be hosted on one server and seconded on another. In the event of the loss of the primary server the secondary server will be able to resume operations within an acceptable timeframe (hours not days).
TA007	Networks	The network is as important to the operations of the college as electric power, running water, and air conditioning. It shall be of the highest quality, impeccably secure, and extremely durable. The network will be transparent to the user. They will be able to do what they need to do, when they need to do, 99-percent of the time.

TA008	**Dedicated Labs**	The college shall provide a dedicated open computer lab that will be always available for students during business hours and cannot be reserved for extended use for any other purpose. Other dedicated computer labs for specialized instructions or training shall be made available and must be isolated from the network, when necessary.
TA009	**e-GCC**	The architecture will no longer be geared solely for internal users and purposes. It will be equally important to provide government data to outside users – in particular the general public. This will mean secure firewalls, virus protection, and high levels of security (PINS, passwords, help desk). It also will mean that normal operations cannot interfere with or impede access and response times for outside users. The outside user community will be viewed as a critical partner who has the same rights to access as any other member of GCC.
TA010	**Planned Obsolescence**	Each piece of technology will have a replacement plan that reflects that technology's lifecycle (the number of years a technology may be used before it becomes obsolete). Each year, the plan will replace the oldest pieces of technology with proven versions or releases, and not always the newest. In this way, the entire technology architecture will remain reasonably current at all times.
TA011	**Smart Devices**	Proliferation of smart devices and the need for training and familiarity.
TA012	**Mirrored or COOP Site**	Technology that can be cloud-based, should be deployed as such, with failover to a mirrored or a disaster recovery site for Continuity of Operations (COOP).
TA013	**Virtualization**	Servers should be virtualized and cloud-deployed whenever feasible.

Technology IT Training (TT)

All technology staff will be fully trained and highly skilled in this area.

TT001	**Engineering**	Technology staff shall be highly trained at analyzing and designing technology solutions using the appropriate (system, network, database) engineering disciplines, methodologies, and tools.
TT002	**Research & Development**	Technology staff shall be highly trained at performing emerging technologies research and development.
TT003	**Wireless**	Technology staff shall be highly trained at analyzing, designing, and implementing wireless technologies.
TT004	**Survivability**	Technology staff shall be highly trained at analyzing, designing, and implementing system backups, recovery techniques, hot swapping, mirroring, and other survivability protocols.
TT005	**Portability**	Technology staff shall be highly trained at taking full advantage of portable computing and communication technologies.
TT006	**All Assets**	Technology staff shall be highly trained at using, troubleshooting, and teaching the proper use of all of GCC's technology assets.
TT007	**eCommerce**	Technology staff shall be highly trained at analyzing, designing, and implementing eCommerce solutions appropriate to fulfill the e-GCC requirements.
TT008	**Networks**	Technology staff shall be highly trained at analyzing, designing, and implementing local area networks.
TT009	**PC Troubleshooting**	Technology staff shall be highly trained at analyzing, designing, and implementing solutions to PC and PC peripheral equipment problems.
TT010	**Customer Service & Support**	Technology staff shall be highly trained at providing, recording, analyzing, and measuring Customer Service and Support activities (i.e. Help Desk).
TT011	**Application Support**	Technology staff shall be highly trained in the fundamental usage of GCC applications so as to better assist users with application problems.
TT012	**Classroom Support**	Technology staff shall be highly trained in the various technologies used in the classroom so as to better assist faculty and students with in-classroom problems.
TT013	**Smart Devices**	Proliferation of smart devices and the need for training and familiarity.
TT014	**Mirrored or COOP Site**	Technology staff shall be highly trained in cloud-based technology and cloud-based computing in support of mirrored or a disaster recovery site for Continuity of Operations (COOP).

TT015	**Virtualization**	Technology staff shall be highly trained in virtualization systems or virtual desktop infrastructure.

FUTURE IT MANAGEMENT ENVIRONMENT

Customer Service and Support

Technology users highly value two things the most. They want the ability to use technology without having to worry about its availability. And they want to receive help when they need it. So long as things are working smoothly, users would rather not have to think about how or whether technology works. They just want to use it. When the technology stops working they want immediate help.

Customer Service and Support (CSS) has become a discipline in recent years with a set of guidelines and standards established. Best practices have been developed that satisfy the user's needs in ways that are cost effective to the supporting organization. Principle among these best practices is the use of automated control and tracking systems. These systems are indispensable to a properly run CSS mission. They enable and enforce problem capture, prioritization, assignment, accountability, trends analysis, and feedback.

An important characteristic of a mature CSS environment is the existence and adherence with a Service-Level Agreement. Each person calling for assistance should know how quickly their problem will addressed. Not all trouble calls are of the same priority. Some are critically important to the operations of the college while others are less critical. The Service-Level Agreement defines different thresholds of importance and assigns a priority to each trouble call. This priority drives the decision-making, response time, and assignment of critical resources to address and resolve the trouble call. With this best-practice agreement in place, users can be assured of timely resolutions to their problems.

