RECOMMENDATIONS OF THE CI/IT GOVERNANCE WORKING GROUP

Final Report

December 15, 2014

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Executive Summary

Charge

The charge from Executive Vice President and Provost Nick Jones and Interim Vice-President for Research Neil Sharkey, formally made on 12 June 2014, was to “Recommend a governance model that will enable Penn State effectively to deliver the full spectrum of computing and data services required for current and future directions in research.” More specifically, the task force was requested to develop at least one, but no more than three governance models that Penn State should consider for adoption. For each of the proposed governance models, the task force was asked to evaluate the degree to which it supports the following priorities: (a) alignment with Penn State’s overall research governance model and organizational structure; (b) ability to enable effective planning, coordination, delivery, and assessment of research CI services along and across the three major categories of Research, Education, and Enterprise services; (c) ability to empower researchers by enabling effective use of common infrastructure across the entire university and to inform upgrades to meet changing requirements and technologies; (d) ability to interface appropriately with IT for education and administration.

Process and Background

The exploration of governance models for research computing began in September 2012 when the Provost and the CIO appointed a Research IT Strategic Plan Committee consisting of about 25 research faculty and IT colleagues as one of several such committees contributing to the creation of an overall IT strategic plan for the entire university. The “Report of the Research IT Strategic Plan Committee” (16 May 2013) is posted on the Institute for Cyberscience website. Parts of it were incorporated in the overall document prepared by the CIO and outside consultants (Goldstein and Associates), “Penn State Information Technology Roadmap through 2017” (available on the ICS website). On 28 May 2013, the Provost and the VPF&B charged the faculty members of the original Research IT Strategic Plan Committee with the task of investigating and analyzing “institutional IT metrics and governance structures at peer institutions” and to “develop recommendations for consideration at Penn State.” The findings of that group are available in “Benchmarking IT @PSU” (15 July 2013), also available on the ICS website. The committee investigated about fifteen peer and aspirational peer institutions, and made detailed analyses of the CI/IT governance structures at Minnesota, Michigan, and Wisconsin. The report recommended “a revision to PSU’s organizational structure that elevates the importance of research computing within the University and decouples research computing from enterprise computing.” What was proposed was in essence a concept—major faculty involvement in CI/IT governance. The present Task Force was created in order to consider options and propose an operational model that would work for Penn State. What has emerged has many parallels and striking similarities to what was proposed in general terms in Penn State’s 2011 IT assessment (also on the ICS website).

The structure proposed here is designed to provide efficient mechanisms for involving faculty and IT colleagues in governance. We want to obtain serious stakeholder input, effectively disseminate “best practices” for research CI/IT, and establish formal faculty governance of research CI through a broadly inclusive Advisory Council and a small, nimble, strongly empowered Executive Committee. Our model proposes development of a network structure for research CI/IT, designed to work cooperatively within the particularities of Penn State’s hierarchical administrative structures. It adopts “best practices” from peer institutions and Penn State’s own ITLC to address the need for stakeholder guidance of research computing. **We must test the effectiveness of this structure, and refine and improve it as best we can, but we believe it offers potentially transformational possibilities for Penn State.**
Findings

(1) Current CI/IT governance, particularly for research, is absent or ineffective, creating barriers to research innovation and productivity. We can make major savings in both time and money.

(2) Neither a wholly centralized nor a wholly distributed model works well. Instead, we need a practical, cohesive, comprehensive governance structure that will promote efficient Communication, Coordination, Cooperation, and Collaboration—the Four Cs.

(3) Research, Instructional, and Enterprise computing are very different beasts with different CI requirements. Each needs its own governance structure and channels of communication, but we also need improved communication across these domains. Enterprise systems should be developed and governed in ways that serve the University’s teaching and research missions.

The task force agreed on and endorses a single governance model. We believe that it will move Penn State forward on a number of important fronts. We aim to advance the academic missions of the university through the following:

- Establish and empower faculty governance;
- Better support the recruitment and retention of a stable set of research-IT professionals who have the training and assistance they need to address common issues as well as support innovation in research;
- Enable and encourage creative and forward-looking Research CI;
- Foster collaboration between and among faculty and IT colleagues;
- Reduce inconsistencies in support, facilities, and knowledge;
- Facilitate updating policies and disseminating best practices;
- Promote a culture change to make the default answer to research-CI needs “yes” rather than “no”;
- Provide a strong voice for Research CI at the highest levels of the University.

President Barron has issued a call for developing a culture of entrepreneurship at Penn State. This is highly desirable because it can promote scientific innovations, transform students’ educational experiences, increase faculty engagement with a range of external constituents, and ultimately, improve our visibility, and future competitiveness. We believe that such a culture will be enabled by a forward looking and transparently governed advanced research computing cyberinfrastructure which will create opportunities for translating research into entrepreneurial activities and economic development in the Commonwealth and globally.
Key Recommendations

(1) Implement a networked governance and organizational model for Research Computing (see diagram) that involves the formation of (a) CI/IT committees representing Communities of Practice that fall either within or across the major research and teaching units at Penn State, whose function is to help identify issues and to be responsible for local implementation of programs and cyberinfrastructure initiatives; (b) an Advisory Council as the heart of the network, populated by representatives from the Communities of Practice, whose primary function is to analyze issues and make recommendations; and (c) an Executive Committee whose function is to establish priorities, make decisions for resource allocation, and act as a guiding coalition reporting to the VPR.

(2) Invest seriously in “Research Computing” through: (a) elevating research CI to give it at least parity with infrastructure, teaching, and enterprise computing CI; (b) ensuring that University-wide CI decisions enable the University’s tri-partite missions of research, teaching, and outreach; and (c) empowering faculty governance in the area of research CI. The established governance structures should immediately be tasked to:

(i). Prioritize a review of infrastructure (hardware, software, networking, labs), personnel (training, compensation), and policy (HR policy, security requirements) to ensure that supporting research is a CI priority across the board.

(ii). Create a one-stop on-line research CI resource for identifying resources for research computing (e.g. labs, initiatives, units), listing university site licenses, explaining critical university cyber policies, and so on.

(iii). Allocate additional resources for the development of shared high-end research services beyond those provided by the old RCC and now delivered by the new Institute for Cyberscience-ACI unit.¹

(iv). Rethink all CI/IT job classifications from the ground up. This will involve making salary comparisons with peer institutions and creating career-track possibilities that will enable us to attract and retain the upper-end IT professionals we need.

(v). Allocate additional resources for the identification, training, and/or hiring of “research oriented IT professionals” at various levels to provide more effective support for research CI throughout all levels of the university.

(3) Consider establishing similar networked “pillars” for Enterprise computing and Instructional computing chaired respectively by the CIO and a Director of Instructional Computing, who might report respectively to the VPF&B and the VP for Undergraduate Education. This step is crucial because Enterprise IT provides critical infrastructure and services for all three domains and good horizontal communication is essential.

(4) Plan to review the implemented governance models and structures one year after adoption, and again after three years, and fine-tune or revamp as necessary.

