Cornell University
Library

Re-Imagining IT at Cornell University

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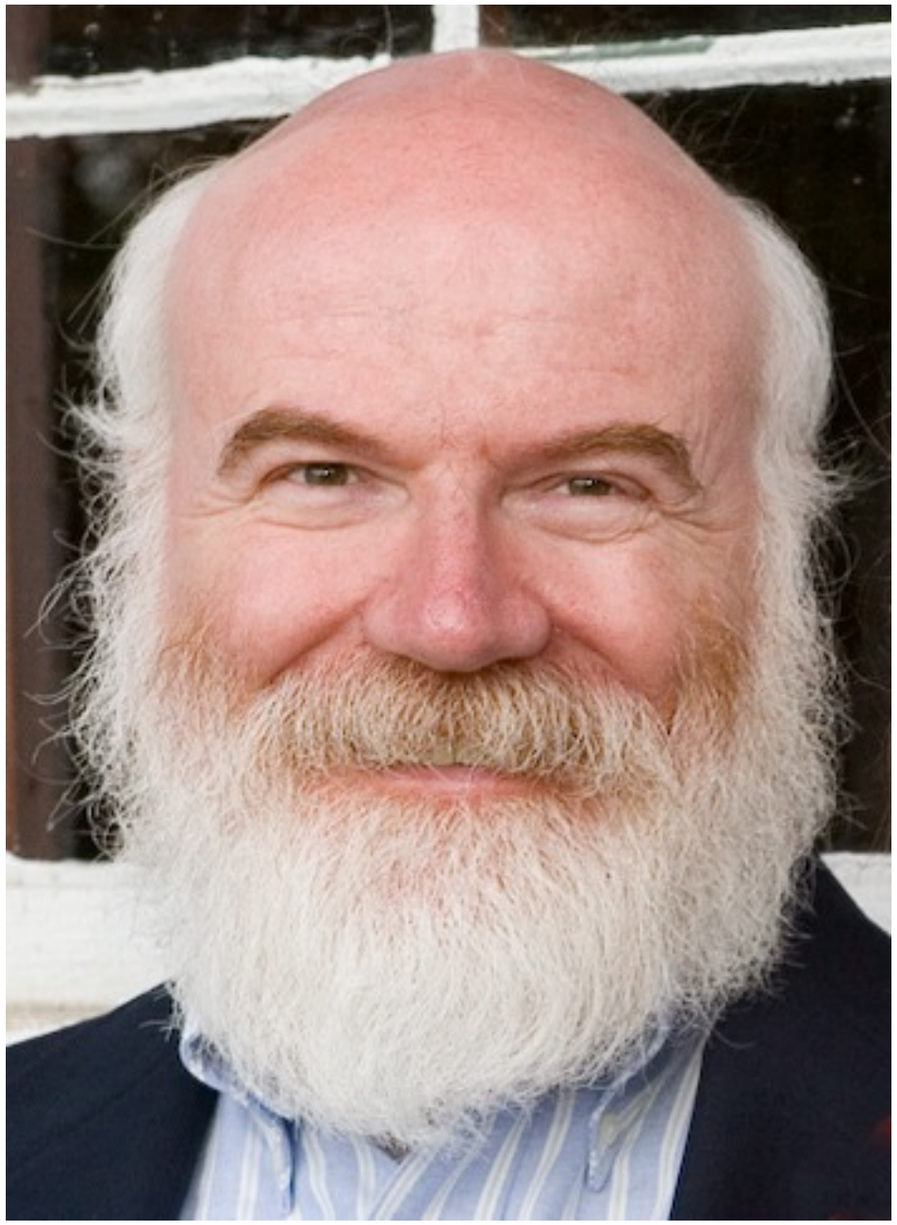

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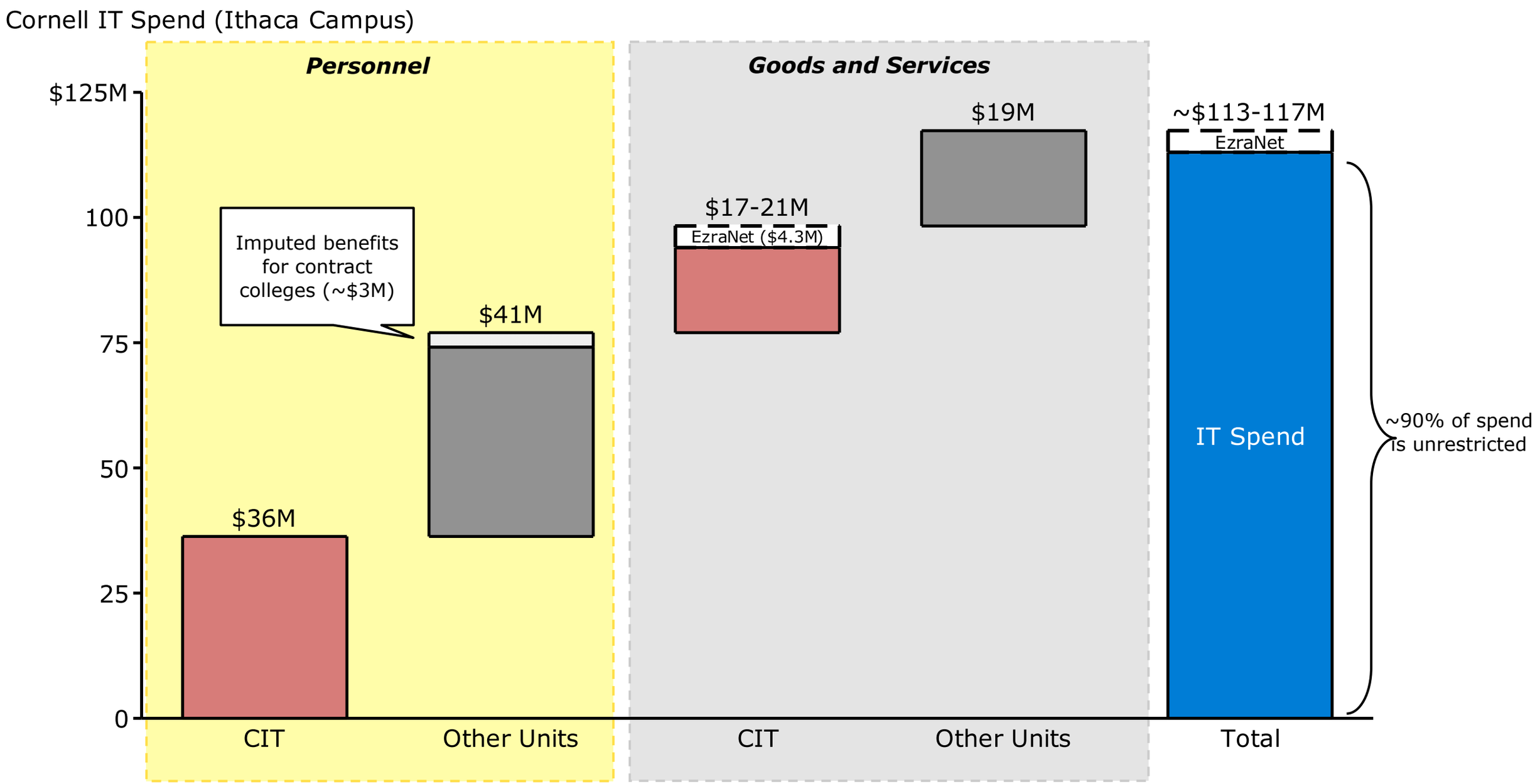
CORNELL UNIVERSITY
FOUNDED A.D. 1865

