BUSINESS INTELLIGENCE IN THE DLC

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What is business intelligence?

On a technical level, business intelligence revolves around data management. Data scientists, analysts, and engineers can often fall under the umbrella of business intelligence, implementing data and reporting solutions.

However, wholistically, business intelligence is about making your business smarter. BI professionals live in the narrow space between technical and business expertise, working directly alongside business owners and stakeholders to examine existing processes, offer strategic insights, and maximize efficiency.

Data is growing exponentially

The size and complexity of our data is reaching a point where simple tools like Excel are not sufficient to manage it. While you can teach almost anyone to use Excel, complex data analysis and software engineering are skills that require years of education and experience.

The right tool for the job

Just as you would not expect a plumber to build a skyscraper, we should not expect an accountant to build a custom data management solution.

That's why hiring a business intelligence expert is the fastest path toward solving your data problems.
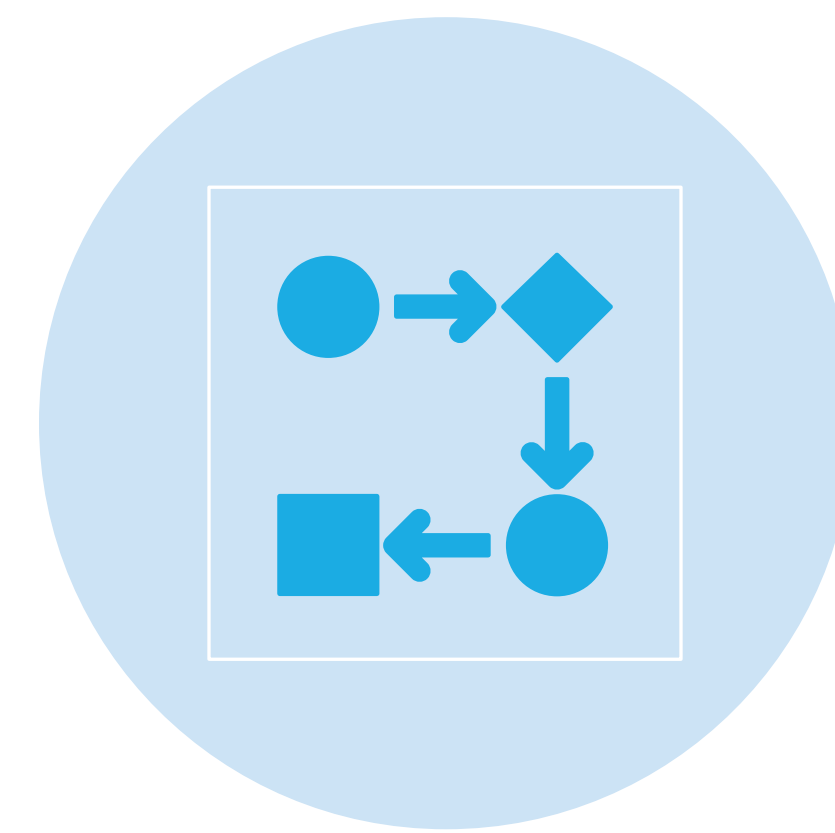
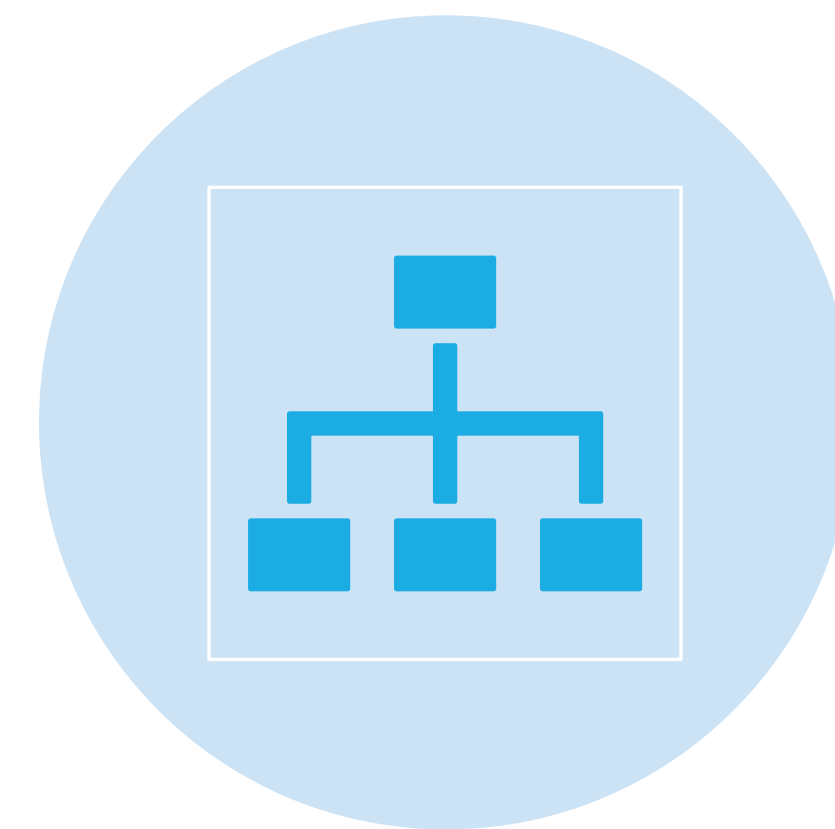# How are DLCs currently struggling with data?