¹ACI translates as “Advanced CyberInfrastructure .”
Research Computing Governance and Research Cyberinfrastructure

I. Definitions

For clarity we provide a pair of definitional clarifications.

A. By “CI/IT Governance” we mean organizational structures and responsible individuals who:

(1) set priorities;
(2) identify institutional opportunities and decide how they should be pursued;
(3) analyze issues;
(4) make decisions;
(5) settle disputes when there is no clear consensus;
(6) monitor and assess successes and failure.

B. Research Cyberinfrastructure (Research CI) merges computing, networking, data technologies, and human resources into a seamless entity to serve research. Research CI is concerned with the full range of CI including:

(1) core CI (networking, infrastructure, and security),
(2) preservation CI (archiving data, digitizing, and providing access to data), and
(3) innovation CI (enabling advanced research and exploration).

II. Why does Penn State need to rethink CI/IT governance?

The Research Computing Strategic Plan Committee of 2012-13 (RCSPC) identified a large number of inefficiencies, failures, gaps, inconsistencies, and problems in CI that affect research. Addressing these issues, it made a number of recommendations in the May 2013 Report from the Research IT Strategic Plan Committee. In general, while some researchers have very good support for research IT, this is uneven, and others encounter roadblocks, delays, limitations, and frustrations in their efforts to use CI effectively to support their research. The recommendations in the Research Computing report were unanimously endorsed by the URC, the Senate Committee on Research, the OVPR Institute Directors, the Evan Pugh Professors, and the Graduate Council. The URC voted unanimously in favor of a resolution proposed by Neil Sharkey that “The changes proposed by the Research IT Committee for Strategic Planning are long-overdue, much needed, and have enthusiastic support for urgent and immediate implementation” (8 January 2013). One major recommendation (moving RCC from ITS to OVPR) has already been acted on. Others need to be (see RCSPC Report of 16 May 2013). We attribute many of the identified problems with research CI to inadequate governance. Research CI needs to be shaped and governed by the people who do research in ways that advance the academic mission of Penn State.

We stress that the problem lies in the decision-making processes and inadequate consultation with stakeholder communities, not in the quality or dedication of our IT colleagues. Penn State has many highly qualified faculty and IT professionals, but a lack of inclusive structures and effective consultative processes have created problems that could and should have been avoided. Here are some examples related to IT services, policies, and facilities that have arisen at least partially from lack of inclusive governance.
(a) Underinvesting in RCC and other Advanced Computing units. We are leaving millions of dollars on the table and cannot be a credible player for major grants because we have underinvested in hardware, software, and people. Penn State has done relatively well in some ranking systems, but more poorly in others, and this is a ground for concern. Strong and comprehensive CI facilitates research and will strengthen our national and international rankings.2 We are pleased and relieved that the current administration is moving aggressively to address this problem.

(b) Spending six years planning a Data Center that was intended to be half for research without systematic consultation of key faculty and other researchers.3 Indicative of this oversight, the resulting plan called for 0.5 MWatt for research for a launch in 2017. However, the “Report of the Research Data and Computing Committee” (October 2013) collected such systematic data and documented minimum need for six times that initial capacity.

(c) Deciding to make UCS (University Collaboration Suite) the universal e-mail and calendaring software for Penn State without sufficient input from (or pilot-testing by) the faculty, staff, and high-level administrators the system was supposed to serve; this led to major concerns in key executive offices. This was reportedly a six-year process to which a halt could have been called in two or three months if we had had a consultative governance structure in place.

(d) Allowing Enterprise Services systems to become severely outdated, an infrastructure issue that the current administration has moved aggressively to remedy.

(e) Forwarding to the Provost for approval in August 2014 an all-university IT strategic plan that contained inconsistencies about governance, and a final governance section that had not been thoroughly discussed with faculty on the committee, many of whom had major objections to it and who had presented an alternative. This committee applauds the Provost’s determination to coordinate the IT strategic plan with those being developed for the university’s research and instructional missions such that the IT plan is driven by Penn State’s academic mission.

Penn State urgently needs to regain the pre- eminent position in advanced research computing that it had twenty years ago. The commitment of the Provost and Vice President for Research to making this happen is enormously heartening. A crucial part of this process has to be much greater involvement of stakeholders of all kinds in decision making processes and in the resource allocation that follows from them. This has not been “The Penn State Way. We are calling for a much-needed “culture change.”

We believe that the governance model we are proposing will greatly enhance the university’s potency in research computing. We emphasize that we are not proposing a radical reorganization of administrative structures in org chart terms. Rather, we are suggesting that a reconceptualization in which a governance “overlay” is applied to existing structures will produce huge improvements in vision, cooperation, coordination, and efficiency.

2 We are well aware of the controversial nature of various University ranking systems, and are proud of the recent improvements of Penn State in the CWUR and Times rankings. We note, however, that these two ranking systems in which Penn State has shown improvement provide greater weightage to educational and reputational scores than do the ARRU/Singh and QS ranking systems in which the institution continues to slide. Penn State has even very recently publicized its appearance in the Shanghai rankings as something to be proud of.

3 This assertion has been challenged, but at a meeting about Data Center plans on 12 August 2013, representatives of central IT, OPP, and CS Technologies were asked by faculty representatives from the Research IT Strategic Planning Committee what consultation had been carried out with faculty. The answer was “None. This is the first time the Data Center has been discussed with faculty.” Whatever consultation with faculty may have been carried out at earlier stages by others, the results of such consultation evidently did not get communicated effectively to later working parties. Nor were they adequately reflected in the summer 2013 version of the data center report presented to the Trustees.
III. Guiding Principles

Keeping our charge in mind, through a series of meetings, informational sessions, and in consultation with key stakeholders, we first developed guiding aspirational principles and operational assumptions for the formulation of research CI governance recommendations:

A. Aspirational principles:

- Establish faculty-led governance models that are inclusive, forward-looking, and conducive to substantive involvement of stakeholders (faculty, IT colleagues, and students) in decisions concerning research-CI resources, facilities, and services.

- Develop a funding model that rewards innovation, open access, and cost-effective solutions.

B. Operational assumptions:

- We cannot be bound by “legacy,” either in equipment or governance.

- Close collaboration/partnership between academic faculty and IT colleagues is essential. Enabling local IT support units to support research effectively through good policy, professional training, and resource availability is a critical element of providing effective support for the research mission.

- An “Advisory Council” should be big and broad enough to gain input from many quarters.

- An “Executive Committee” should be small, nimble, and decisive.

- We must be flexible and dynamic. IT systems change more rapidly than research instrumentation in many areas of science. A telescope may serve well for 15 or 20 years; computing hardware reaches end-of-life status in 4 or 5 years and must be replaced, while we must have the capability to employ and deploy new, customized, and/or innovative software or systems on an even shorter time frame. We need to encourage a culture of rapid adoption, and accepting and learning from failure.

- Whatever governance structure is put in place should be reviewed after one year, again after three, and occasionally thereafter. We probably won’t create something perfect on our first try, so nothing should be set in stone.