GCC should adopt two such systems. First is a Help Desk system used by dedicated MIS technicians providing first and second echelon support to users with problems. GCC has an IT Help Desk Standard Operating Procedure that helps establish end-user roles and an escalation process for requesting MIS support. Second, is a management tracking system.

Performance Management

GCC should implement these CSS best practices for one other important reason; performance measuring. As the college moves closer to performance-based budgeting it is incumbent upon each functional unit to identify measurable outputs from its work processes and to equate these outputs to budget dollars. What is needed most is a way to measure (count) process outputs.

These counts are a natural byproduct of systems such as the Help Desk system. All work must be measured. When all work is tracked in a database the measures are automatically captured.

The MIS department has evidence of establishing and capturing performance measurement data through their Unit Assessment Report. Through the use of an assessment management tool, Improve (formerly TracDat), the MIS department can enter information on their technology programs, to include assessment plans, program outcomes, assessment methods, evidence and data measuring those outcomes, data utilization and decisions made, and follow-up actions into the next assessment cycle. This provides a systemic approach which helps the MIS staff understand how well they are meeting their performance goals. Areas of improvement are assigned an Administrative Unit Outcomes (AUO) number and tracked. Each AUO is measured in percentages against established criteria and documented on the Unit Assessment Report.

IT Management IT Standards (MS)
IT Management will be fully trained and highly skilled in these standards. **The term 'IT Management' means the person or persons responsible for a particularly portion of the architecture. It does not signify MIS only.**

MS001	Roles & Responsibilities	IT Management personnel shall abide by the IT-related organizational charters which delineate the roles and responsibilities of all those charged with managing portions of the GCC EA.
MS002	Supervising & Leading	IT Management personnel shall be highly skilled in leading and supervising other members of their staff, employees from other offices, and vendors/contractors.
MS003	Team Building	IT Management personnel shall be highly skilled in building and motivating teams.
MS004	Customer Service & Support	IT Management personnel shall be highly skilled in providing high quality customer service and support to the users of the systems for which they are responsible. They shall be highly skilled in Interest-based Bargaining and other negotiation skills.
MS005	Help Desk	IT Management shall provide a robust Help Desk function. It shall have a single contact phone number and email address; it shall be staffed by trained Help Desk technicians and shall operate in accordance with the IT Help Desk Standard Operating Procedure.
MS006	Systems Management	IT Management personnel shall be highly skilled in the principles, disciplines, techniques, and tools used to manage complex computer and network systems.
MS007	Risk Management	IT Management personnel shall be highly skilled in identifying and assessing risks, devising mitigation strategies and contingency plans, and effectively communicating potential risks to senior management.

MS008	**Project Planning and Scheduling**	IT Management personnel shall be highly skilled in scoping a project, identifying the resources required by the project, developing project plans and building project schedules based upon the availability of resources.
MS009	**Project Management**	IT Management personnel shall be highly skilled in managing projects so that they are delivered in accordance with the agreed to requirements, on schedule, and within the budgeted amount of resources.
MS010	**Configuration Management**	IT Management personnel shall be highly skilled in controlling the configurations of the myriad software, hardware, and documentation under their control to ensure that updates, releases, and patches are properly introduced into the architecture.
MS011	**Strategic Planning**	IT Management personnel shall be highly skilled in planning for system needs and opportunities up to 5 years into the future.
MS012	**Performance Management**	IT Management personnel shall be highly skilled in measuring their workloads, adjusting workloads and staffing to ensure the most cost-efficient operation, and then requesting budgets in accordance with these workloads.

IT Management IT Architecture (MA)

Management will be compliant with this architecture. **The term 'IT Management' means the person or persons responsible for a particular portion of the architecture. It does not signify MIS only.**

MA001	**Remote Access**	IT Management shall have full, remote, access to every database, application, directory, and operating systems that make up the GCC Enterprise Architecture. With this access they shall be able to perform their duties without having to physically relocate to the site of the problem.
MA002	**Full Authority**	IT Management shall have authority to debug, fix, monitor, and perform other necessary duties throughout the GCC architecture.
MA003	**Tools**	IT Management shall have all the tools (software applications, test equipment) necessary to perform all routine maintenance, troubleshooting, and future planning on every component within the architecture.
MA004	**Enforcement**	IT Management shall constantly monitor the architecture and shall have the right to disallow, deactivate, confiscate, and remove any unauthorized additions to, or modifications of, the approved architecture.
MA005	**Accountability**	IT Management shall be accountable for its decisions and actions to the TWG.
MA006	**Delegation**	IT Management shall distribute and delegate authority as it deems appropriate. There shall be no centralized owner of the GCC except the TWG.
MA007	**Licensing**	IT Management shall be responsible for maintaining all licensed software media (diskettes, CD/DVD's) for tracking the location of each use of licensed software; and for ensuring that licensed software is either renewed or replaced before it expires.