Inability to get the data they need

Inefficient ways of collecting, managing, and sharing data

Issues with data accuracy and timeliness

Lack of documentation surrounding data and business processes

How can business intelligence help?

A BI expert can navigate MIT data sources like the MIT Data Warehouse to extract and organize your business data.

Data can be imported into reporting tools, like Quickbase and Tableau, to present data in a clear and concise way.

Unlike consultants or an IT professional in a central office, a BI expert hired in _your_ office works with _you_ on a **daily** basis, understanding your business needs.

How is BI helping Biology?

Current Projects:

o Tracking undergraduate researcher payroll hours

o Consolidation and management of cost objects

o Personnel data management

o Service center billing management

Planned Projects:

o PI portfolio forecasting

o HQ finance and budget management

o HR data management

o EHS and Facilities data management

o Faculty recruiting data management and process improvements

Challenge: Monitoring Payroll Suspense

When an employee or student is paid from a cost object that ends or is closed, if they are not moved onto a new cost object manually, SAP automatically places them onto a "suspense" account.

Tracking people on suspense requires running reports against SAP or checking eSDS. Most departments (including the central Payroll office) track this information in Excel, where it is someone's job to look up information and manually update a spreadsheet each month.
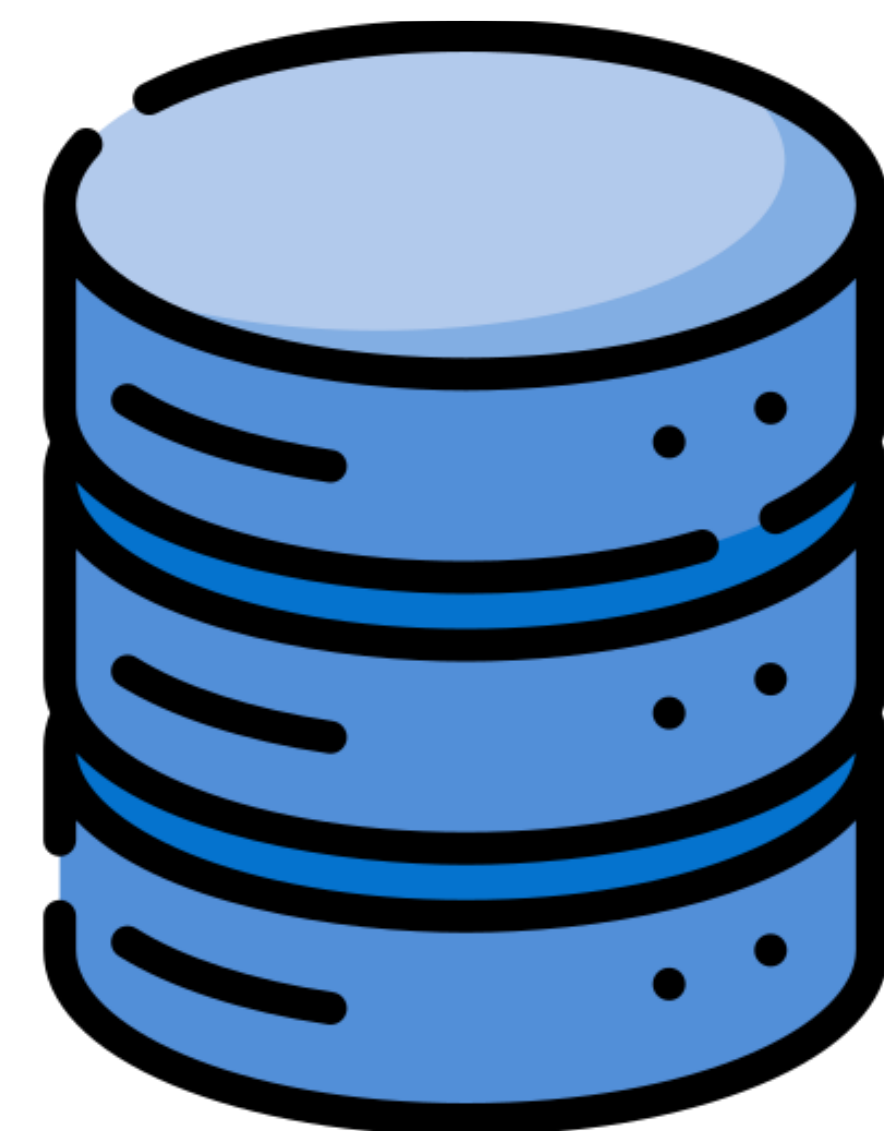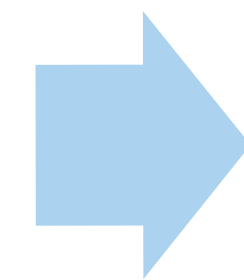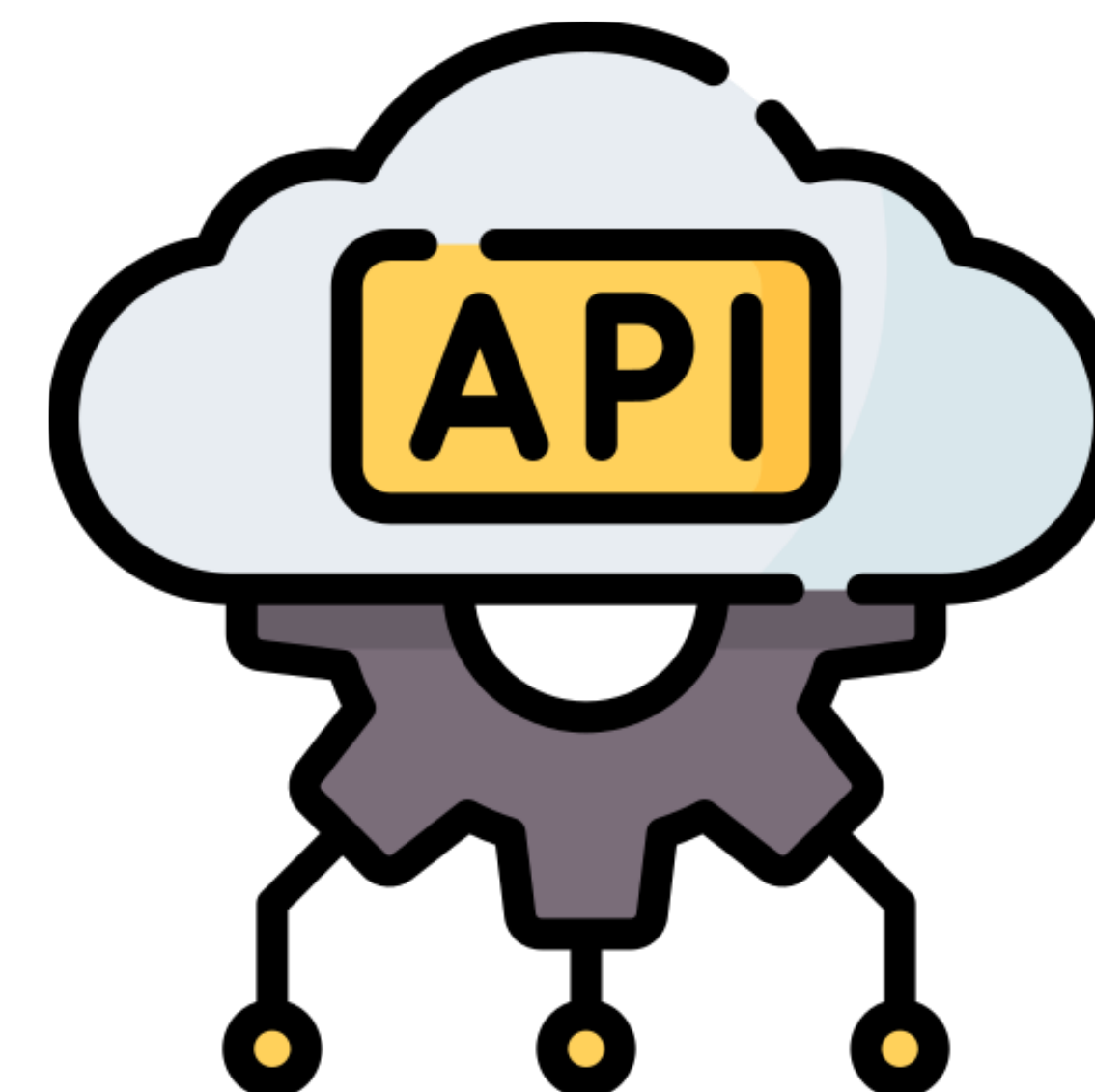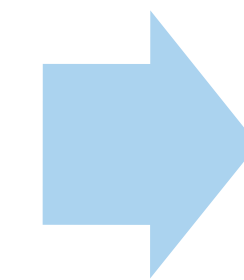
Solution: Data Integration with Quickbase
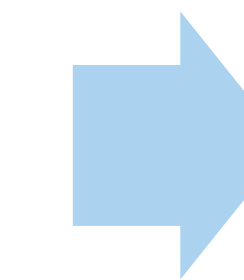