IV. Research Computing Governance at Penn State

A. The Proposed Model

Penn State has all the usual hierarchical University Governance structures, but in comparison with peer institutions it has a history of minimal faculty involvement in governance. This is particularly true in the area of research computing. Working from our guiding principles and operational assumptions, and trying to apply recent thinking about “best practices” (Kotter, 2012), we have created an operational model designed to cope with mounting complexity and rapid change. The goal of the proposed CI governance structure is to disseminate and foster “best practices” for supporting research CI, and to help facilitate collaboration and cooperation among individual units.

We propose a highly networked multi-level governance structure that comprises three closely linked components. These are (1) Committees representing Communities of Practice within and across the major organizational units at Penn State, which help identify issues and are responsible for local

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implementation of programs and cyberinfrastructure initiatives; (2) an **Advisory Council** that acts as the heart of the network, populated by representatives from the Communities of Practice, whose primary function is to bring forth and analyze issues and make recommendations; and (3) an **Executive Committee** whose function is to establish priorities, allocate resources, and act as a guiding coalition reporting to the VPR. Details of these components are illustrated in the schematic and described below.

(1) **Communities of Practice (CoPs).** Each College and OVPR Research Institute should have a Unit Committee charged with identification and coordination of the unit’s research CI needs. So should some other units (e.g., the Library). Other groups dealing with particular CI issues or practices (e.g., users of “Big Data”) are expected to form their own CoPs. These “domain CoPs” with functional expertise may be self-identified, or identified by the VPR, Executive, or Advisory Committee. Many of these domain CoPs will cross unit boundaries, and they may overlap. Not every CoP will necessarily need a standing representative on the Advisory Council (“AC”, defined below), but may instead send a representative to the AC when issues arising need to be communicated. The composition of each CoP should be determined by the individual unit or domain area, with the goal for unit CoPs being that the Dean, Director, or his or her delegate will establish a committee ensuring that the interests and needs of the unit’s faculty and IT colleagues are effectively communicated to the Advisory Council. We presume that

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5 Our preliminary list of “unit” CoPs includes the twelve colleges, the University Libraries, the OVPR Institutes (MRI, Huck, PSIEE, SSRI, and ICS), the Commonwealth Campuses, Hershey College of Medicine, the ARL (and perhaps others?).
each committee will actively engage faculty, IT colleagues, and other stakeholders in whatever ways will best serve cooperation, coordination, and efficiency within that unit.

All CoP committees are expected to bring issues and requests to the Advisory Council as necessary. Local unit committees also have a key role in implementation. In addition to providing input to and bringing issues to the attention of the Advisory Council, unit committees will help to coordinate CI policies and requests within units; ensure that local computer policy is in sync with best practices and is coordinated with operations of other units; and generally promote effective Research CI within their units.

(2) The Advisory Council (AC). The Advisory Council will analyze CI issues, enable communication up, down, and sideways (between units, CoPs, and executive sponsors), and make recommendations about policies and priorities to the Executive Committee. The AC also provides a forum for discussion to establish links between both unit and domain CoPs. As these links are established, a network structure of cross-unit and cross-CoP communication will develop. The AC is in a central location within this research CI network, and will facilitate its development. Once communication and coordination is achieved in the AC, we expect that unit and domain CoPs will communicate and coordinate with other CoPs as appropriate to disseminate best practices, share resources, and pass on knowledge of solutions to research CI issues.

We expect that as the research CI network develops, solutions to CI issues will be developed among units without all issues needing to flow through the AC. We expect that the AC will be the main venue to address system-wide issues and coordinate on common best practices that are either tied to other university structure (e.g. risk management, HR, Provost), or that affect all IT support units, and in turn researchers, system-wide. Ongoing IT management and support will continue to be provided by current IT support units, and practices that work will certainly continue as they have. The network and the AC should be for exceptional issues that can’t be solved locally, or where opportunities for coordination and policy setting by multiple units would benefit the collective.

We expect the AC to address current issues that have been identified, but also expect it to anticipate issues and trends that could be coming down the pike in order to pre-empt any potential problems, and to capitalize on future opportunities. Awareness of looming issues and opportunities will critically depend on information provided to the AC by its members and links to other relevant groups within (and outside) the University.

Each CoP administrative unit (as judged appropriate by the VPR and the Executive Committee) will send a faculty representative to the Advisory Council. These representatives should possess strong research credentials and be engaged in research computing. The AC should also have significant representation from central and College/unit IT colleagues. Representation from the ITLC, and regular consultation with that body, are important. The AC will also have one graduate student representative from the Graduate and Professional Student Association. We seek a coalition of the expert and the passionate.

Each unit CoP may choose whether to elect or appoint its faculty representative, and will decide on the duration of its representative’s term of service. However, across the Advisory Council, terms will need to be staggered so that the Council has a mix of seasoned and new representatives in any given year.

The Advisory Council will elect its chair and vice-chair for two year terms (re-election for a second term should be permissible). The Vice Chair will typically become Chair when the Chair rotates out of that role. If the Chair for the following year and the Executive Committee find that the Advisory Council will need additional domain expertise, they may seek out and appoint as many at-large members as seem desirable. Service on the Advisory Council must not be seen as a pro-forma duty:
The Advisory Council will be designedly large: Having one member from each of the 12 colleges, Hershey Medical Center, the Libraries, the five major research institutes, the Applied Research Lab (ARL), and a select number representing the various kinds of Commonwealth campuses, puts the size of the AC near 25. With the addition of IT representatives and at-large appointees, the AC could number forty or even more. Members are expected to keep their own units informed of policies, decisions, and issues arising, and to bring issues to the AC from their units.

One of the major functions of the Advisory Council is to help populate “working groups” charged with making recommendations on particular issues. Some working groups will be standing committees; others will be temporary ad hoc bodies. Particularly because the AC is a large and diverse body, we expect AC working groups on particular issues to play a critical role in exploring issues and developing alternative solutions and recommendations. Working groups are likely to meet much more often than the full Advisory Council. Initial recommended working groups include the following:

1. Emerging research committee (to deal with emerging technologies and new research areas with particular CI requirements).
2. IT/HR/Job classification and compensation committee (to deal with issues of CI/IT compensation across units and flexibility in hiring CI/IT staff). (See Appendix A.)
3. Policy committee (to coordinate with University-wide IT policies on topics such as access to the research network, data classification, security, and so on).
4. Data preservation and information assurance committee (to deal with developing and disseminating policies and technologies for data preservation and dissemination).
5. Evaluation committee (to examine how to assess research CI needs, and to assess the success or failure of Research CI governance at furthering its goals).
6. Budget committee (to examine how to fund research CI in a decentralized budget environment, consider F&A, how to support new research CI/IT positions, how to encourage units to share resources when they feel stretched, and to make recommendations for budget practices to the VPR and in turn to the Provost).
7. Working group on CI grant implications to identify needs and opportunities (e.g., bringing groups together, pipeline building) so we are better able to compete for major grants.
8. Infrastructure working group to deal with CI links to core infrastructure, e.g., instrumentation, access to cloud series vs. wired networks, networking.
9. Data Center working group to provide input into ongoing work on the Data Center and develop policies related to co-location of servers for research at the Data Center.
10. Committee to promote cyber-enabled entrepreneurship.
11. Coordination Committee (to connect and ensure coordination with the Instructional Computing and Enterprise Services Advisory Councils, with the faculty Senate and/or Senate Committee on Research as appropriate, and between units).