IT Management IT Training (MT)

IT Management will be fully trained and highly skilled in this area. **The term 'IT Management' means the person or persons responsible for a particularly portion of the architecture. It does not signify MIS only.**

MT001	**Supervising & Leading**	IT Management personnel shall be highly trained in leading and supervising other members of their staff, employees from other offices, and vendors/contractors.
MT002	**Team Building**	IT Management personnel shall be highly trained in building and motivating teams.
MT003	**Customer Service and Support**	IT Management personnel shall be highly trained in providing high quality customer service and support to the users of the systems for which they are responsible.
MT004	**Systems Management**	IT Management personnel shall be highly trained in the principles, disciplines, techniques, and tools used to manage complex computer and network systems.
MT005	**Risk Management**	IT Management personnel shall be highly trained in identifying and assessing risks, devising mitigation strategies and contingency plans, and effectively communicating potential risks to senior management.
MT006	**Project Planning and Scheduling**	IT Management personnel shall be highly trained in scoping a project, identifying the resources required by the project, developing project plans and building project schedules based upon the availability of resources.
MT007	**Project Management**	IT Management personnel shall be highly trained in managing projects so that they are delivered in accordance with the agreed to requirements, on schedule, and within the budgeted amount of resources.
MT008	**Configuration Management**	IT Management personnel shall be highly trained in controlling the configurations of the myriad software, hardware, and documentation under their control to ensure that updates, releases, and patches are properly introduced into the architecture and applications.
MT009	**Strategic Planning**	IT Management personnel shall be highly skilled in planning for system needs and opportunities up to 5 years into the future.
MT010	**Performance Management**	IT Management personnel shall be highly skilled in measuring their workloads, adjusting workloads and staffing to ensure the most cost-efficient operation, and then requesting budgets in accordance with these workloads.

ONE-TO-FIVE YEAR INITIATIVES

Redundant Network and Systems Improvements

Introduction

Although the most critical of GCC's systems for both instructional and administrative operations are now residing in the cloud, any major disaster occurring in the existing campus' Internet and network infrastructure will seriously hamper the college and interrupt services until traffic is re-routed, or the network is repaired, rebuilt, or another suitable location is identified to host users. This addresses our inability to immediately recover to full normal operational status from most major disasters, especially those relating to accidental construction digs and breakage of Internet and network infrastructure. In order to make sure we are prepared for the worst contingencies, we need to build redundancy into our network, both the wired and wireless systems. GCC should build the network infrastructure with redundancy that can be readily activated when it is needed. Multiple fiber-optic cables and Internet links with a mesh topology is an example of such redundancy. This long-term forecast will put in place the network and its associated equipment that will allow the college to continue business operations despite natural or manmade disasters of its primary communications. More specifically, this will provide the technology and the means to recover from disaster and equip all employees with necessary resources to continue servicing our students. In short, the college's system's hardware, software, network, and Internet connection needs will be there when it is most needed after any major catastrophe.

Five-fold Project Description

This future environment envisions a five-fold approach
1. Design the redundant network
2. Put in place the redundant network
3. Connect the redundant network with multiple links to different ISPs
4. Linked via secure high-speed fiber-optic cables and with sufficient bandwidth
5. Procure and utilized cloud services for hosting of ERP system and other servers

This infrastructure will be capable of linking the main Mangilao campus to a remote, secure and safe facility with all the inherent benefits of the cloud environment. In case of disasters or emergencies, the redundant network along with the cloud-based environment will allow the college to simply continue operations either from within the main campus or from the users' home. The configuration of this redundant network and cloud-deployed systems will act as both the primary and backup infrastructure. This type of installation must be hardened and able to withstand major disasters, such as typhoons and earthquakes and accessible 24/7 and 365 days.

Voice-over-Internet-Protocol (VoIP) Telephone System Implementation

Introduction

GCC is currently implementing Voice-over-Internet-Protocol, or VoIP, which will replace the college's expensive and archaic Plain-Old-Telephone System (POTS) with the cost of substantially cutting costs and improving communications and efficiencies. VoIP technology has proven itself over the recent years and different types of this technology are implemented throughout the world by various system manufacturers and phone service providers. This is a proven phone system that can provide the college with lower cost of ownership, is easy to manage and can grow with the college, as needed. Many installations of similar VoIP systems, within the first two years of use, are known to have paid for its self with all the cost-savings from paying standard telephone services.

The system installation will be for the main Mangilao campus. The college may choose to have these services available to its remote satellite classrooms and employee offices, possibly at a later time.

The system will be hosted by the provider at its facility.