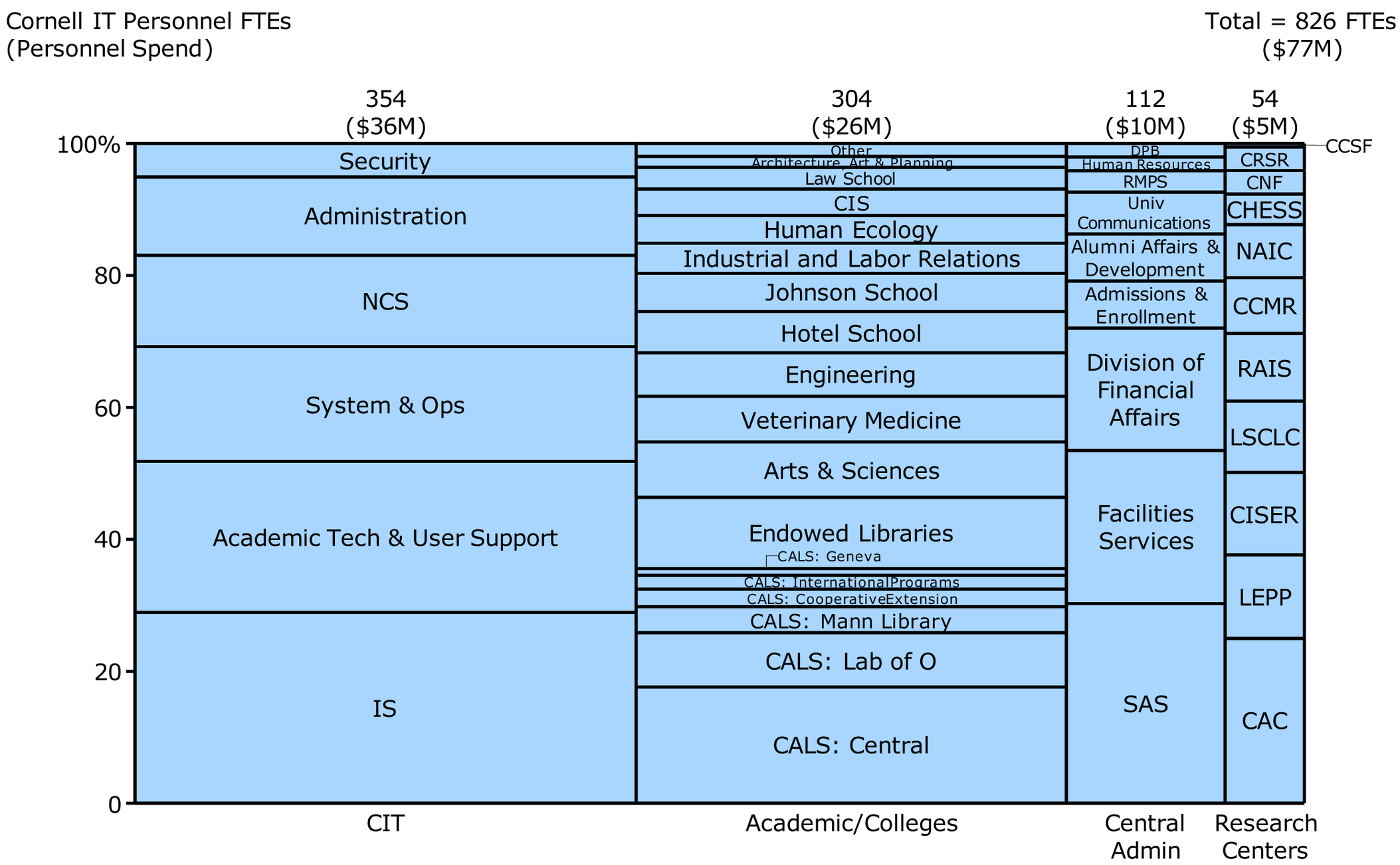
The Crisis

- As of June 2009, Cornell had a structural operating budget deficit of $130 million/year
- Significant savings had to be achieved within 1-2 years, and the full deficit eliminated by 2015
- Cornell brought in Bain Consulting to do a high-level review of the administrative budget

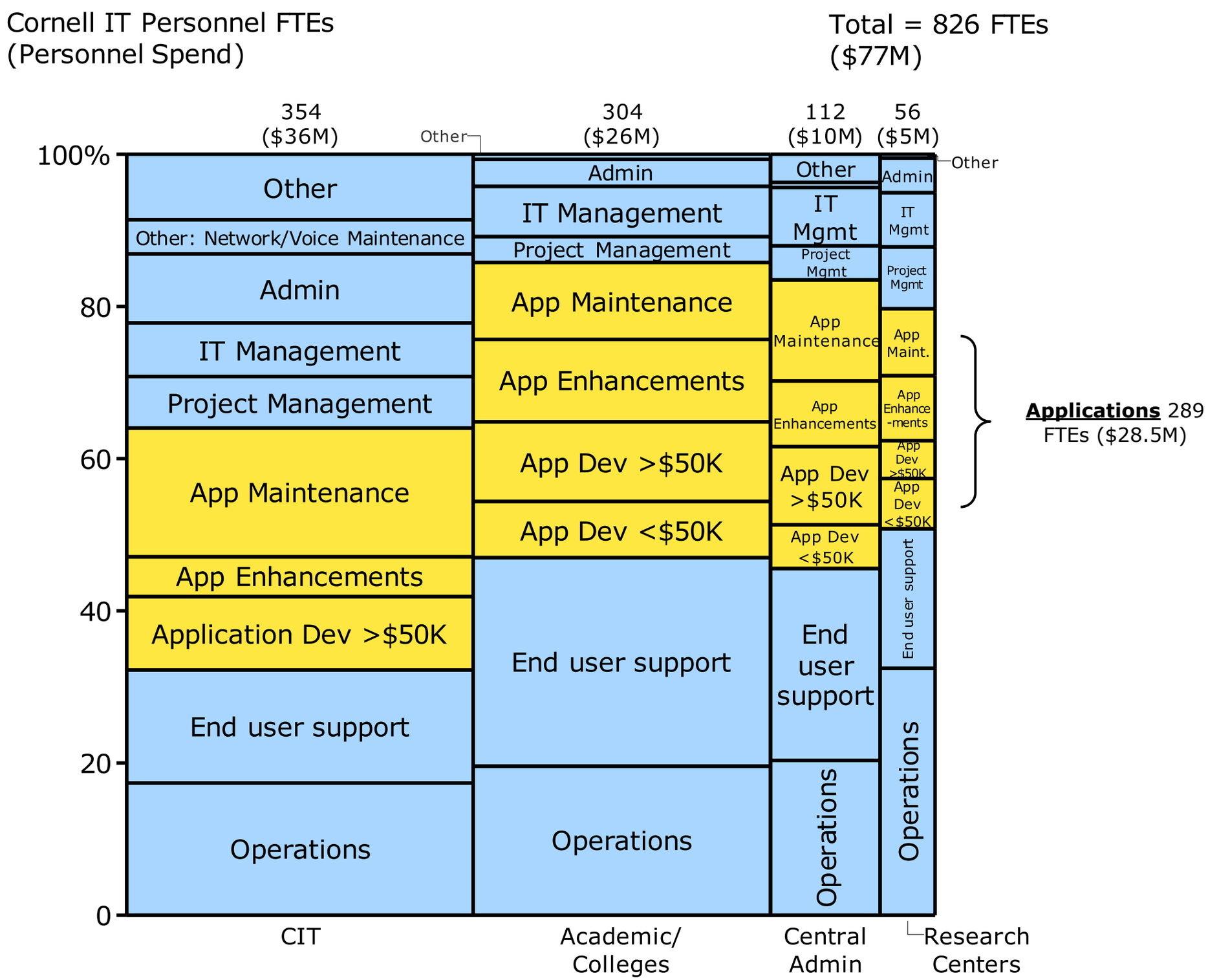
In 2009, Cornell University was spending approximately $113-117M on IT (Ithaca campus)



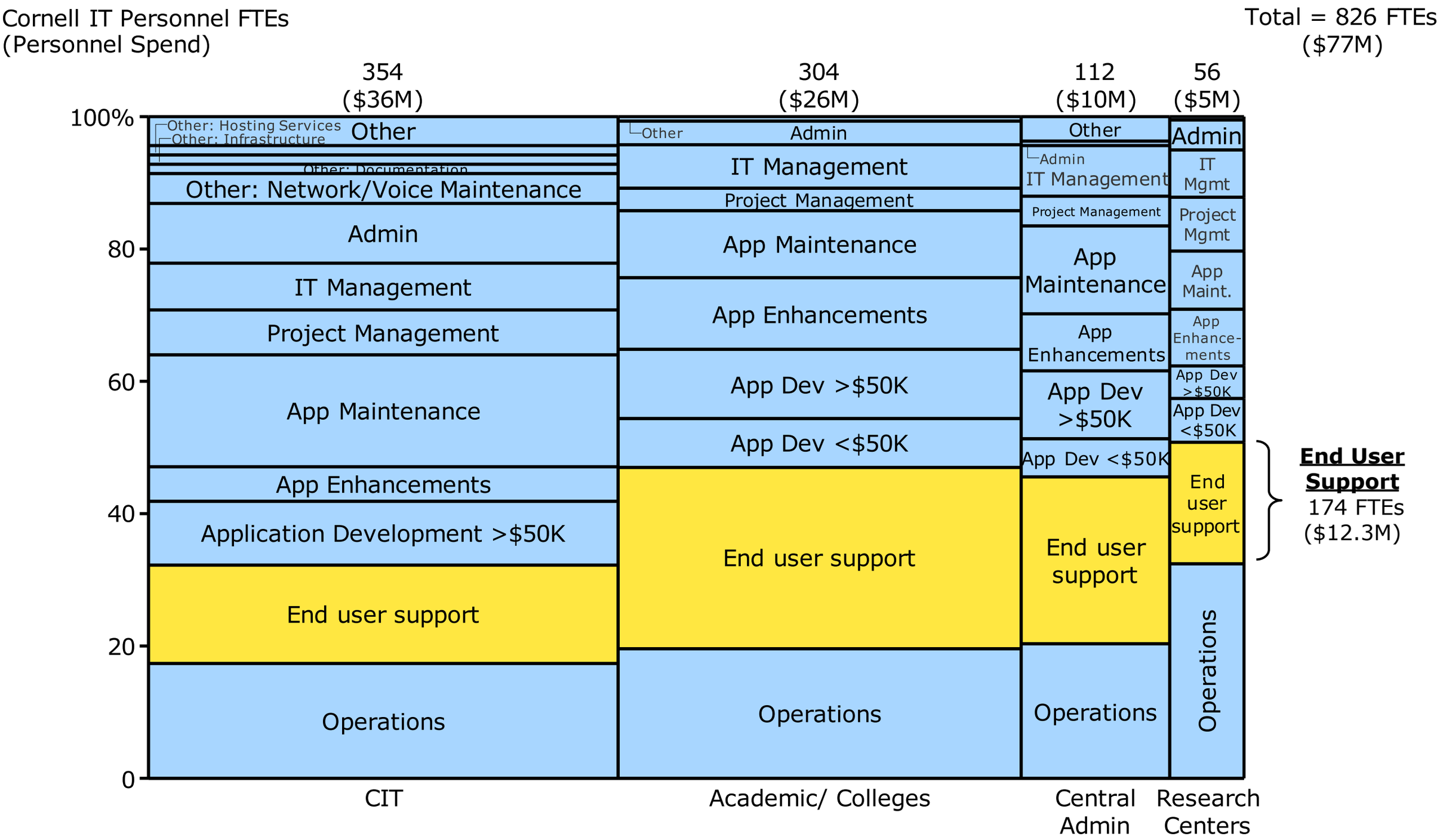
Personnel spend of $77M was spread across multiple units



Approximately 289 FTE and ~$28M was spent on developing, enhancing, and maintaining applications



End User support represented ~174 FTEs and $12.3M in personnel spend



Key IT Issues Identified

- **IT governance:** Complex environment with poorly defined roles and decision rights. This resulted in fragmentation of IT resources, redundant systems, and inconsistent standards
- **End-user Support:** Spend on desktop support (~ $7M) was nearly twice benchmarks
- **Application Development & Maintenance:** Over $28M spent, but campus was generally unhappy with applications
- **Servers & Storage:** infrastructure was fragmented and not virtualized, adding costs