The Chairs of these committees might often be Executive Committee members (see below). In any case, when possible there should be at least one representative from the Executive Committee to serve as liaison to ensure good communication between that group and the Executive Committee. There are many obvious linkages between these committees and outside groups, and appropriate experts/representatives in
other areas should be involved in discussions. For instance, the budget committee thinking about funding models for research CI might work with the Faculty Senate committee on F&A, budget officers, and the Office of Sponsored Programs.

(3) The Executive Committee (EC). The executive committee will make decisions about policies, recommend budget priorities to the Provost and VPR, and serve as a liaison between researchers with CI needs and the executive level of University governance. When EC recommendations concern units outside the purview of the VPR, the VPR will take such recommendations to the Provost and President. The EC will be positioned to hear about repeated issues or collective needs, and then prioritize the need for attention to various CI issues. In addition to reacting to needs, the EC will be a place to formalize planning and act proactively.

Potential members will be nominated by the AC (at least double the number of appointees needed). They will be appointed by the VPR in consultation with college Deans and the Institute Directors and continuing members. As with CoP representatives to the AC, we expect that these representatives will possess strong research credentials and be engaged in research computing. The EC will consist of six members plus the chair, serving staggered three-year terms. The Chair will serve a two-year term (and is reappointable). A Vice-Chair will normally succeed to the Chair. The Director of the ICS will serve as a non-voting member of the Executive Committee (but may vote in order to break a tie). The EC will give direction to the Chair concerning Research CI.

A crucial function of the EC is liaison with roughly parallel bodies in Enterprise and Instructional computing, both of which should send representatives to the meetings of the EC. Having at least one of the Enterprise representatives come from the ITLC makes sense. Assuming that the “three pillar” overall model is adopted, the CIO and the Chair of the Instructional Computing Executive Committee (or their designated representatives) should be ex-officio members (and the Chair of this committee or representative should serve an ex-officio member of the other two).

(4) The Chair of the Executive Committee is responsible for the entire realm of research computing. We anticipate a substantial time commitment required from the Chair and Vice-Chair of the EC, necessitating a buy-down of time commitment (at least 25%; probably considerably more to start) of their current appointments. Staff support, either (or both) in the form of administrative support (for meeting scheduling and agenda development) and IT/CI support (the “research guru” to develop a catalog of research services) may be needed, especially in the formative stages of the governance structure.

(5) The Office of the VPR. The ICS Director and the Chair of the Executive Committee report to the VPR (or depending on how that office is organized, perhaps to a designated Associate VPR). (We presume that the ICS Director and Associate VPR will not ordinarily be the same person: these jobs are just too big.) The VPR will work with the Provost and the VP for Finance and Business to identify and obtain resources needed for research CI functions and initiatives, and when necessary to facilitate access to other university offices, e.g. OHR, risk management, and so on.

The table below summarizes function, members, selection process, and term of service of each group. Communities of Practice self-identify, are identified by the VPR, or represent administrative units (e.g., colleges, Institutes). Representatives designated by the CoPs identify issues and bring them to the Advisory Council where they can be discussed. Rather than expecting the 50+ person AC to meet in many long meetings, we expect AC working groups on particular issues to play a critical role in exploring issues and developing alternative solutions and recommendations. Although we hope that the AC will usually be able to reach consensus recommendations, solutions will be formally decided upon when

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6 An alternative would be Co-Chairs named with staggered appointments. Whichever is adopted, chairing the Executive Committee will be a demanding job and appropriate time compensation will be in order.
necessary by the EC. s necessary, the EC will work with the VPR and Provost to obtain funds to pay for necessary investments in research CI (though many of the important informational and policy aspects of research governance, such as sharing information and coordinating on best practices, do not have a direct price tag), and to work with other administrative units. Solutions and practices then move back down through the stack from the EC, through the AC, to CoPs (both unit and domain CoPs), where they will be ultimately put into effect. The AC is also a key facilitator of the emerging research CI network, bringing relevant actors together for information sharing.

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| **Communities of Practice** | • Identifies issues  
• Implements solutions | • Users from each unit  
• Domain experts | • Nominated or appointed | • Determined by local unit |
| **Advisory Council** | • Analyzes issues  
• Makes recommendations  
• Facilitates network | • Domain experts from CoPs  
• Unit representatives  
• Change agents | • Nominated or elected by unit  
• At-large members appointed by AC | • 2 years |
| **Executive Committee** | • Sets priorities  
• Allocates resources  
• Coordinates network | • Research leaders from AC  
• Guiding coalition  
• Institutional representatives | • AC nominates  
• VPR/Deans appoint (consulting with EC) | • 3 years, staggered  
• Chair – 2 years; re-appointable |

**B. The Rationale**

The proposed model is meant to involve and empower stakeholders. It

- establishes “faculty governance” of Research Computing;
- connects faculty and IT professionals at every level;
- establishes go-to individuals in every local unit (college, institute, etc.);
- creates clear channels of communication, bottom-up, top-down, and across the three IT domains;
- creates a broadly inclusive central forum for discussion and advice;
- creates a manageably small Executive Committee to advise the Chair and the VPR;
- establishes a clear relationship between the ICS and the rest of research computing;
- puts the VPR squarely in charge of advocating for research computing and arguing for the funding it needs to work well.
- fosters entrepreneurial activities.

We believe that this model will promote and facilitate getting questions and suggestions effectively transmitted both horizontally and vertically. It will facilitate “upward” communication to the VPR, build
links between IT professionals and faculty users, and facilitate communication of new policies and opportunities to a large and diverse pool of researchers.

Both the proposed model for Research CI-IT Governance (diagram on page 7) and the “three pillar” model for overall CI-IT Governance (diagram on page 16) embody three fundamental principles.

- First, that good organizations depend upon vertically integrated domains of expertise that enable good ideas to migrate upwards and the resources for implementation to respond in reverse.
- Second, that domain expertise becomes most useful to the organization when horizontal cross-fertilization is built in.
- Third, that a sound cyber-infrastructure demands a fit between people and processes at all points—in this instance faculty research leaders and staff research CI-enablers.

We further suggest that implementing this kind of coordinated structure offers Penn State a wonderful opportunity to improve the working conditions and job satisfaction of our IT colleagues—and will lead to better hires and long-term retention. IT colleagues provide mission-critical services throughout the university, but many units are encountering increasing difficulties in recruiting and retaining staff. Anecdotally we are aware that some IT staff have greatly increased their salaries by moving into private-sector jobs, even without having to relocate to urban areas. There is a widespread perception that some units pay significantly more than other units for similar work, and we face “churn” in the workforce. We know that central OHR reviews salary bands bi-annually (a review is currently under way), and we recommend that a committee with faculty and ITLC representation meet with OHR to consider these problems and explore solutions. (For further discussion, see Appendix A.)