Python
- Custom ETL code

MIT Data Warehouse
- SQL query

Quickbase API
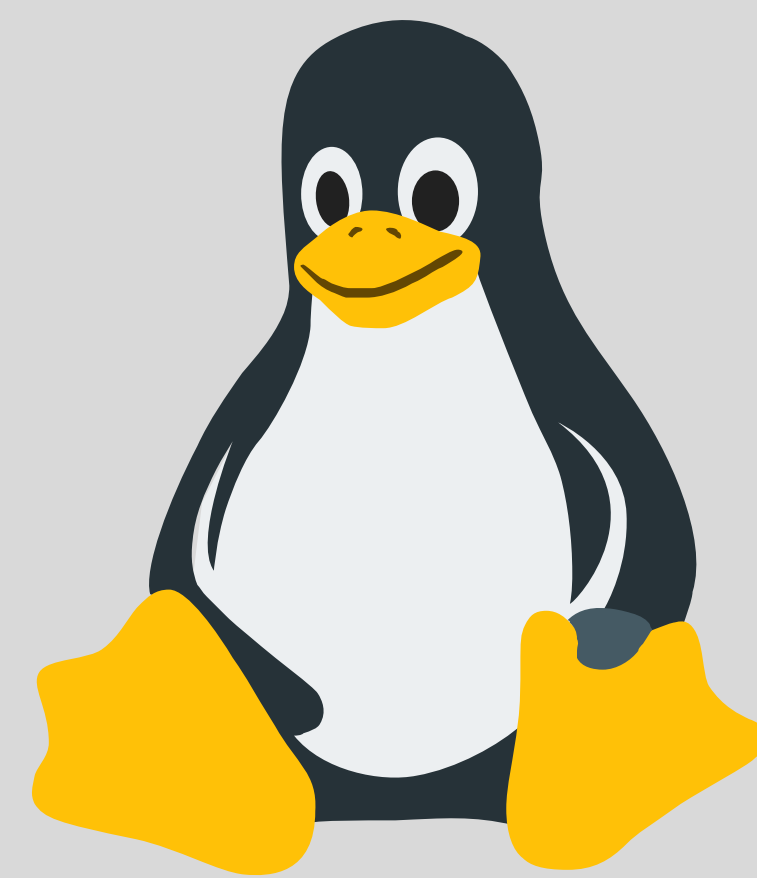- Upserts data from MIT DW

Quickbase
- Stores data

Python ETL code stored on Linux virtual computer on AWS runs daily

Amazon Web Services

EC2 Linux Instance

Python

Daily Update

Monitoring Payroll Suspense

BI Solution:

People on suspense are automatically added and removed from Quickbase, eliminating the manual tracking process.

AUTOMATED REPORTING

Age	Name	MIT ID	Title	Supervisor	Start	End
86	Dalrymple, Russell	900000000	Postdoctoral Fellow	Seinfeld /Jerry	08-01-2024	10-31-2025
72	Steinbrenner, George	900000001	Program Scientist 3	Costanza /George	08-15-2024	08-31-2024
55	Bania, Kenny	900000002	Research Assistant	Seinfeld /Jerry	09-01-2024	01-15-2025
55	Abbott, Mickey	900000003	Program Scientist 3	Kramer /Cosmo	09-01-2024	09-30-2024
41	Peterman, J.	900000004	Postdoctoral Associate	Benes /Elaine	09-15-2024	08-31-2025
31	Ross, Susan	900000005	Postdoctoral Associate	Costanza /George	09-25-2024	08-31-2025
25	Drake, Scott	900000006	Research Assistant	Seinfeld /Jerry	10-01-2024	01-15-2025
25	Puddy, David	900000007	Program Scientist 3	Benes /Elaine	10-01-2024	01-31-2025
11	Chiles, Jackie	900000008	Research Assistant	Kramer /Cosmo	10-15-2024	01-15-2025
10	Sacamano, Bob	900000009	Postdoctoral Fellow	Kramer /Cosmo	10-16-2024	10-15-2025

Monitoring Payroll Suspense

BI Solution:

Financial and/or administrative staff are alerted by Quickbase as soon as someone falls onto the suspense account.

notify@quickbase.com   3:51PM
SUSPENSE NOTIFICATION: Sacamano, Bob in the Kramer Lab
To: Tyler Brezler

The person listed below has fallen on suspense. Please log into Quick Base if you will be moving this person back onto their previous account, or if you know the new account they should be placed on.

Go to Quick Base:
https://mit.quickbase.com/db/bumchacqz

Kramer Lab

Name: Sacamano, Bob
MIT ID: 900000009
Title: Postdoctoral Fellow
Start: 10-16-2024
End: 10-15-2025

Challenge: Monitoring UROP Payroll

Undergraduate researchers can sign up to work in labs and be paid for their time. However, the amount of time they can work is limited per semester, and they are not supposed to exceed this limit.

Current MIT systems do not tally up total hours/dollars for the semester, so this must be tracked at the department level, primarily by staff looking up hours in the payroll system and manually entering them into an Excel spreadsheet.

Monitoring UROP Payroll

BI Solution:

UROP hours are automatically added to Quickbase each week, eliminating the manual tracking process.