High-Level Analysis

- By comparing Cornell's IT personnel spend with standard industry metrics, it was estimated that changes in IT could save $10-$13 million/yr out of a total administrative savings of $90 million/yr
- This was the third highest area of potential savings in the Cornell budget after procurement and reducing supervisory overhead

Crisis = Opportunity

We already knew

- Many individual units had created independent IT support groups - some very small
- CIT cost recovery models made central services appear expensive compared to local solutions
- There was no budgetary or governance support for close collaboration among units or between units and CIT
- That if we could break down the budgetary and governance barriers, we could deliver much more efficient and effective IT services to all of Cornell

Developing the Reimagining IT Recommendations

- University IT governance and decision rights: Analysis by team of five - two faculty, interim CIO, Dean of CIS, and a college officer
- End-User Support: Analysis by team of seven - IT specialists from across campus and one college officer
- Application Development & Maintenance: One senior CIT manager, two unit managers, and me
- Servers and Storage: Delayed, eventually team of five IT specialists developed recommendations
- Team results were then summarized as recommendations in the Reimagining IT Vision document by the three leads and accepted by the President and Provost

The Gory Details for each area

Governance

IT had a complicated governance structure with unclear roles and decision rights

Cornell IT Committees

- ITMC/CITO
- SFG/COGS
- Data Stewards
- ACAC/ASPC
- CCD
- FABIT
- Sec Council
- PS Directors

IT Providers

- CIT
- CAC
- CISER
- External providers

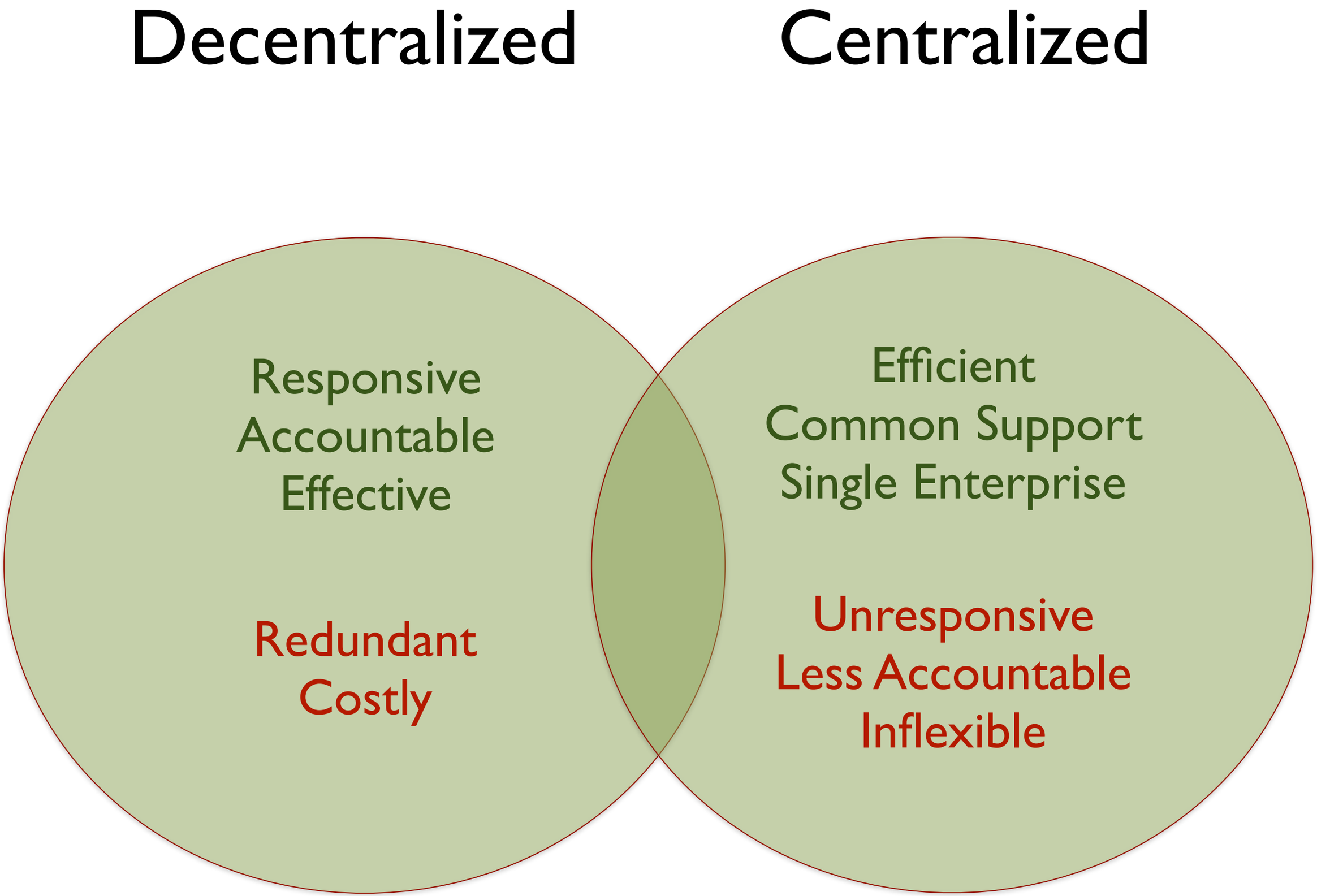
IT Consumers (and providers)

Admin units	Academic units	Research centers
CIT	Arts & Sciences	CAC
DFA	Engineering	CISER
Facilities	AAP	LEPP
Admissions	CALS	LSCLC
AAD	Human Ecology	RAIS
Communications	ILR	CCMR
RMPS	VET	NAIC
Libraries	JGSM	CHESS
Pres/Prov Offices	LAW	CNF
Research Admin	Hotel	CRSR
	CIS	CCSF
	Grad School	
	CESS	

Governance model leads to redundant systems and inconsistent standards

Problems with existing governance model

- Lack of visibility and control between central IT and units
- Units viewed CIT as expensive
- Duplication of services across CIT and units
- Few common IT standards across Cornell
- Individual unit decisions led to fragmentation of services and infrastructure


Decentralized
Centralized
Responsive
Accountable
Effective
Redundant
Costly
Efficient
Common Support
Single Enterprise
Unresponsive
Less Accountable
Inflexible

Striving for the best of both worlds

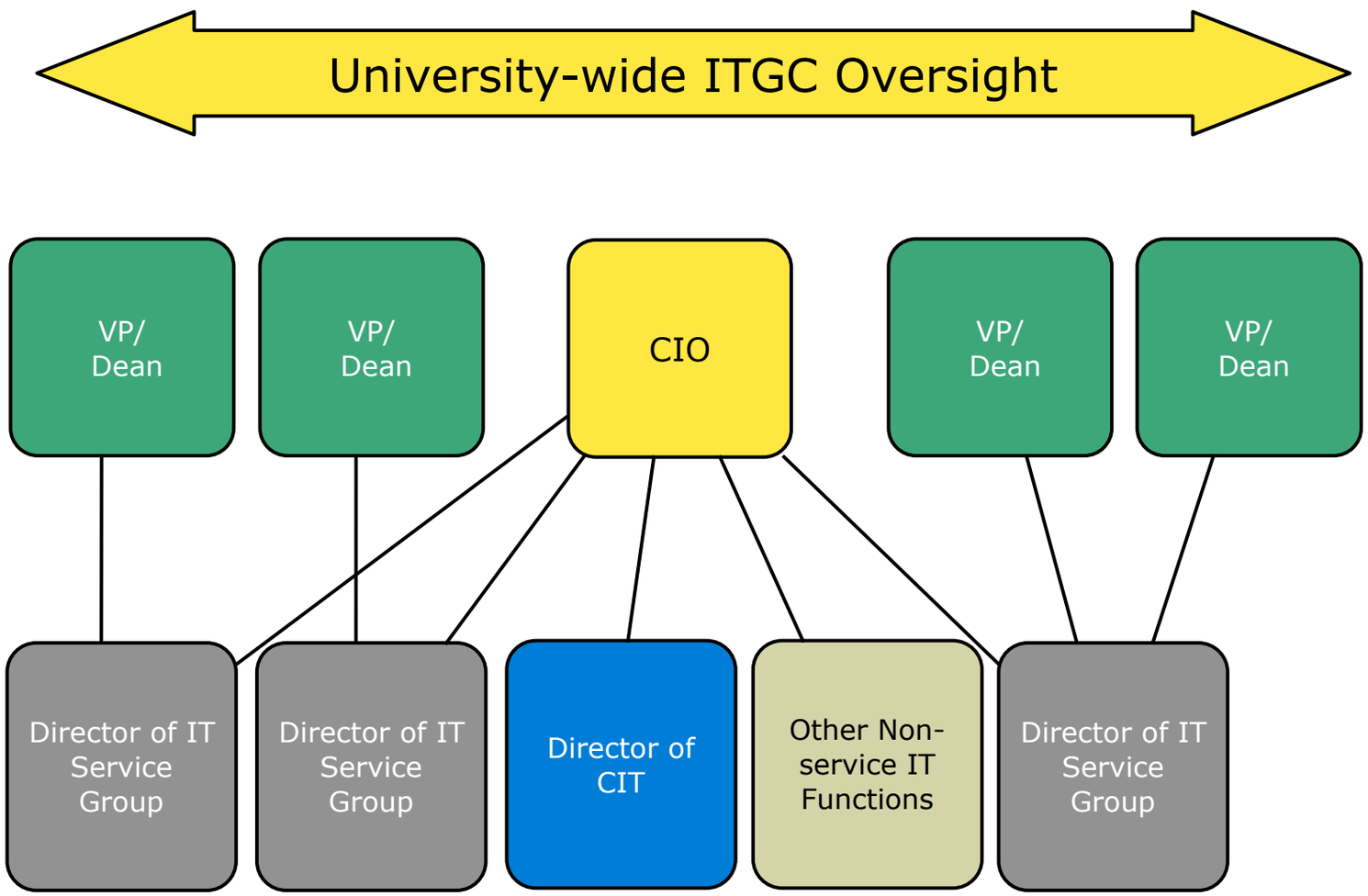
- Coordination, not centralization
- IT is embedded in and reports to the individual units, and can create flexible local solutions
- Common Cornell-wide services and infrastructure mean that distributed IT groups don't have to build everything from the ground up

Three part solution

- IT Governance Council (Provost, CFO, Dean of CIS, and CIO) and CIO provide coordination and oversight for all non-sponsored research IT at Cornell
- Central IT provides university-level common services and infrastructure
- IT Service Groups provide comprehensive appropriately sized unit-level support (25-50 IT staff members per service group)

Proper governance will ensure that the ITGC has oversight of IT activities across campus

High-Level Reporting Relationships



IT Service Groups:
Service Groups are a redeployment of local IT functions and may be shared by multiple units. They develop unit-specific applications, perform in-person support, and host walk-in support centers.