C. What makes this model work?

Four Cs are vital to ensuring success of the proposed research governance structure:

- **Communication** up, down, and sideways. A major aim of the Research CI governance structure is to facilitate both “vertical” and horizontal communication. Communication occurs upward from individuals through CoPs to the Advisory Council level, which can transmit them (with recommendations) to the Executive Committee and its Chair, and in turn to the VPR. Communication occurs downward from the VPR and the Executive Committee to individual units and people via information, news, policy, practices, and resources. And communication occurs sideways between faculty and IT colleagues within units, between faculty and IT colleagues across units, and across CI-IT pillars. This model allows development (through CoPs and the Advisory Committee) of a network of CI-related communication links.

- **Collaboration** between and among research faculty and IT colleagues, both in central IT support units and in college or other units.

- **Coordination and Cooperation** among departments, colleges, institutes, and other units. This is at best complicated, and budgetarily tricky. But we need to promote a **Culture of Abundance**, and efficient coordination and sharing, rather than a mindset of “Keep your hands out of my jampot.” Deans, Provosts, and other University leaders must recognize that investment in research CI is indeed an **investment** and not merely an expenditure. Effective CI is first and foremost a facilitator of research; leading CI can further become a multiplier furthering the research mission of the university.

D. Decision Flow and Resource Allocation

The flow of decisions (that is, the authority to implement decisions reached and policies established by the Executive Committee is critical to making any governance structure put its aspirations into practice.
We expect that most priorities and policies will be set mainly by consensus after appropriate information gathering and problem exploration by key working groups and the AC. Formally, however:

- **Decisions affecting units directly controlled** by the Director of the ICS (in particular ICS-ACI) will be directly implemented.

- **Decisions affecting the whole spectrum of Communities of Practice** (collegiate, departmental, institute, or other unit) will be transmitted to the Advisory Council and to the individual Community of Practice CI/IT committees and IT Directors for implementation.

- Authority for **decisions affecting central ITS or telecommunications units, and for policy-making discussions with other administrative units such as OHR or risk management officers**, will be formally conveyed via the VPR to the appropriate administrators.

Some Executive Committee decisions concerning CI will require additional funds in order to implement them. For the Executive Committee to deliver “unfunded mandates” would be poor practice, but the VPR cannot fund everything, and in any case this proposal will not establish a new CI support unit (decisions and policies will be implemented by local IT units). Paying for research CI involves a complex combination of “distributed support” from a variety of sources. We seek a “Culture of Abundance,” but recognize that a high priority for the EC will be to figure out how we best mix and match funds from a variety of sources to support research CI. We recommend that the Executive Committee (via its Chair and the VPR) will advance initiatives and recommendations to the Provost, and that funds will be directly allocated to Colleges, Institutes, and other relevant units to enable implementation of Executive Committee recommendations and mandates to advance research computing across Penn State.

**E. Governance Priorities:**

(1) **Appoint a “Research Computing Guru” and set up a “Research Computing Website.”** Following from other institutions, an initial office under the auspices of the VPR this could be labeled the “Office of Research Relations” or “Research Services Management Office.” We need someone (or maybe a couple of people) conspicuously advertised as go-to resources for anyone with a research CI question. We also need a one-stop on-line resource for connecting researchers with available research CI resources. The main component of this web site should be at least a Service Catalog and perhaps a Service Portfolio (a good example is the Michigan IT Services Portal: [http://services.it.umich.edu/](http://services.it.umich.edu/); what we envision is a serious expansion in the research direction of the current ITS service catalog, one which reaches outside of ITS). But most vitally we need a highly accessible person who can answer questions and put people (whether researchers or unit IT personnel) in touch with expert help when needed. We have been wasting a lot of time and money, and this is easy to fix.

(2) **Establish a number of short-term “working parties” to assist in transition and development of the final committees.** These working parties should draw on the expertise of the Executive Committee and the Advisory Council membership; some of these may require only two or three meetings while others may go on considerably longer or even evolve into standing working groups of the Advisory Council. But we see these committees mostly as a key part of the transition, not as part of a permanent governance structure. We presume that the VPR, the Director of the ICS, and the Executive Committee will continue to set up such temporary working parties as the need arises (as described above under “Advisory Council”).

(3) **Plan Periodic review.** We must develop a plan for monitoring and evaluating the effectiveness of new and existing policies and practices, including determination of metrics for measuring both short and long term success. We expect that review of the research governance structures will be carried out under the purview of the VPR. Such review could lead to future improvements or wholesale revamping of the research governance structure. We recognize that what we are proposing is an experiment, a significant
departure from long-established Penn State practice. It will almost certainly need to be tweaked, or even seriously rethought and we have built an evaluation step into our plan, for this reason. But we believe that establishing faculty-led governance and empowering stakeholders (faculty, IT colleagues, and students) will have profoundly beneficial effects. We are convinced that it will reward innovation while promoting open access, cost-effective solutions, and the entrepreneurial spirit Penn State needs to develop.

(4) Review and Disseminate Best Practices. As we developed the overall recommendations for research governance, we identified a number of best practices that we believe could be quickly implemented by units working with research CI. Following discussion to confirm recommendations and prioritize among these, the new EC and AC should request appropriate funds from the Provost/VPR to put these into practice (i.e., for hiring).

- Within academic units, IT and research computing should come together under an associate dean of research. This could mean partial reporting, or at least consultation, between IT and the Associate Dean for Research or his/her office.
- Units should include a trained research CI professional. When a faculty member has a non-standard need, it should be normal protocol (rather than an exception) for the research liaison to be called in.
- There should be an internal review of unit CI policy that affects research. Faculty should be included in the review to identify positive points of IT support for research, and areas where IT is not supporting research CI in ways that faculty need.
- There should be an “onboarding” (and potentially offboarding) IT person in each unit. When a new faculty member arrives, this IT person should ascertain if he or she has non-standard research CI needs. If the researcher has or needs connections to other units (especially for joint appointments/cross-unit hires/co-hires), the onboarding person should work to ensure that all CI needs are met by someone. If there are issues of coordination and communication (and budget), the IT onboarding person should take the issue to the local head of IT who can facilitate a connection to the other unit, or if necessary bring the issue to the appropriate Associate Dean(s) for coordination. An issue for the AC/EC to address should also be the development of a baseline onboarding/offboarding policy/process that could be used as a foundation for the units. This is important since this governance network process should significantly increase the amount of resource sharing between member units. A solid onboarding/offboarding process will soften the path for new users and protects critical resources when those users depart.
- There should be a shift in culture so that the answer on research CI needs is never simply, “We can’t do that.” Rather, answers supportive of the research enterprise could be: We can do that under these conditions; We aren’t the best place for that but here is a group/unit/institute on campus that can, and let me make a contact there to hook you in; or, Here is a set of alternative solutions to the problem you discuss, which of these will work best for your problem? Conversation on research CI needs should be collaborative, with a detailed discussion of the problem and needs of researchers, with collaborative work on solutions. If the real need/issue is broader or reflects more general practice or policy that could be addressed, then development of a more standardized and broader reaching solution should be explored in addition to facilitating an individual research requirement. The ongoing dissemination of best practices, development of connections between faculty and IT professionals, and establishing links between units with appropriate expertise will assist in this task.