Distance Education (DE) Improvements and Expansion

Introduction

The following was partly extracted from the GCC DE Strategic Plan (DESP).

GCC has been and will continue providing Distance Education (DE) to its students. Distance Education remains a vehicle through which the College can help students in Guam and Micronesia with the attainment of their academic goals, by providing high-quality accredited programs in career and technical courses in an online format.

The impact of rapid change in educational technologies and the growth of virtualization of classroom settings also increased the need for technology to address online deployment of courses as well as implementation of various remote student support services. The updated Enterprise Architecture will assist in the improvements and expansion of DE. The EA will address the technology services that will enable the promotion of growth, effectiveness, and efficiency for DE.

THE GAP

GAP AND IMPACT ANALYSIS

The purpose of capturing GCC's current IT environment and projecting a desired and optimum IT environment is to identify the gaps which need to be addressed. Identifying the gaps sets the stage for finding potential solutions and alternatives, reprioritization of college objectives, and inserting these action plans into GCC's budgeting life-cycle. Ultimately, it will take individual projects to implement the specific pieces of the future environment. As predicted, there are gaps between the current environment and the future architecture. What follows is a manageable list of the most pressing ones.

DATA

There is a sizable gap between the current data architecture and the proposed future architecture.

1. This first initiative will give birth to others as well. Once we can identify an individual user, what else can we provide that user in terms of services and features? No doubt users could be granted differing levels of authority with their login. What should those levels be and who should have them? From a capacity planning perspective, we will have volumes of information to study. How can this information be used to get ahead of approaching risks and looming problems? Both of these opportunities will become available once we have Student Login Ids implemented.

2. This second important initiative is to conduct an analysis of the Records Management situation. The goal is to drastically reduce the amount of paper being generated and stored. Two solutions to this problem are 1) replace paper forms with online forms, and 2) store the electronic image of a document but not the physical document. The first solution should be the primary focus for addressing this problem, not the continued storing of paper forms and documents that duplicate online data. Only those original documents which must be stored shall be stored. All others will be scanned and stored electronically.

3. This third initiative is to improve how GCC provides DE Services and deliver the classroom environment off-campus, either instruction or support services to students who are not physically co-located with the individual providing the service. This technology utilizes internet-based educational services as well as video and audio services. Many of the current variables that drive data storage requirements will apply when implementing a DE service. For example, federal and Guam laws, regulations, statutes, policies regarding education records and how long they are kept and maintain will impact data storage capacity planning.

APPLICATION

1. This first application initiative is to procure a robust Help Desk system to satisfy the needs of the IT Help Desk Standard Operating Procedure. This could be an open source system, like Moodle is, that would be supported by a world-wide community of IT professionals. It should be web-based with significant reporting capabilities.

2. This second initiative is to procure a robust Issues Tracking system to satisfy the needs of the college. This could be an open source system, again like Moodle. It should be web-based with significant reporting capabilities.

3. A third initiative worthy of consideration is the replacement of the bookstore software that tracks sales and inventory and is integrated or interfaced with the Banner ERP.

TECHNOLOGY

The gap between the current technology architecture and the proposed future technology architecture is nearly as great as the gap in IT Management. This is where some significant funds will be needed. To move into the future state of the technology these gaps must be filled.

1. The most pressing issue is the network. It needs to be modified from its current topology into a full mesh with a high-speed / high-bandwidth Internet and with redundant connections for the campus. Then, this network needs to be fitted with powerful load balancing software to deliver on the promise that all of this new technology holds. Not only will all users benefit from this modernization, but existing MIS resources will be able to begin tackling other important issues.

2. Imaging takes up an inordinate amount of staff time. First, the policies surrounding imaging need to be reconsidered. Primarily, does GCC wish to continue to insist that all PC's be under one site license for the operating system? What are the costs associated with this decision? What are the risks of other options? In any case, imaging is a reality. Therefore, technology will be procured to more fully automate the image/re-imaging process. Rather than using images stored on external USB drives, images will be housed on robust networked servers and re-imaging accomplished via the network. Software exists that constantly monitors the images of PC's on the network and re-images them automatically when necessarily.

3. Technology selected to improve support for DE will include the web-based systems for interactive audio or video conferencing that can provide real time face-to-face or pre-recorded video can be used to present class lectures with visually oriented content.

IT MANAGEMENT

The gap between the current state of IT Management and the future environment is the largest, and by far the most serious gap of all. The IT Management function suffers from understaffing, miss-placed staffing, under-trained staff members, and too much responsibility. Centralized IT

management is appropriate for infrastructure (procurement, networking, licensing) but is not appropriate for every aspect of the IT environment.