Description

- ITGC makes strategic decisions that apply campus-wide
  - Establishes IT priorities
  - Approves campus-wide staffing requirements
  - Approves annual IT budget
  - Drives accountability for an effective IT organization
- CIO has reporting relationships with CIT and IT service groups
  - Sets campus-wide standards and ensures best practices are followed
  - Enforces basic service level campus-wide
  - Recommends staffing roles and levels for CIT and IT service groups
- IT service group directors also report to VPs/Deans
  - Unit leaders ensure that service groups are meeting units' programmatic needs
  - Unit leaders monitor and enforce unit-specific service level agreements

Project oversight

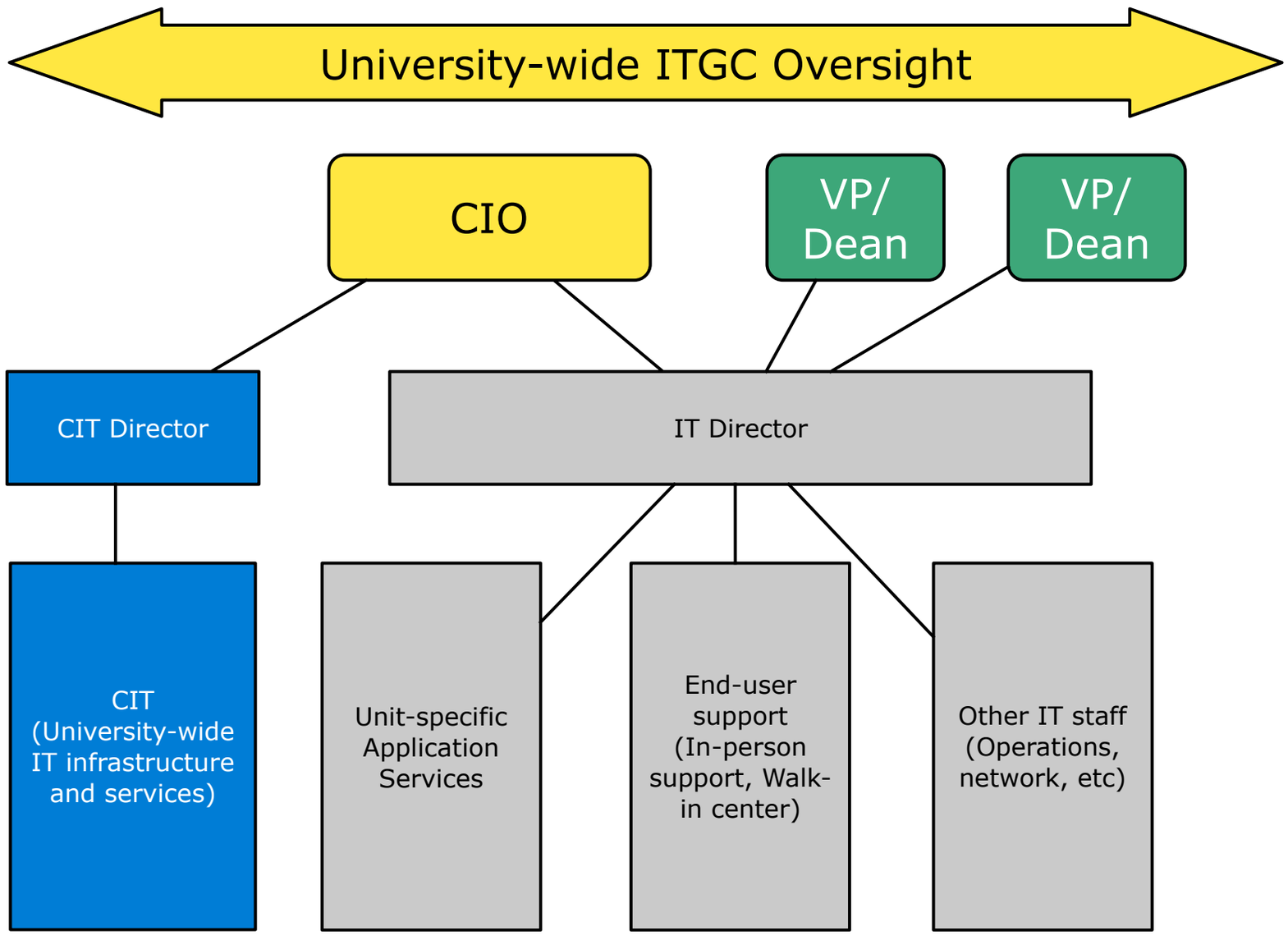
- All projects over $25K must submit formal business case; <$100K can assume approval
- Projects over $100K must receive approval from ITGC subcommittee (Administrative, Academic, Infrastructure)
- Projects over $250K must receive ITGC approval
- Will require IT staff time tracking and project management

University-level IT Services

- The central IT group coordinates with all the IT service groups to provide comprehensive services to the university
- CIT is not just a standalone, subsidized cost-recovery unit
- Central services provided at marginal, not fully-burdened, cost

Service Groups will support unit needs; CIT will provide campus-wide services

Service Group Delivery Model

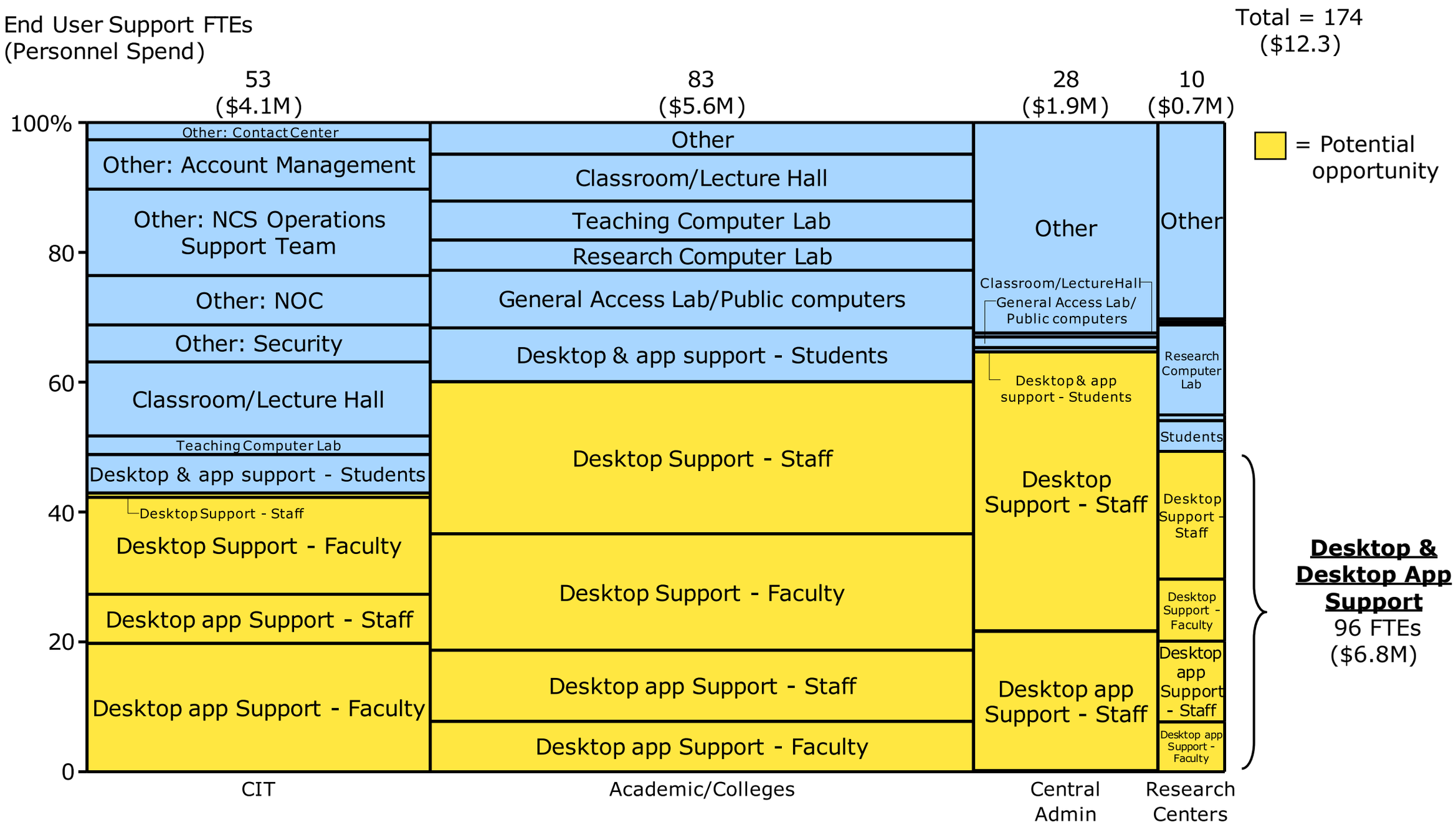


Description

- All service groups will provide agreed levels of support to constituent units
- IT Directors will lead and manage service groups
  - Directors accountable to CIO and constituent VPs/Deans
- Development teams will focus on unit-specific applications
  - Primarily research-funded and smaller, unit-specific projects
- Support teams will provide in-person support
  - Dispatched from the University-wide service desk
- Service groups may also include a limited number of other approved IT staffers
- Service groups may serve as "centers of excellence" for specialized campus-wide services