For some “Frequently Asked Questions” about this proposed governance model, see Appendix C.
V. All-University Research, Instructional, and Enterprise CI/IT Governance

Thus far we have addressed “Governance of Research Computing.” But this is not something that can function well in isolation, and we believe it will work best if it is securely integrated in a larger CI/IT governance scheme. We understand the terms of our charge as an invitation to consider broader implications and structures that would support research computing, and so to offer additional suggestions. We also believe that there may be core principles in our report that should apply to other areas of governance, for example, the idea that academic leadership and prioritization of academic needs would fit well in all areas. We therefore turn now to a broader question: What would be a strong and efficient all-university CI/IT governance structure that would work for Penn State? We have studied (and learned from) what is currently being done at Michigan, Minnesota, and Wisconsin/Madison, but universities do differ.

A. “Three Pillar” Vision of CI/IT Governance at Penn State

In response to a charge from David Gray (VPF&B) and Rob Pangborn (Interim Provost) in May 2013, the Faculty Committee of the Research Computing Strategic Plan group made an intensive study of CI/IT governance at peer institutions, particularly Michigan, Minnesota, and Wisconsin. We will not repeat their findings, which are available in the report of 15 July (https://www.ics.psu.edu/rcigov/index.html) (Benchmarking IT Analysis Offered by the Research IT Strategic Plan faculty Group – July 2013).

1. Rationale. The gist is that Penn State is seriously out of line with what peer institutions consider “best practice,” in areas reaching beyond research computing. The key points are:

   - Governance for Research and Instructional computing should be separated from Enterprise Services computing.
   - Research and Instructional computing should have clearly defined executive leadership and oversight from outside of IT.
   - Strong faculty governance committees should be responsible for Research and Instruction (and faculty should be represented on the Enterprise Services IT Executive Committee).
   - Each “pillar” (Research, Instructional, Enterprise) should be “stakeholder driven.”
   - Each should have a clear focus on setting strategic priorities and have mechanisms for ensuring accountability.
   - Each realm needs broad representation and should have formal and informal mechanisms of input from Communities of Practice.
   - The governance process needs to be both inclusive and efficient.

See diagram below for the Proposed “Three Pillar” Model.
What the present working group has come up with is based on the 15 July 2013 report, and parallels the 3-pillar structure of the 2011 IT Assessment report, but offers a number of refinements and improvements. The concept here is that each of three quite different kinds of CI/IT should have its own “Director” or “Chair” (and an executive committee) reporting to a Vice-Presidential level champion who would work with the Provost on budgetary issues. Policy would be made by the Executive Committee in consultation with its Chair and the ICS Director, subject to the approval of the relevant Vice President (and ultimately the Provost and President).

We point out that something very like what we are recommending for Research and Instructional Computing already exists for the “Enterprise pillar.” The ILTC is, de facto, functioning as what we are calling a large “Advisory Council,” and the “ITLC Board” is a rough equivalent to the “Executive Committees” that we are envisioning. (For a brief explanation of the ITLC, see Appendix B.)

2. Operations. Our sense of how the “Research” pillar would work is briefly explained in Part III of this document. We would not undertake to suggest precisely what structure would work best for Enterprise, and Instructional might turn out to be significantly different from Research. We strongly urge, however, that practitioners and stakeholders should be involved at every level in all three realms. The guiding principle here is that Penn State’s academic mission should drive its operations, not the other way around. A few brief comments and explanations follow.
(a) **Close and cordial cooperation across all three realms is obviously vital.** We do not envision or endorse the idea of “separate silos,” which would waste time and money and miss opportunities. Infrastructure and core services will be provided by Enterprise Service and informed by the University’s academic mission (teaching, research, engagement).

(b) Regular **coordination and communication** needs to take place at every level from the Communities of Practice to the Advisory Councils to the Vice Presidential and Provost levels. We suggest that ex officio members from each pillar sit on the other two Advisory Councils to promote exchange of ideas and information. Faculty and staff should be represented at various levels in the “Enterprise Services” pillar to ensure that these services are driven by the academic mission.\(^7\) Formal structures will help to ensure that the necessary coordination, communication, and consultation does occur.

(c) We recommend that the Vice Presidents and Provost (or Associate Vice Presidents and Vice Provost as appropriate) set up **“working parties” drawn from all realms** to address problems that affect all three pillars. An example is salary equity for college IT personnel in relation to what is paid central personnel. Current perceived inequities that privilege central IT need to be taken up with HR, and are best tackled at a high administrative level.

(d) **Funding issues** need further investigation and a working party needs to be set up to explore them. How we mix and match Central, College, Institute, and Grant money is a decidedly complicated question.

(e) An issue beyond our immediate concern is how important CI/IT functions that fall outside the purview of college, institute, and central IT should be linked in an overall governance system. An example is **World Campus**, but there are others. What is the logic of the current state of affairs, how well is it working, and could it be improved upon?

(f) An important responsibility of the Executive Committee for Research CI/IT is to assess policy being developed in the other “pillars” (and other Penn State non-computing administrative units), and to make recommendations about such policies to the VPR. All policies developed in other administrative units that may affect research and research CI should be provided in the draft stage to the VPR’s office and in turn to the Research CI/IT Executive Committee for commentary, recommendations, and input. The committee and OVPR must be consulted in the formation of major policy that may affect research, not just informed.

3. Analysis

(a) **Advantages:**
- The faculty and the VPR would “own” research, as they should.
- “Instructional Computing” is firmly attached to Undergraduate Education, where it belongs.
- The CIO can concentrate on the enormous Enterprise operation, which is where his or her attention needs to be.
- Conflicting claims on budget will be adjudicated by the Provost.

(b) **Drawbacks:**
- Lack of “one voice” for IT/CI (though one might argue that three voices in concert would be better than one).

Cooperation across domains is crucial and perhaps hard to make work (though if other universities can induce faculty and staff to communicate and cooperate, that ought not to be impossible for us).

\(^7\) A comment from one of the Deans we have consulted: “It has been difficult to get ITS attention to unit level issues with enterprise computing.”
(c) Alternatives and considerations:

- Clearly, this is only a recommendation for consideration in other domains. Enterprise or Teaching IT might need their own structure.

- While the large undergraduate student body likely dominates campus teaching IT (through computer labs, computer and software ordering), graduate students are another important educational constituency. Appropriate consideration of graduate teaching is important. One view is that if teaching IT includes consideration of graduate students, teaching IT should not fall under the undergraduate pillar, but in an integrated graduate/undergraduate pillar. An alternative view is that since graduate education is typically tied much more closely to research than is undergraduate education, and is typically handled in local units, it should fit within the proposed research governance structure under the VPR and Dean and of the Graduate School. Yet a third view is that there may be multiple categories of students (e.g. Professional Master's students) with unique needs. Fit of non-undergraduate education IT is an important topic for future discussion.