AUTOMATED REPORTING

	Payroll Start ↓	Payroll End	Rate	Hours	Amount
Drake, Scott (2 payroll hours)					
UROP-2025FA-J Seinfeld (2 payroll hours)					
	09-30-2024	10-06-2024	16	20	$320.00
	09-23-2024	09-29-2024	16	20	$320.00
TOT				**40**	**$640.00**
Peterman, J. (1 payroll hour)					
UROP-2025FA-E Benes (1 payroll hour)					
	10-07-2024	10-13-2024	16	9	$144.00
TOT				**9**	**$144.00**
Puddy, David (2 payroll hours)					
UROP-2025FA-E Benes (2 payroll hours)					
	10-07-2024	10-13-2024	16	20	$320.00
	09-30-2024	10-06-2024	16	20	$320.00
TOT				**40**	**$640.00**

Monitoring UROP Payroll

BI Solution:

Students are automatically notified if they are close to exceeding their limit, or if they work beyond their limit. Manual tracking of hours is no longer required and staff only need to get involved when students exceed their limit.

AUTOMATED NOTIFICATIONS

N **notify@quickbase.com**   5:29 PM
UROP Funding Limit Warning
To: Tyler Brezler

Dear Mickey,

You're receiving this email because you are approaching the funding limit for your UROP project, which is $2,400.00.

Based on the hours submitted from your previous timesheet (this calculation does NOT include any hours worked this current week), your totals for the semester are:

Total Hours Worked: 112.5

Total Amount: $1,800

Percent of Limit Worked: 75%

Please track and plan your hours carefully for the rest of the semester so that you do not exceed your funding limit. If you are working a higher number of hours per week, please consider reducing the number of hours you work per week, or plan on wrapping up your project in conjunction with your remaining hours.

Challenge: Tracking Cost Object Changes

SAP does not provide users a way to be notified when cost objects are created, overrun, receive additional funding, or other changes. Additionally, data from Kuali Coes is tied into research cost objects, but does not provide user alerts either.

Tracking Cost Objects Changes

BI Solution:

Data from both SAP and KC is pulled in Quickbase and consolidated into a single app, making it easy for users to view all cost object data for the entire DLC in a single report.

AUTOMATED REPORTING

	Account ↑	Name	Sponsor	DLC	Type	Start
Baker /Tania (4 accounts)						
	1509100	Start-Up Funding: Biology		Biology	Cost Center	07-01-1992
	2602800	Swanson Career Development Professorship		Biology	Internal Order	10-01-1992
	2734956	Whitehead/Baker Scholar Allowance		Biology	Internal Order	07-01-2002
	3859662	Professor Baker Discretionary Fund		Biology	Internal Order	11-01-2019
Bell /Stephen P (4 accounts)						
	1509600	Start-Up Funds - Bell		Biology	Cost Center	07-15-1994
	2600055	Whitaker Chair Scholarly Allowance		Biology	Internal Order	07-01-2017
	2600107	D'Arbeloff-Improving Pedagogy Training		Biology	Internal Order	04-01-2021
	6948687	Mechanisms of replication origin licensing studied by real-time single-molecule fluorescence	NIH	Biology	Project WBS	09-20-2022
Boyer /Laurie Ann (19 accounts)						
	1520908	Boyer Start-Up Fund		Biology	Cost Center	07-01-2007
	1520911	Prof. Boyer-Vpr Support		Biology	Cost Center	07-01-2017
	1520913	Seed Grant In Biomechanics Program		Biology	Cost Center	07-01-2023

Tracking Cost Objects Changes

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Data from both SAP and KC is pulled in Quickbase and consolidated into a single app, making it easy for users to view all cost object data for the entire DLC in a single report.