End-User Support

End-user support is concentrated in desktop and application support

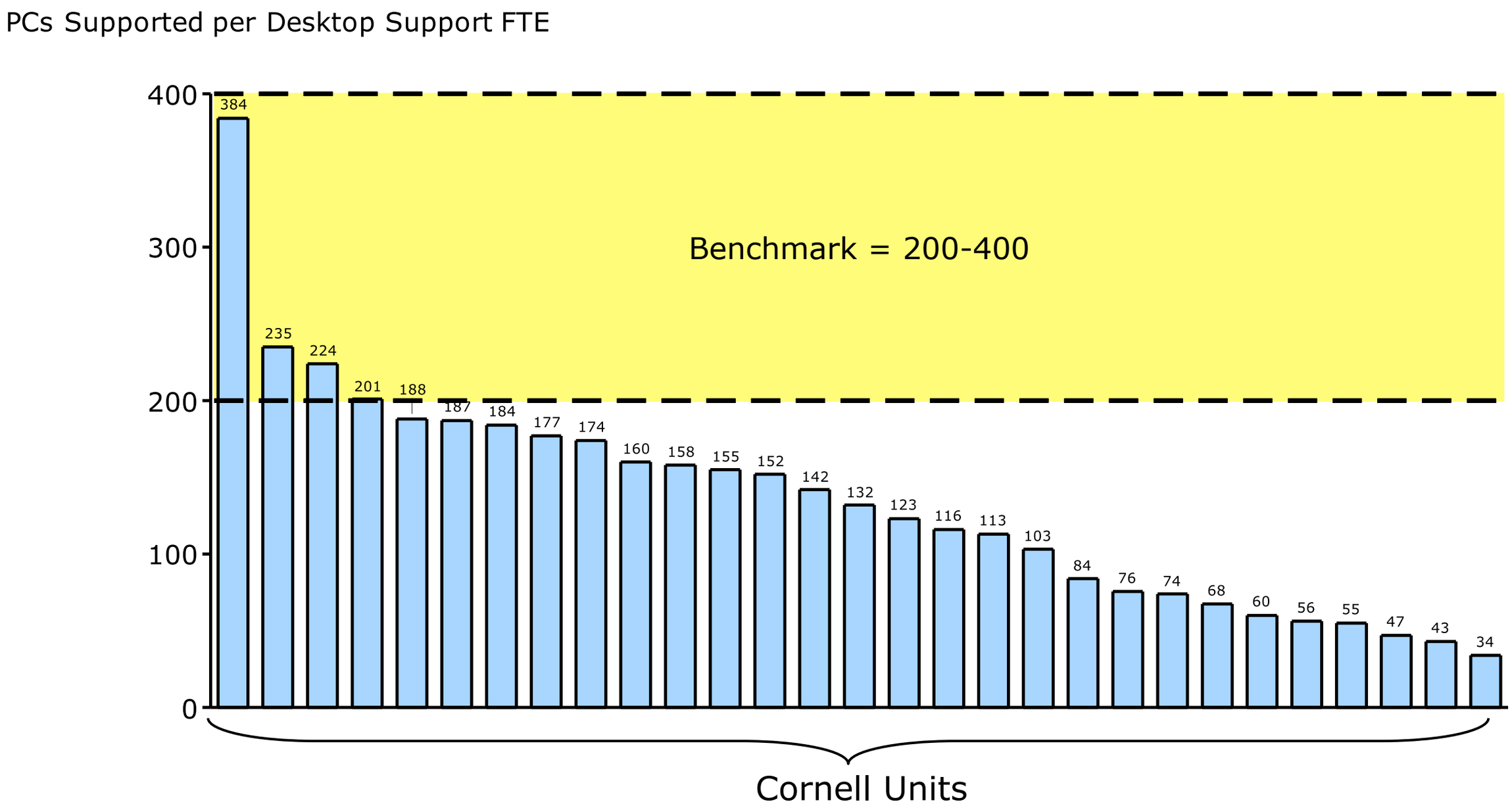


There are at least four different models for desktop support at Cornell

	Unit Employees		Outsource	
	Dedicated desktop support	Ad-hoc desktop support	Other campus unit	Third-party
Description	• Employed by unit • Job description is to provide desktop support	• Employed by unit • Job description is not to provide desktop support; however, provide support as needed	• Another campus unit provides desktop support • Often transfer of money occurs to pay for services	• Hire a third party firm to provide desktop support to unit
Benefits	• Usually sit in same building and offer **high levels of service** and responsiveness • Can hire and deploy individuals with capabilities unique to unit	• **Cost effective** for smaller units	• Keeps **money within Cornell** • Allows **smaller units** to have **access** to dedicated **desktop support** staff	• Can be **less expensive** • Provides **access to capabilities** that may not be present in unit
Concerns	• Can be **expensive** for small units	• Often **not informed about desktop standards**, rules, and regulations (for example: don't have admin passwords)	• **Confusion over roles and responsibilities** of contracted units • Often **not cost effective**	• **Security** of Cornell data and systems

Results in inconsistent delivery of desktop support

Units have varying degrees of scale in desktop support, most below benchmarks



Standardizing devices is critical in controlling costs in support services

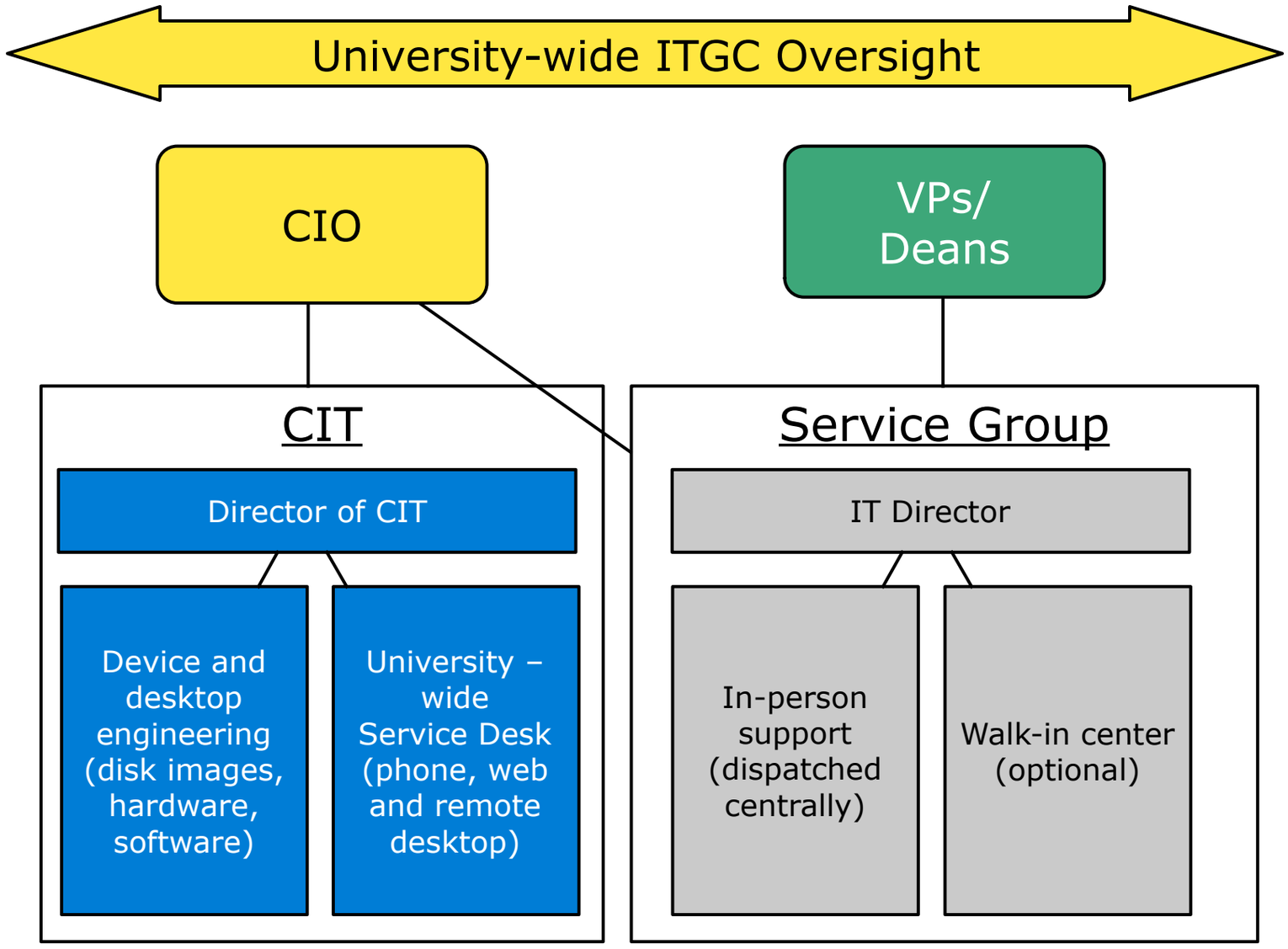
Device list not exhaustive

Device type	Recommended Standards (excludes sponsored funds)	Implications
• Personal computers (desktop or laptop)	• **Small set** of certified PC vendors (e.g. 1 PC, 1 Laptop, Mac) • Certified vendors provide repair	• Single source, **central purchasing** of personal computers that meet university-wide standards
• Operating systems	• **Small group** of standard versions (e.g., 1x each Windows, Mac, Linux)	• Operating systems installed through **central desktop engineering** teams
• Mobile devices	• **Preferred vendors & multiple** devices • Paid for with Cornell stipend • **Limited support**	• Users **call cell phone carrier** for technical support to resolve issues
• Printers	• **One vendor** with outsourced hardware support • **Shared multi-function** units are standard	• Printer types (makes, models) **determined centrally** • **Standard replacement cycle** adhered to by units