- Another model would be a two-pillar model separating enterprise systems from the academic missions of the university. In such a model, enterprise and core administrative systems could fit in one pillar, with teaching and research fitting well in a second.

- Another element for future consideration will be the place of the World Campus in IT, as the World Campus moves more into areas where research computing support becomes important.

- Another important point is that whatever CI governance structures might develop in the future, care should be taken to ensure that they are compatible and integrated with Research CI governance.

B. Recommendation on Future Internal Evaluation of CI/IT

We have considerable in-house expertise in the CI/IT realms, and this committee strongly recommends that Penn State make use of its own internal expertise. The faculty of the College of IST are highly qualified to assess the currency, competence, efficiency, and value for money of our IT operations, both central and dispersed. So, from very different perspectives, are the faculty in the Colleges of Business and Engineering. Regular evaluations conducted for the Provost, the VPR, the VPF&B, and the Dean and VP for Undergraduate Education are essential. Faculty from these units may be able to run the internal review process; faculty and other stakeholders should also be able to participate in evaluations of key service units.
VI. Relevant Documents

Links to the following documents may be found at: https://www.ics.psu.edu/rcigov/index.html

1. Committee Charge (June 2014). Provost/VPR Charge to the Task Force [PDF]; Research CI Governance Task Force Memo [PDF]


3. Benchmarking to other Universities: July 15, 2013 “Benchmarking IT @ PSU” slideshow. Benchmarking IT Analysis offered by Research IT Strategic Plan Faculty Group – July 2013 [PDF]


6. The Goldstein IT Assessment Executive Summary, June 2011. PSU IT Assessment Executive Summary – Final Summary of Recommendations 2011 [PDF]
Appendix A

Implications for IT Colleagues and HR Issues

Both the Research Governance model (diagram on page 5) and the more general “three-pillar” hierarchy of responsibility (diagram on page 11) strongly imply a shift in faculty-staff relationships away from one-way service delivery and toward partnership and shared ownership of outcomes. We will need to rethink the university’s career pathways and reward structures for IT colleagues and to reevaluate job classifications. Much as with faculty career structures, staff identify and focus on areas of discrete expertise at early career stages; migrate to more integrative and technically demanding roles; develop managerial and leadership capacity in specific areas; and eventually undertake senior executive roles demanding high-level strategic leadership and decision-making. However, faculty have a relatively well-defined career path with some flexibility for lateral changes in direction. In contrast, IT colleagues often remain isolated in small units with little opportunity for lateral transitions to other units or for gaining the skills to make career advancement possible. To make the most of our resources we must eliminate the glass ceilings that prevent advancement and the glass walls that impede horizontal migration.

An effective human resource structure for Research Computing will reflect the governance network in its ability to involve and empower CI colleagues as stakeholders at all levels. The governance network model has important implications for the working conditions and career prospects of our IT colleagues. We believe that a governance structure has the potential to address a number of issues of concern raised by IT professionals around the university, including compensation competitiveness (where Penn State is not on par with other Big 10 schools), policies that allow more flexibility when hiring external candidates than when seeking to internally promote or reward internal candidates, HR categorizing disparate IT professionals in the same job classification/titles across units and despite different responsibilities (e.g. classifying a “system administrator” in HPC or enterprise systems equivalently to a College level administrator running a single mail server), the lack of any bonus or incentive structure for certifications, and the lack of defined Paths for promotions. Good IT professionals want strong performance based evaluations, merit based increases and promotions that visible and attainable, and want a lack of performance to lead to a fast track of dismissal or reprimand. Clearly, some of these issues pertain to staff evaluation more generally, but IT professionals around the university see them as important as well. In general, we need HR policies that support effective recruitment of the best people for appropriate positions in IT at appropriate compensation levels, make available and support professional development in terms of skills and mobility within the University, and support retention of effective professional research IT staff.

We want to

- **Recognize and capitalize on the diversity of skills and interests that shape research.** The go-to qualities essential to those staffing research CI include the abilities to find creative solutions to problems and to identify resources; depth of expertise in either technical (e.g. network communications) or applications areas (e.g. visualization.); and business, organizational or communication skills. Each of these must be evaluated and recognized in the reward structure.

- **Convey “ownership” of research as a staff as well as faculty prerogative.** There are many mechanisms that we can use to embed staff in the heart of the research engine. These might include a research forum and incubator for emerging ideas; support for sabbaticals and conference travel; skills development and training in a second discipline; and seed grants for pilot projects. We want to promote innovative and strategic thinking, and to reward individual initiative.

- **Communicate, bottom-up, top-down and across the three IT domains.** Communication fosters relationship-building, which in turn improves the communication. This not only improves...
research, but reveals for participants pathways for job advancement, either vertically or horizontally.

- **Systematically promote IT career development** by means of cross-training and study fellowships in CI management.

- **Build on the culture of transparency and trust implicit in this governance structure.** The cooperative and collaborative spirit of this design has important implications for the human relationships it will foster. The structure is shallow but allows for diversity at each level—decision-makers are not far removed from implementers so that the values of each can be reflected in the outcomes. This should prove a powerful tool for advancing our shared research mission at Penn State.
Appendix B

The Information Technology Leadership Council (ITLC)

The ITLC is charged with ensuring that information technology goals and strategic plans support those of the University. To fulfill the charge, ITLC:

a) Fosters collaboration, and facilitates delivery of services that meet the academic and administrative needs of the University.

b) Provides a forum for Penn State IT leaders to plan and collaborate on initiatives to implement policies, improve services, develop the workforce, and improve governance practices.

c) Maintains connections to IT governance bodies to ensure its practices are aligned with and responsive to the needs of the research, instruction, and administrative communities.

The ITLC is governed by a Board of Directors. Nine Board members are elected by the Council. Board composition is reviewed annually to ensure effective and proportional representation of University IT effort. Personnel with primary leadership responsibility for information technology in a college, campus, academic support or administrative unit are eligible for ITLC membership. Unit budget executives appoint representatives. Membership is limited to one representative per unit unless the ITLC Board grants an exception.

ITLC commissions several domain-specific standing committees with opportunistic charges. The standing committees enlist and appoint fixed-term Working Groups. The Working Groups are singularly charged to address specific opportunities or issues.