1. New Governance policies and structures are already being implemented. In the very near future, the TWG will replace MIS as the entity in overall control of the IT environment. While working groups or committees do not manage day-to-day operations well, they are effective at guiding the activities of other organizations who can manage operations. The TWG will be able to reach consensus decisions. TWG will be able to present recommendations to senior management. TWG will be able to handle grievances against IT-related policies and procedures. In the future, representatives from all areas of GCC will make all major IT decisions.

2. Likewise, MIS will have new responsibilities. MIS will no longer have final decisions in IT matters. The TWG will be ultimately held responsible for the IT environment, thus lightening MIS' load. In the long-term, GCC will have a single IT vision and voice.

3. As MIS in particular is relieved of some of its responsibilities, it will want and need to learn new skills so as to better serve users' needs. The most pressing new skill to be learned is Project Management. Not far behind, however, are other complex skills such as system and database design, capacity planning, customer service and support, performance measuring, and others. MIS is not the only organization in need of acquiring new skills. As organizations embrace new responsibilities over portions of the IT architecture, they will need to acquire similar technical skills to become self-reliant and accomplish their objectives.

4. Another IT management challenge is the initiative to improve the delivery of DE services. GCC currently faces a network that has limited bandwidth to deliver DE when compared to other schools who have a mature DE program. Designers and developers involved in DE planning, acquisition, and implementation of GCC's DE will have and appreciate the operational vision of how DE is to be delivered from the instructor to the student. The updated DESP should also be used to guide this initiative further.

APPENDIX A – ORGANIZATIONAL CHART

Guam Community College
Organizational Chart

Administrative Structure

BOARD OF TRUSTEES

PRESIDENT

ACADEMIC AFFAIRS Office of the Vice President	FINANCE & ADMINISTRATION Office of the Vice President	OFFICE OF THE PRESIDENT
School of Trades &Professional Services	Business Office	Commmunications & Promotions
School of Technology & Student Services	Human Resources	Development & Alumni Relations
Assessment, Institutional Effectiveness & Research	Management Information Systems	Planning & Development
Admissions & Registration	Materials Management	Facilities
Continuing Education & Workforce Development	Student Financial Aid	Peace Officer Standards & Training Commission
	Environmental Health & Safety	

Operational Structure

Frank P. Arriola, Chairperson   AUG 2 0 2021

Date

APPENDIX B – PARTICPATORY GOVERNANCE

ARTICLE VII - PARTICIPATORY GOVERNANCE

A. PURPOSE

The intent of this Article is to establish and implement a means for providing broad participation by faculty and administrators in the decision-making processes that support student learning programs and services and improve institutional effectiveness, while acknowledging the designated responsibilities of the Board and the College President.

The Board and Local agree that the faculty shall join in participatory governance of the College Committees defined in this Article.

B. GENERAL PROVISIONS

Committees at the College are composed of constituency representatives and consider matters pertaining to a designated charge or subject.

1. No other committees shall be formed by the College to conduct the same or similar functions as those committees formed by this Agreement.

2. The Financial Exigency Committee and Reduction-in-Force Committee shall be convened as outlined in Article XV.C -Planning for Financial Exigency and Article XV.D-Planning for a Reduction-in-Force. Faculty membership shall be by appointment of the Local President in accordance with Article III.A.2-Consultations and Negotiations.

3. Committees under the purview of the Local must identify their Chairpersons and membership for the next academic year by May 1 of each academic year.

4. The charge of these committees shall in no way be cause for interference in the normal day-to-day operations of the College.

5. In keeping with accreditation requirements, each committee shall submit a year-end report reflecting data and evidence of committee work to the Vice President for Academic Affairs/Accreditation Liaison Officer (VPAA/ALO) no later than May 1 of each academic year.

C. COMMITTEES

1. Local (Union) Committees
The following committees fall under the Local's purview either through appointment or elections and the charge, composition, and workload components are described herein:

   a. Calendar Committee

   b. Resources, Planning, and Facilities Committee

   c. Negotiations Committee

   d. Advancement-In-Rank Committee

   e. Professional Development Review Committee (PDRC)

Calendar Committee	
Charge	This Committee proposes the five (5) year academic calendar based on a thorough analysis of relevant information and will include a Calendar that encompasses the work year for faculty. For secondary faculty, secondary activities will be proposed to meet institutional needs within the framework of the GCC calendar. The Calendar Committee shall confer with the Vice President for Academic Affairs (VPAA) to coordinate the GCC calendar with the Guam Department of Education (GDOE) calendar. A draft calendar shall be completed no later than March 1 to allow for review by the Faculty Senate. Comments or recommendations from the Faculty Senate shall be submitted no later than March 15 to be reviewed by the Calendar Committee. The Calendar Committee presents the proposal to the College President for concurrence and transmission to the Board via the VPAA on or before April 1. Furthermore, the Coordinator for Admissions and Registration shall publish the 5-year Academic Calendar.
Chairperson	Chairperson and/or Chairperson-Elect to be elected from among the membership.
Composition	Deans of each School, Coordinator for Admissions and Registration, one (1) member appointed by the VPAA, and four (4) faculty members* (two (2) postsecondary and two (2) secondary) to be appointed by the Local President.
Workload	Collateral Duty*