Exceptions will require full cost recovery and multiple levels of approval

Staffing changes will reflect regional clustering of end-user support within Service Groups

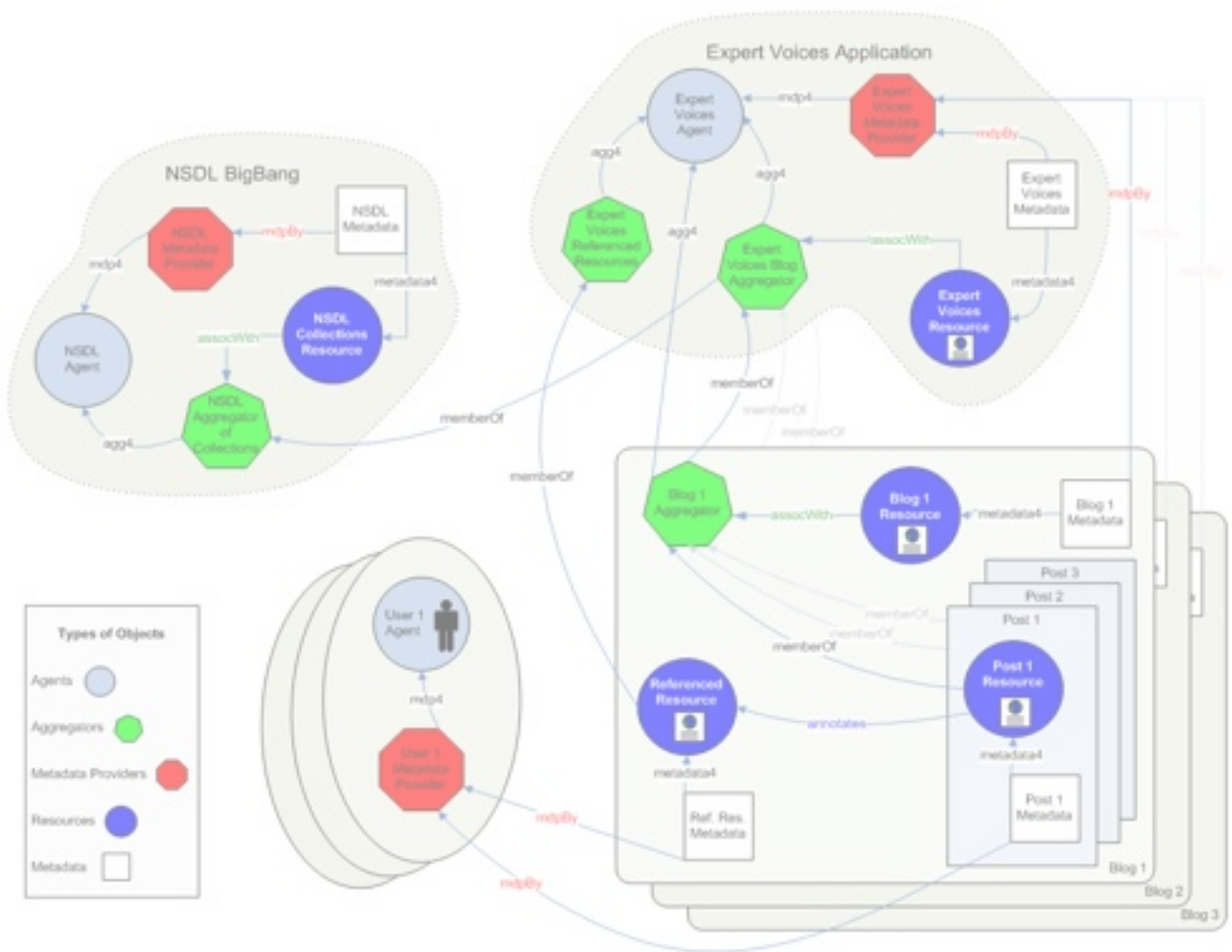
High-level delivery model



Description

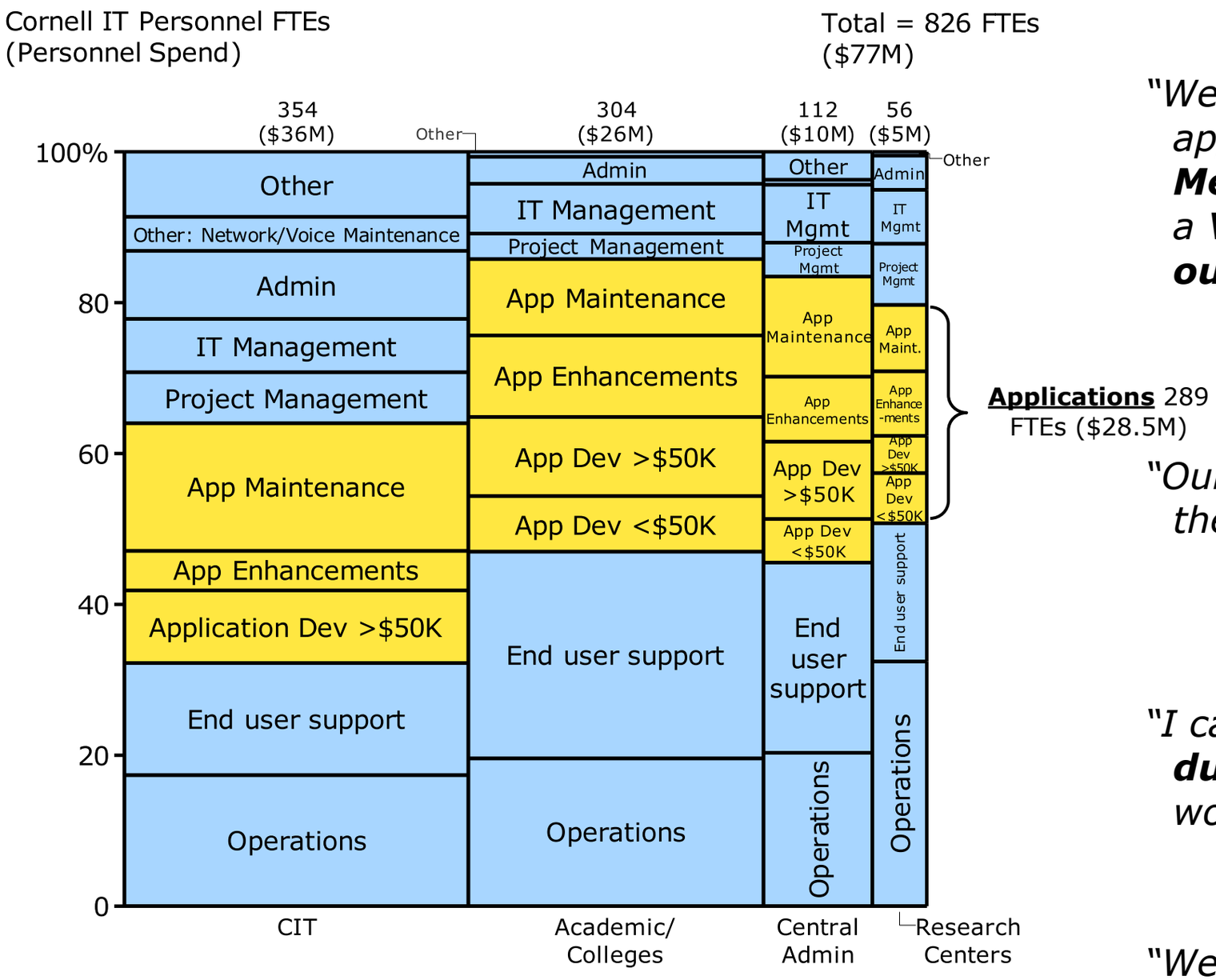
- Central service desk provided by CIT
  - Serves as initial point of contact and resolution for campus
  - Will use phone and remote desktop technologies
- Service groups provide clustered end-user support for units
  - In-person desktop support teams dispatched by the service desk
  - Strategically placed walk-in centers will be available in certain units
- CIT also provides device and desktop engineering
  - Maintains device standards, disk images and non-standard hardware/ software
- New/enhanced capabilities and roles
  - Example: University-wide service desk, walk-in support centers

Application Software Services, Development, Maintenance and Support



Approximately 289 FTE and ~$28M is spent on developing, enhancing, and maintaining applications

Cornell spends significant money on applications…



…with questionable results

*"We **spend enough money** on applications **to get a gold-plated Mercedes Benz**, but what we've got is a **Volkswagen** with the **engine falling out**."*