CI/IT governance must be compatible with governance of other strategic IT interests, such as enterprise and teaching. ITLC’s diverse and representative membership enables ITLC to inform the Advisory Council and serve as liaison between CI/IT and other IT interests. Additionally, ITLC is well positioned to coordinate and proctor common-good infrastructure and services that will be shared among all IT interests, including CI. We expect that ITLC members will participate in the unit committees and CoPs that populate the Advisory Council, and that there will be formal links between the Advisory Council and ITLC. More generally, in the proposed governance structure we expect overlap between individuals in multiple Communities of Practice, unit groups, working groups, and administrative leaders. We believe that the ITLC can serve as a collaborative presence across all three vertical “columns” at two distinct horizontal levels (Infrastructure/Services and Advisory Councils). All three Advisory Councils should include ITLC representation. The ITLC will advise and consult with the Advisory Councils to ensure that IT priorities are aligned with unit and overall university strategic plans. The ITLC will seek and incorporate Advisory Council input into operational processes and technological implementation of infrastructure and services that enable research, instruction, and enterprise activities.
Appendix C

Some Frequently Asked Questions
About the Proposed Research CI Governance Structure

Q. Why isn’t the proposed composition of the Research Governance Executive Committee (EC) at the Dean level, or populated by Deans?

A. We considered the suggestion that the Executive Committee be constituted wholly or largely by college Deans and/or Associate Deans for Research. We concluded that this would not be appropriate for at least two reasons. First, our object is faculty governance. Although the Deans and Associate Deans are faculty members, they would be appointed to the EC as administrators rather than in their roles as researchers. Second, our vision is that the EC members will have deep content knowledge and experience with research CI, as well as be willing and able to commit their time to put their knowledge into practice to advance the research CI infrastructure at Penn State though extensive consultation with Advisory working groups on the one hand, and the OVPR and Provost on the other. College Deans and Associate Deans do not necessarily have deep knowledge in the rapidly developing research CI field, and they also have a range of administrative commitments that will keep them from waking up each day to consider the question, “How can research CI at Penn State be improved?” which is our expectation for EC members.

Q. Why don’t we say exactly who should be on each unit committee?

A. We heard the suggestion that we specify detailed “best practice” for constituting and populating the unit CoP committees. But the units are so different in nature and size (e.g., Nursing vs. Eberly) that we believe they are best left to use their own judgments. We presume that the unit committee would be chaired by the relevant Associate Dean for Research (or equivalent) or his or her designee, and that it will usually include both faculty researchers and unit IT professionals.

Q. Who will review these structures and decide if they should be changed?

A. Since the committees are under the OVPR, the OVPR will review and (if necessary) make recommendations to the Provost about needed changes.

Q. Is the structure we are recommending (Communities of Practice populating a large Advisory Council from which a small Executive Committee is drawn, advising and reporting to the Vice President for Research) just another hierarchy? Is communication going to be just top-down/bottom-up?

A. NO: this is not what we have in mind. We expect the creation of CoPs and formal nature of the AC to encourage development of less-formal network connections between units, researchers, and CoPs. Communication is partly up (information flow, suggestions), partly down (dissemination of best practices, policy decisions affecting CI), and partly across (information sharing, coordination of research CI resources). We hope that solutions to CI issues can be developed among units without all issues needing to flow through the AC. We want to foster formal and informal networking. As the networks form and resources are identified, this will become more common. We hope that the Advisory Council will be the main venue to address system-wide issues and form common best practices that are either tied...
to other university structure (e.g. risk management, HR, Provost), or that affect (or should affect) all IT support units, and in turn, researchers system-wide.

Q. *How will this work in practice? What are some critical use cases?*

A. Possible use cases are numerous. A few notable ones include the following.

   a) I have a research problem with IT. Do I go to the Advisory Council? Ans: No. Support questions and requests should always go to the local IT support professional first. If that individual does not know the answer, or the problem involves research resources that the first contact cannot address, that person should bring in the local "research IT" representative. That person would work to come up with solutions (including software or equipment purchase/installation), or facilitate a link between the researcher and another unit that can provide a solution (for example, setting up a connection with the advanced computing cluster or an appropriate lab supporting a technology). We expect the advisory council to address issues affecting multiple users, for example when policies conflict with researcher needs and there needs to be a common solution or best practice developed, or when there is a question that a shared investment would be more cost-effective than simply individual responses.

   b) How do we identify these supposed commonalities and potentially-shared facilities to encourage effective use of research CI? Ans: an initial project of the Advisory Council or appointed "research guru" would be to catalogue research resources. Since the AC should have representatives of all relevant administrative units (and CoPs), it is a logical venue for information gathering and “gap analysis.”

   c) We have IT issues with HR, Risk Management, or another administrative unit that has an impact on research CI. How do we deal with this? Ans: In general, we expect to engage in a serious dialogue between other units (such as HR or Risk Management) and the committee to seek solutions. We would expect that a working group of the AC will develop a set of issues and recommendations (perhaps with a representative from the other unit sitting in the working group from the start, or perhaps being linked in later). The Executive Committee, with authority from the Provost, would arrange meetings with representatives of the unit to argue the faculty/researcher/IT perspective on the issue. Ultimately, decision authority rests with the University's executive leadership, but the goal would be for coordination and discussion to enable mutually positive outcomes easily.
Appendix D

Working Group Members

- D. Scott Bennett, Distinguished Professor of Political Science
- Ginger Breon, Assistant Dean for Administration and Chief Information Officer, Smeal College of Business
- James Broach, Professor and Chair of Biochemistry, Penn State Hershey
- Guido Cervone, Associate Director, Institute for CyberScience and Associate Professor of Geography
- Ismaila Dabo, Assistant Professor of Materials Science and Engineering
- Gregory Dillon, Associate Director for Research and Technology Transfer and Associate Professor of Engineering, Penn State Erie
- Douglas Dodson, Director of IT Services, Huck Institutes of the Life Sciences
- John Domico, Director of Computing, Department of Computer Science & Engineering
- Christopher Duffy, Professor of Civil & Environmental Engineering
- Wayne Figurelle, Assistant Director, Institute for CyberScience
- Eric Ford, Professor of Astronomy & Astrophysics
- Chris Forest, Associate Professor of Climate Dynamics
- Lara Fowler, Senior Lecturer, Dickinson Schools of Law (Facilitator)
- Lisa German, Associate Dean for Collections, Information and Access Services, University Libraries
- Charles Gilbert, System Architect and Systems Team Lead for Advanced CyberInfrastructure
- Lee Giles, David Reese Professor, College of Information Sciences and Technology
- Rick Gilmore, Associate Professor of Psychology
- David Gindhart, Director, Office of Research Information Systems
- John Harwood, Associate Vice Provost for Information Technology
- Daniel Haworth, Professor of Mechanical Engineering
- Vasant Honavar, Associate Director, Institute for CyberScience and Professor and Edward Frymoyer Chair, Information Sciences and Technology
- Robert D. Hume, Evan Pugh Professor of English
- Vivek Kapur, Professor of Veterinary & Biomedical Sciences
- Ping Li, Associate Director, Institute for CyberScience and Professor of Psychology, Linguistics, and Information Sciences and Technology
- Richard Marboe, Associate Director of Research Operations, Applied Research Laboratory
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• Charles Pavloski, Senior Research Associate, Meteorology
• Padma Raghavan, Associate Vice President for Research and Director of Strategic Initiatives; Director, Institute for CyberScience and Distinguished Professor of Computer Science and Engineering (Chair)
• Richard Rauscher, Director of Research Informatics and Computing, Penn State College of Medicine & Hershey Medical Center
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