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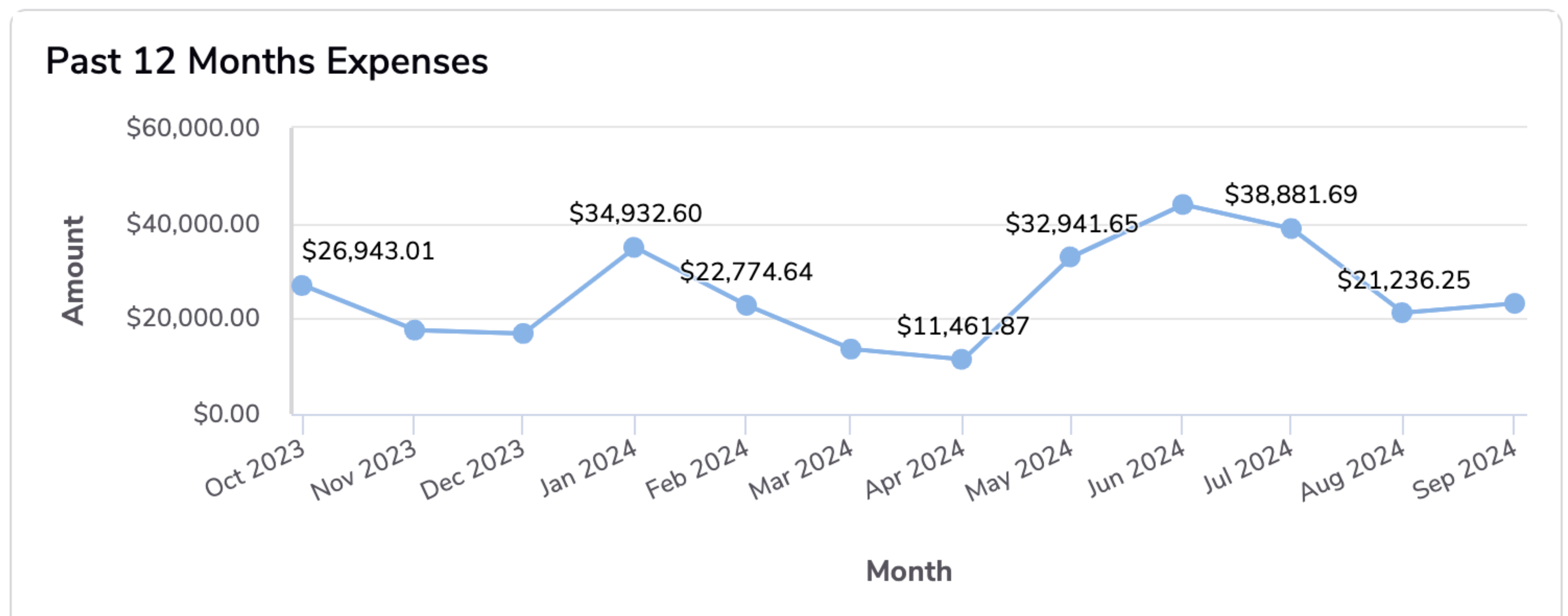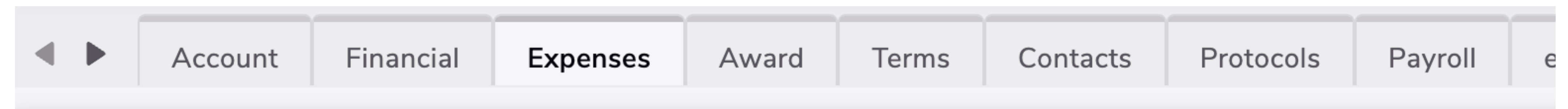
Tracking Cost Objects Changes

BI Solution:

Data from both SAP and KC is pulled in Quickbase and consolidated into a single app, making it easy for users to view all cost object data for the entire DLC in a single report.

AUTOMATED REPORTING

Tracking Cost Objects Changes

BI Solution:

Since data is imported on a daily basis, users are alerted within 24 hours when important changes occur to their cost objects.

AUTOMATED NOTIFICATIONS

How is Business Intelligence helping ChemE?