Dean

*"Our **spend is not commensurate** with the applications we have."*

Vice President

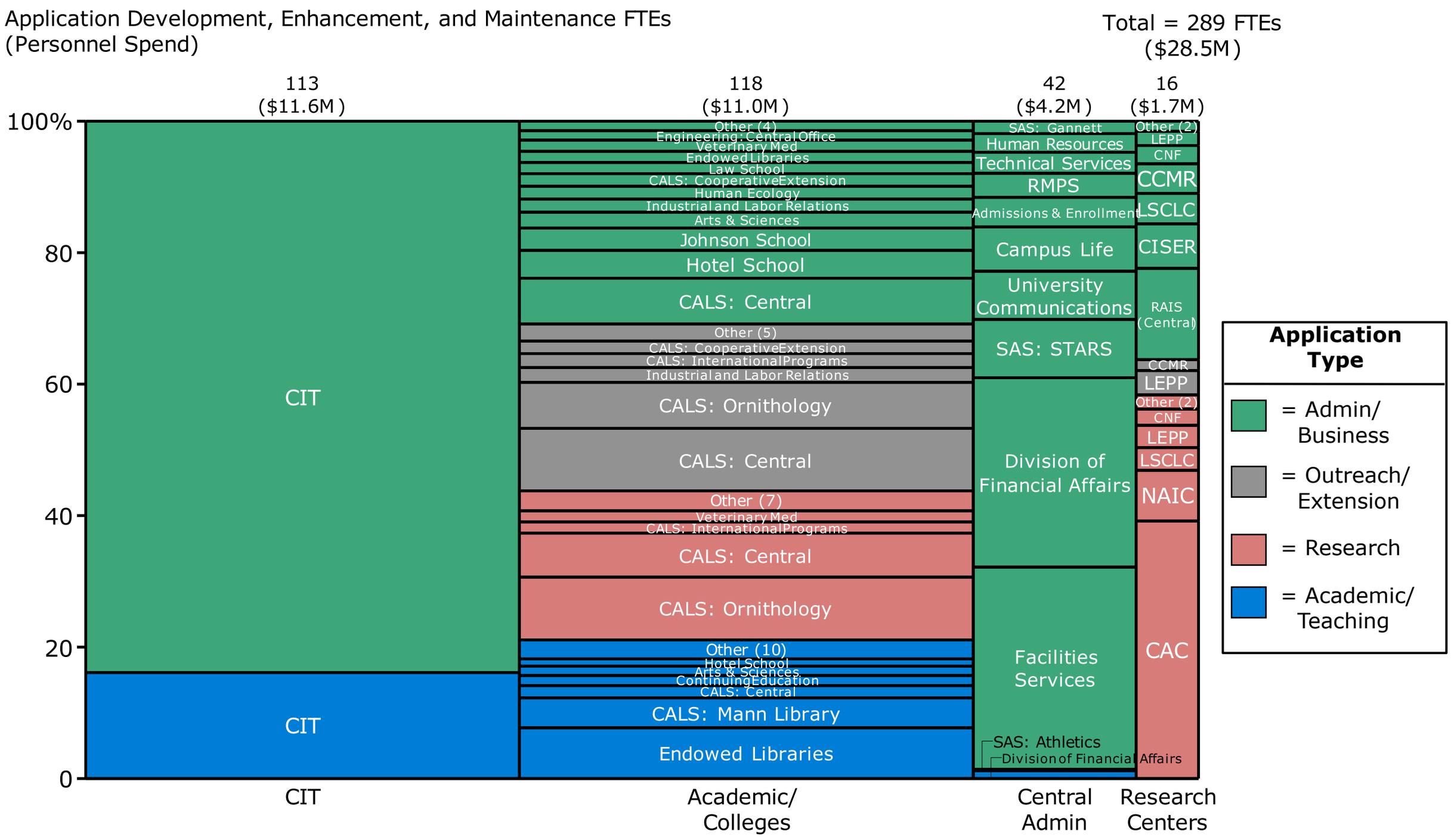
*"I came into this project assuming **duplicative application development** would be a **big opportunity**."*

College IT employee

*"We put a lot of money into building apps to **fill needs not met by the university**."*

College Officer

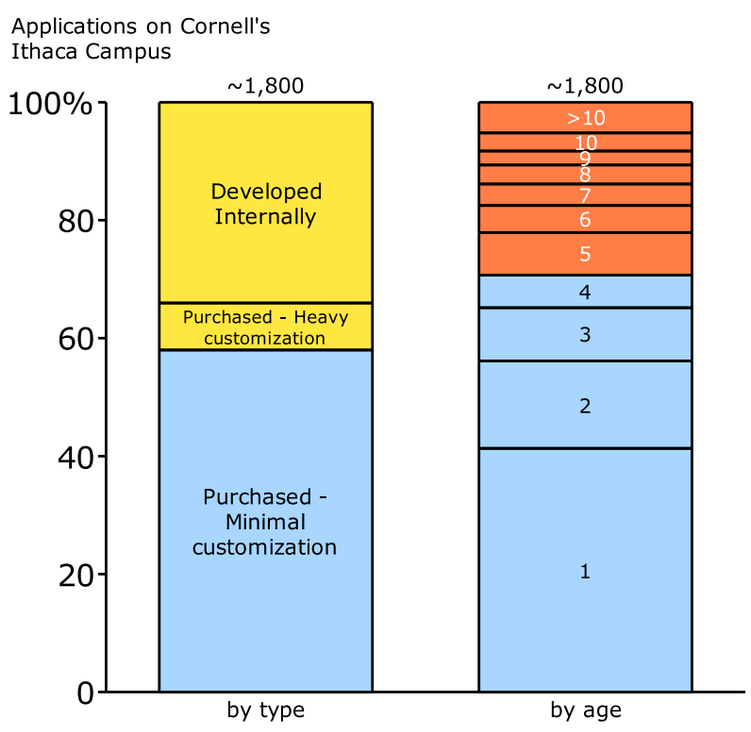
Application development and maintenance resources are highly fragmented



Fragmentation of application development results in inefficiencies

Poor life cycle management

- Cornell is maintaining over **1,800 applications,** many >5 years old
- **~50%** were **developed internally** or customized heavily



Duplication of applications

- *"We are all **rewriting the same applications**. We can't come together, not even some of the smaller colleges, and agree on what our end user requirements should be."*

College IT Director

Example

- Three colleges collaborated to develop a SIP (Salary Improvement Plan) application
- They agreed on ~80% of development but ended up with three unique solutions
- Application was not designed for University-wide standards & scale

Multiple standards for applications

- *"We **don't need gold-plated** applications**, when bronze will do**."*

College Officer

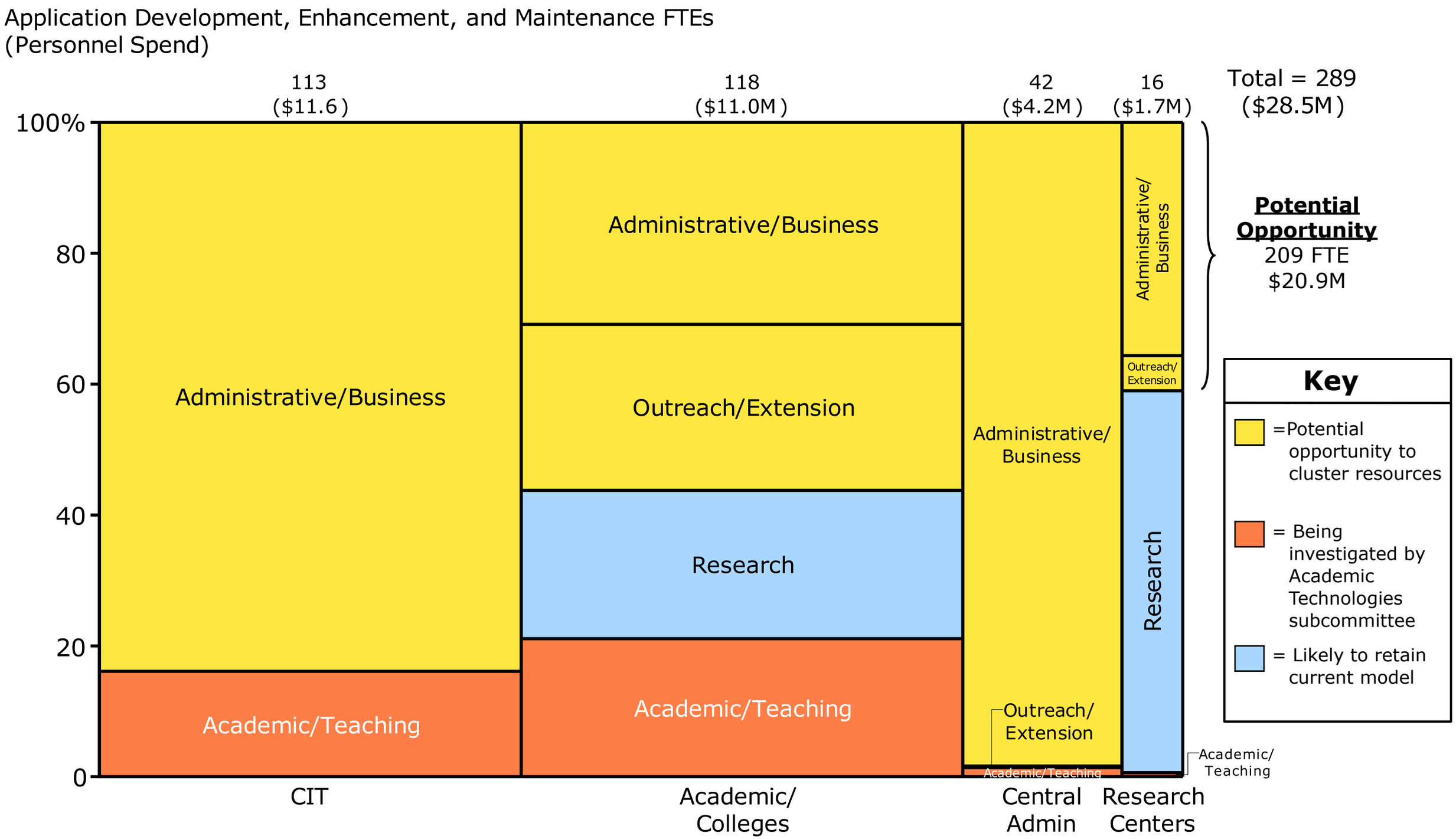
Example

- One unit developed an application to monitor and track compliance
- Animation and other "bells and whistles" were added when vanilla application would have sufficed