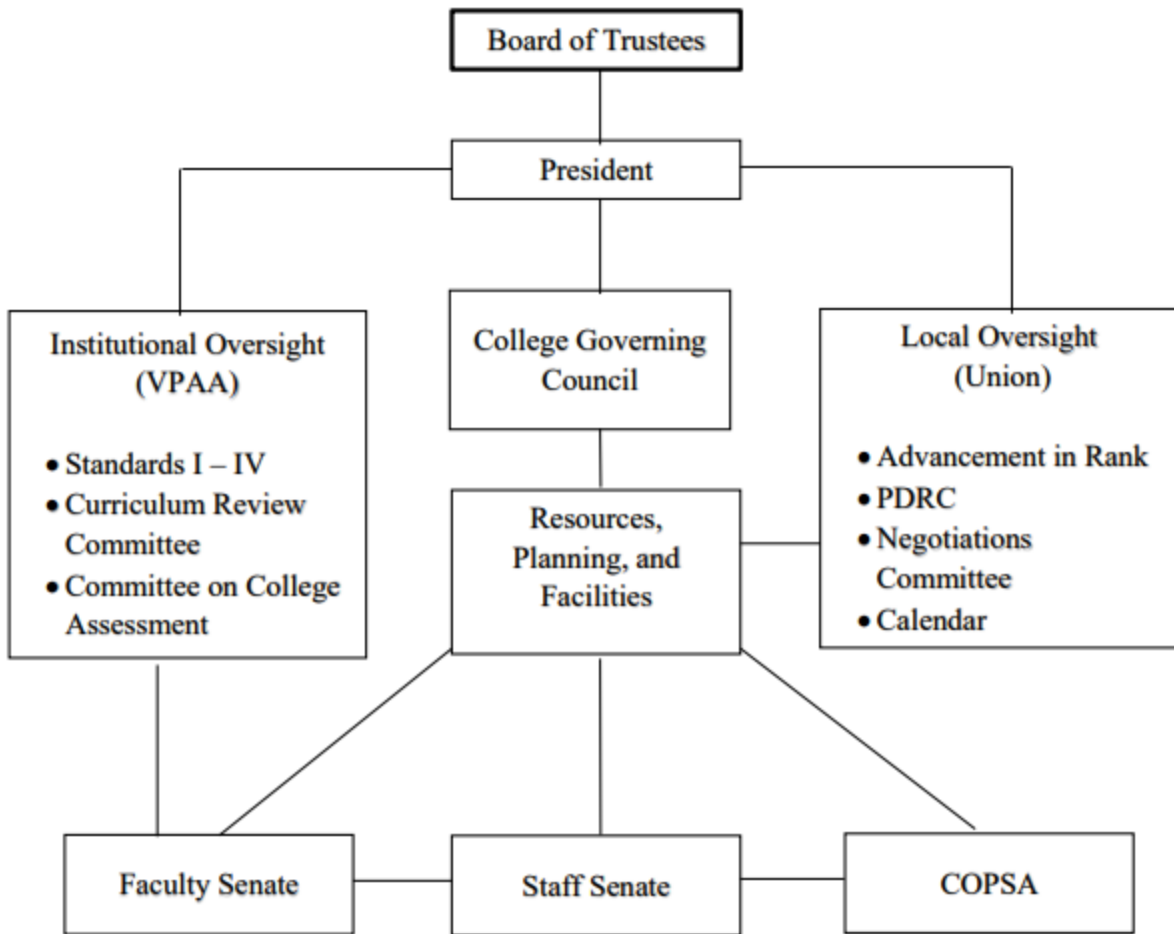| Resources, Planning and Facilities (RPF) Committee	
Charge	This committee reviews the Facilities Master Plan and recommends the priority of capital improvement projects for the College and those projects that have great impact on student learning outcomes (SLOs). It is the forum for discussion of any available or needed resources and facility issues or concerns. The Resources, Planning and Facilities Committee may make and forward recommendations for action to the College President. The College President may transmit recommendations to the Board for approval and further disposition.
Chairperson	Two (2) Chairpersons: Local President and Vice President for Finance & Administration.
Composition	Local President*, one (1) faculty member appointed by the Local President, Faculty Senate President*, Vice President for Finance and Administration, Facilities & Maintenance Representative, one (1) administrator appointed by the College President, and no more than an equal number of staff and student representatives.
Term	Monthly during the academic year or at the call of either Chairperson.
Workload	Collateral Duty*

Negotiations Committee	
Charge	The Local President and the Board will convene the Negotiations Committee two (2) years prior to the expiration date of this Agreement to review the Faculty Job Specifications and/or Faculty Evaluation process (see Article X-Performance Appraisal) as needed. The Negotiations Committee will prepare written recommendations for the negotiating team to review for possible inclusion to the Agreement.
Chairperson	Co-Chaired by the Chief Negotiators of both Parties
Composition	The composition shall be six (6) to eight (8) members per team as selected by the Local President and Chair of the Board of Trustees.
Support	Administrative support provided by the College.
Workload	For academic years 2021-2022 and 2022-2023, committee members will have the following: A) For postsecondary instructional faculty: instructional hours reduced to 180 per semester. B) For all secondary and non-instructional faculty: participation to be reflected in faculty workload or release.

Advancement-In-Rank Committee	
Charge	Refer to Article VIII-Advancement-in-Rank.
Chairperson	Chairperson and/or Chairperson-Elect to be elected from among the membership.
Composition	The Advancement-in-Rank Committee shall be elected by the Local dues paying members of the Bargaining Unit and consist of six (6) elected faculty members who, at the time of the election, hold the rank of Assistant Professor or higher, have been employed by the College for a minimum of three (3) years, and are dues paying members of the Local.
Term	A term is defined as three (3) years. Members shall serve no less than three (3) years with staggered terms and may not serve two (2) consecutive terms.
Workload	The first year of this Agreement (AY 2017-2018) will be a transition year; faculty who are members of the committee will receive one (1) release with set deliverables each semester. Faculty may opt for compensation or release after the transition year. A) For postsecondary instructional faculty: instructional hours reduced to 180 per semester. B) For all secondary and non-instructional faculty: participation to be reflected in faculty workload or release.

Initials: RDS FQT
March 10, 2017

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Professional Development Review Committee (PDRC)	
Charge	Refer to Article IX-Professional Development Initiatives.
Chairperson	Chairperson and/or Chairperson-Elect to be elected from among the membership.
Composition	The PDRC shall be elected by the Local dues paying members of the Bargaining Unit and consists of six (6) elected faculty members, who at the time of the election, hold the rank of Assistant Professor or higher, have been employed by the College for a minimum of three (3) years, and are dues paying members of the Local.
Term	A term is defined as three (3) years. Members shall serve no less than three (3) years with staggered terms and may not serve two (2) consecutive terms.
Workload	The first year of this Agreement (AY 2017-2018) will be a transition year; faculty who are members of the committee will receive one (1) release with set deliverables each semester. Faculty may opt for compensation or release after the transition year. A) For postsecondary instructional faculty: instructional hours reduced to 180 per semester. B) For all secondary and non-instructional faculty: participation to be reflected in faculty workload or release.

2. Institutional Committees:

   To meet accreditation standards addressing participatory governance by faculty, various committees will be established by the Vice President for Academic Affairs/Accreditation Liaison Officer (VPAA/ALO) to meet institutional needs that impact student learning. Membership in these committees will be voluntary and in response to the call for participation prior to the start of a new academic year. Services provided will be in accordance with Human Resources (HR) procedures. These committees will not be a part of the regular faculty workload.

Initials:
RDS FQT
March 10, 2017

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Institutional Oversight (VPAA)	College Governing Council	Local Oversight (Union)
• Standards I – IV • Curriculum Review Committee • Committee on College Assessment		• Advancement in Rank • PDRC • Negotiations Committee • Calendar

Resources, Planning, and Facilities

Faculty Senate	Staff Senate	COPSA

APPENDIX C – DISTANCE EDUCATION POLICY

Policy 340

Guam Community College
Board of Trustees

Distance Education Policy

WHEREAS, distance education (hereinafter referred to as DE) refers to the practice of offering educational services – either instruction or support services – to students who are not physically co-located with the individuals providing the service. DE includes the use of computer and Internet-based educational services as well as video and audio services. Institutions use Internet technologies to bring students educational programming in either synchronous (students and the service provider are interacting on line at the same time) or asynchronous modes (students and the service provider not interacting on line at the same time). Educational interactions delivered through these means may occur on campus as well as off campus; and

WHEREAS, DE can be a convenient, flexible, and effective means of providing education. Nearly half of all the college students in the country are of the age group once thought of as nontraditional. They are working adults or adults seeking first educational credentials or retraining. Many working adult students with multiple demands on their time find DE to meet their needs better than campus-based education; and

WHEREAS, DE is also an opportunity for the College and the students to contribute to environmentally friendly practices. Courses that run through DE reduce the use of paper and copying, as resources are available digitally. In addition, students commute to campus less frequently than traditional courses, lessening the use of gas and related emissions into the environment; and

WHEREAS, in addition to working adults, the traditional-aged college students come to campus with extensive experience using digital technologies in their personal and school lives. For these students, DE that involves the use of Internet, web casts, text messaging, and other digital media is comfortable and familiar. As technology continues to expand world-wide, participation in DE assists students in preparing for the workforce; and

WHEREAS, the College has developed and is currently implementing a Distance Education strategic plan.