Change Business, not just IT

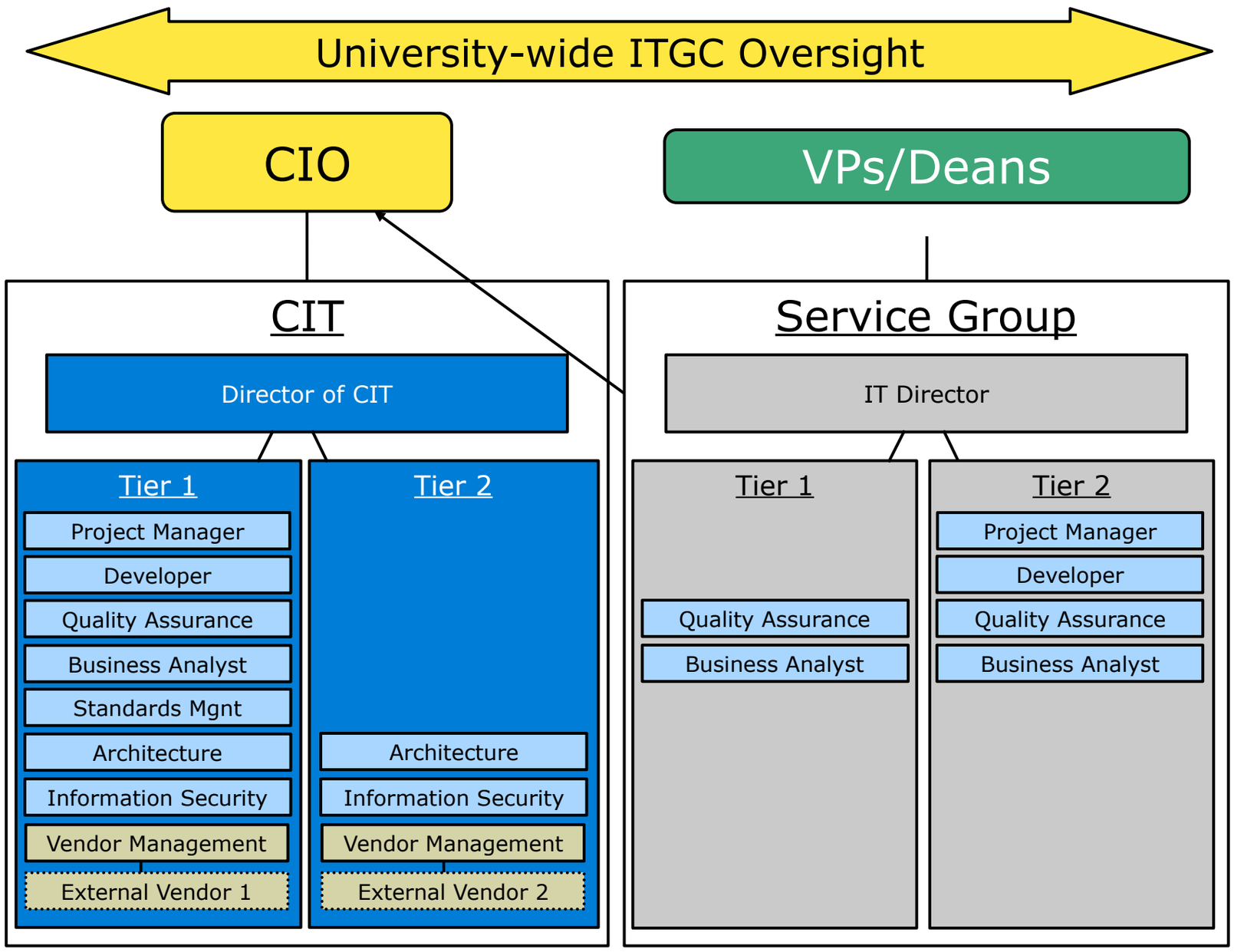
"Developing or molding a solution to meet existing, often historical or idiosyncratic practices, is ineffective and expensive. We instead need to make careful choices of standard IT systems and services while simultaneously redesigning the affected work practices so that they are effective with the new systems and services."

Admin/bus and outreach/extension applications offer the largest opportunity for clustering



Staffing will reflect changes in oversight and focus on clustered development

High-level delivery model



Tier 1 = Applications with high cost and campus-wide impact

Tier 2 = Applications with lower cost and/or unit-specific impact

Description

- CIT provides campus-wide solutions
  - Application development/sourcing for solutions that are either large or impact multiple units
  - Architecture and information security for entire campus
  - External vendors and outsourced solutions
- IT service groups provide unit-specific solutions
  - Development resources focused primarily on smaller, unit-specific solutions
  - Staffing levels subject to ITGC oversight
- New/enhanced capabilities and roles in both CIT and IT service groups
  - Examples: architecture, vendor management, business analyst

Servers and Storage

Improved Centralized Services

- Convert to blade servers, reducing power and cooling requirements
- Virtualize most servers, and include “on demand” services
- Develop uniform campus-wide storage solutions
- Cost-recover based only on incremental costs, not on overhead

What about Library IT?

Before Reimagining

- Library had two independent IT organizations
- Individual IT staff were scattered in unit libraries and departments
- IT units had defined areas of responsibility, but there were both gaps and overlaps
- The IT units were a mix of IT-related activities

DIVISION OF LIBRARY INFORMATION TECHNOLOGIES

Organizational Chart

Application Development

arXiv

Don Beyer
Gerda Shank
Jacob Weiskoff

Electronic Publishing and Institutional Repository

David Ruddy, Director of Electronic Publishing
Dave Fielding
Shin-Woo Kim
Martin Lessmeister

Enduring Access

Bill Kehoe

Web Development

Adam Smith, Coordinator
Matt Connolly
Jim Reidy
Steve Rokitka
Rick Silterra

Administration & Project Management

Mary Beth Martini-Lyons
Fiona Patrick
Jinhee Roper
Ira Revels

Oya Rieger
AUL

Application Development
Simeon Warner
Director

IT Infrastructure
Marty Kurth
Director

IT Infrastructure

Contracted Services Management

Oliver Habicht

Desktop Services

Pete Magnus, Coordinator
Amy Blumenthal
Andrew Goldman
Laura Heisey
Rick Lightbody
Joe Richardson

Digital Media Group

Danielle Mericle, Coordinator
Mira Basara
Shakhya Bodhiswama
Rhea Garen
Bronwyn Mohlke

Systems Architecture

Surinder Ghangas, Coordinator
Peter Hoyt
George Kozak
Lydia Pettis

Unit Library Technology Consulting

Michelle Paolillo

Supporting learning and research in the life sciences, agriculture, human ecology and applied social sciences

Information Technology Services

The Information Technology Services (ITS) group (map it) at Mann Library is responsible for all computer equipment in the library, which consists of approximately 130 public access computers and 120 staff computers. Mann Library ITS also develops digital collections and other online teaching and research resources for the library, the College of Agriculture and Life Sciences, and the College of Human Ecology. Mann Library ITS is responsible for over 25 servers that run a variety of systems developed in Mann Library including:

- CALS Research Portal
- Cornell University Geospatial Information Repository (CUGIR)
- e-Clips: Cornell's Premier Digital Video Clip Collection
- The Essential Electronic Agricultural Library (TEEAL)
- Virtual Life Sciences Library (VIVO)
- USDA Economics & Statistics System

Cornell University Library IT (CUL-IT) became one of the first four IT service groups at Cornell

What is IT?

- Does it include digitization services and metadata creation?
- What about ePublishing support (arXiv, Project Euclid, eCommons)?
- For web development: Are the graphics and content creation functions part of IT?

Under Cornell's new IT structure, none of those activities are IT

What are the consequences?

- Library avoids oversight burden by separating out IT-enabled activities from core IT activities
- This forced a very specific division of responsibilities into two high-level units: CUL-IT and Digital Scholarship Services
- Web development is split into two different organizations: one for programming, and one for content and design

CORNELL UNIVERSITY LIBRARY
Information Technologies

Internal Advisors

Data Exec

Carl A. Kroch University Librarian
Anne R. Kenney

Chief Information Officer
Ted Dodds (as of Jan '11)

Information Technology
Dean B. Krafft
Director and Chief Technology Strategist

Digital Scholarship Services
Oya Rieger
Associate University Librarian

Mary Beth Martini-Lyons
Jinhee Roper

Mann Library
Mary Ochs

MANN LIBRARY INFORMATION TECHNOLOGY SERVICES
Jon Corson-Rikert
Director

Nick Cappadona
Brian Caruso
John Cline
John Fereira
Brian Lowe
Frances Webb

Special Projects
Manolo Bevia
Jim Blake
Elly Cramer
Huda Khan
Joseph McEnerney
Stella Mitchell
Anup Sawant
Melissa Wallace
Rebecca Younes
Timothy Worrall
Miles Worthington

LIBRARY SYSTEMS AND DISCOVERY SERVICES
Chris Manly
Coordinator

Peter Hoyt
George Kozak
Lydia Pettis

MANN LIBRARY INFORMATION TECHNOLOGY SERVICES OPERATIONS
Holly Mistlebauer
Coordinator

Donna Callais
Bill Klinko
Gabriel Plaine

Special Projects
Chris Westling

WEB PROGRAMMING
Adam Smith
Coordinator

Matt Connolly
Jim Reidy
Rick Silterra

SOFTWARE DEVELOPMENT AND INTEGRATION, and REPOSITORY ARCHITECTURE/SERVICES
Simeon Warner
Director

Dave Fielding
Bill Kehoe
Shin-Woo Kim
Martin Lessmeister
Thorsten Schwander
arXiv programmer, vacant

DESKTOP SERVICES
Peter Magnus
Coordinator

Amy Blumenthal, *Services Coordinator*

Andrew Goldman
Laura Heisey
Rick Lightbody
Joe Richardson

CONTRACTED SERVICES MANAGEMENT
Oliver Habicht
Director

LAW LIBRARY WEB SERVICES
Sasha Skenderija
Developer

Updated September 2010

What's Working for the Library?

- Developers now share common web services, code repository, and practices
- Creating common service monitoring system and system configurations
- All Library units can draw on complementary expertise of formerly separate units
- If anyone in the Library has an IT problem, CUL-IT owns it

What challenges remain for Cornell?

- A lot remains to be implemented, including university-level services, a central helpdesk, and 3/4 of the service groups
- There is no current plan for supporting academic technologies or making investments in academic IT
- Agreement on a new university budget and cost allocation model is critical to all the new IT efforts
- ITGC review for projects could discourage new efforts - even when they result in better outcomes
- Many IT efforts currently work well - the proposed changes could break them

Acknowledgements

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Tim Lynch and Paul Davis, Applications Workstream

All the members of CUL and CUL-IT

and all the many other Cornell faculty and staff who continue to contribute to the Reimagining IT effort