NOW, THEREFORE, BE IT RESOLVED, that this document serves as a policy for the College to support the Policy on Distance Education and Correspondence Education of the Western Association of Schools and Colleges (WASC), Accrediting Commission for Community and Junior Colleges (ACCJC) (Revised August 2012).

BE IT FURTHER RESOLVED, that a manual will be developed based on this policy. The manual will include specific forms, and other detailed processes that are necessary to ensure the policy is implemented.

Amended & Adopted: February 16, 2018
Resolution 1-2018
Adopted: July 7, 2010
Resolution No: 7-2010

Definitions

- An Online course is defined as one in which all regularly scheduled classroom time is replaced by required activities completed at a distance and managed online. Online courses allow students to take courses from geographically remote locations, without any need to come to campus (for instance, while deployed in the military).
- Hybrid online courses are taught using two instructional formats: on campus and online, combining traditional face-to-face classroom instruction with computer-based DE (e.g., 50% of the course work is electronically delivered). In a hybrid course, a significant part of the course learning is online and as a result, the amount of classroom seat-time is reduced.
- Web-Enhanced courses are traditional face-to-face classes that are augmented with course web sites. However, unlike hybrid courses, web-enhanced classes continue to hold all of their meetings on-campus. Web-enhanced courses are NOT distance education courses.

Requirements

- The College will adhere to all ACCJC policies regarding DE.
- All credited courses and programs that include or will include components of DE (online or hybrid online) must be approved through the Curriculum Approval Substantive Change Process. These will include courses offered through the regular semester cycle, special projects, or Continuing Education cycle, for as long as they include DE components.
- As per the WASC Distance Learning Policy, the College is expected to give the ACCJC advance notice of intent to offer a program in which 50% or more of the courses are electronically-delivered, through the Substantive Change process. Any request for ACCJC's approval of a DE program, must be coursed through the Office of the Academic Vice President.
- All courses and programs delivered through electronic means must have clearly defined and appropriate program/course student learning outcomes (SLOs).
- Students are responsible for accessing resources to complete all course requirements and resolving any technical difficulties outside of Guam Community College.
- All DE courses must be clearly identified as either online or hybrid online courses in the annually-published college catalog and in the class schedule published every semester.
- All online courses can only be taught during academic years where traditional courses are also offered as an alternative course, with the exception of continuing education courses. All DE courses must be electronically delivered by the course management system agreed upon by the College (in order to ensure consistency and uniformity in course delivery and eventual assessment of these courses.[1]
- Prior to teaching a DE course, individual faculty members are responsible for acquiring sufficient skills by completing at a minimum a 3-credit course (must be

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[1] The platform the College currently utilizes is the Moodle Course Management System.

verified through official college transcripts) on building an online course, minor troubleshooting, and features of a course management system.

- Faculty must be able to provide minimal technical assistance to students (e.g., course enrollment into course management systems, access to online course materials, access to online examinations, etc.). The College will identify an individual person or department to provide further assistance for students and faculty.
- As per the WASC Distance Learning Policy, the College must ensure that the student enrolling in course is the same student who completes the course. Therefore, students enrolling in DE courses must present photo identification during the orientation procedure. Only those enrolled students should receive the enrollment key or password to enter the course. Students enrolled must agree, in writing, to be solely responsible for the completion of the course.
- Faculty and staff involved in DE courses will be provided with training opportunities specific to online learning.

Resources

- *Copyright.* Faculty and students must refrain from using copyrighted materials illegally and seek permission from the respective author or publisher to use copyrighted material. For more information on the U.S. Copyright Law, visit the U.S. Copyright Office's web site.

Privacy/Security

- In accordance with the U.S. Family Education Rights and Privacy Act of 1974 (FERPA), the College is committed to protecting the privacy of all faculty and students enrolled in DE courses. The information collected will only be visible to the instructor, system managers, technical support team and other pertinent personnel. In order to ensure privacy, posting personal information such as phone numbers and addresses are discouraged and should be kept confidential. Sole access to DE courses should be limited to the registered student to maintain integrity of privacy and academic integrity as well.

Support

- *Basic Student Support Services.* Each student enrolled in a DE course shall have access to all the academic support services, instructional equipment, and campus events and other non-academic activities provided to other students. Support services may include, but are not limited to, academic advising, counseling, library services, computer access, tutoring services and financial aid.
- *Library Support.* The Library shall provide equivalent, effective and appropriate support for DE courses. Library support may include, but is not limited to, access to over 7,000 different periodicals (majority of which are available full-text) and online public access of the library catalog (through the GCC Library web page) and other strategies that emphasize access to these resources.