- Accounts, Balances & Transactions
- Aging Travel
- Budget vs. Expense by Functional Area
- Budget vs. Expense by Category
- ChemE People – Faculty Research Groups
- ChemE People – Scholarly Appointments
- Development Proposals
- Faculty Chairs
- Faculty Sabbaticals

- Fund Account Commitments
- Grad Student Appointments
- Grad Student Milestones
- Invested Funds Analysis
- ProCard Charges
- Research Volume by Sponsor
- Research Volume by Principal Investigator
- Student Fellowship Distribution
- Underrecovery

Challenge: Faculty Research Groups

o Financial management for a faculty research group requires appointment data for all members of the group

o Sponsored research staff appointment data is stored in SAP HR appointments and SAP Salary Distribution.

o Grad Student Appointment advisor and appointments data is stored in MITSIS and the Graduate Appointments Portal (GAP).

o Integrating the data into a single report is complex and requires frequent updates.

Faculty Research Groups

BI Solution:

- Import the faculty member's grad student advisee list from MITSIS into Quickbase

- Import grad student appointments from Graduate Appointment Portal (GAP)

- Utilize account supervisor data from SAP eSDS to import salaries for sponsored research staff who are supported by faculty member accounts.

- Manually enter administrative and financial staff for the faculty research group

Sponsored Research Staff and Grad Student Members

Group Member Name ↑	Job Title / Student Year	Start Date	End Date (Approximate Date for Students)	Annual Salary Research or Postdoc	Current Term Appointment Type	Current Term RA and TA Account Assignments
Brushett, Fikile (10 members)						
Employee (2 members)						
	Postdoctoral Associate	04-01-2024	03-31-2025	$		
	Postdoctoral Associate	04-01-2024	03-31-2025	$		
				$		
Student (8 members)						
	Grad Student	2024FA	2028SP		Fellowship	
	Grad Student	2021FA	2025SP		External Fellowship Research Assistant	3947115

Challenge: Grad Student Appointments

o Funding information for 250+ grad students is needed each term from faculty advisors and faculty support staff.

o Available appointments for each student are impacted by internal and external Fellowships, Teaching Assistant positions, banked funding from previous TA terms, faculty research grants and departmental grad student support commitments to faculty.

o Previous system involved storing data on multiple spreadsheets. Presenting a clear view of available options for each student was complex and time consuming.

Grad Student Appointments

BI Solution:

- Academic Office tracks student Fellowships, Teaching Assistant appointments, student banked funding and departmental grad student support commitments in Quickbase.

- A customized view of available options is presented for each student, enabling faculty support staff to easily select appointments for the upcoming term.

- Appointment data is approved by finance team, then routed to Academic Office.

Grad Student Appointment Funding

Challenge: Departmental Budget & Expense

o Department needs to track budget vs. expense by functional area and budget vs. expense by category.

o Nimbus does not have clear functionality to create budgets for functional areas within the department.

o Nimbus does not have functionality to create departmental budget by expense category.

Department Budget & Expense

BI Solution:

- Create budgets in Quickbase by functional area.

- Import expense transactions from SAP by account.

- Sum SAP transactions into functional areas by account.

Budget vs. Expense by Functional Area

☐	Functional Area ↑	FY25 Budget	FY25 Expense
☐	Academic Office		
☐	ChemE Headquarters		
☐	Communications Lab		
☐	Communications Office		
☐	Department General		
☐	Development		
☐	Diversity, Equity and Inclusion		
☐	Events		

Department Budget & Expense

BI Solution:

- Create budgets in Quickbase by expense category.

- Import expense transactions from SAP by Account and GL Account

- Sum SAP transactions into expense categories by Account and GL Account.

Departmental Expense by Category

Personnel / Operating	Expense Category	FY24 GIB	FY24 Dept	FY24 Total
Personnel	Faculty Salaries			
Personnel	Administrative & Support Staff Salaries			
Personnel	Academic & Research Staff Salaries			
Personnel	Employee Benefits			
Personnel	Student Stipends, Tuition & Fees			
Operating Expenses	Equipment & Facilities Charges			
Operating Expenses	Meetings, Seminars & Events			
Operating Expenses	Travel			
Operating Expenses	Other Operating Materials & Services			
Operating Expenses	Underrecovery			
Operating Expenses	Cost Sharing			
Operating Expenses	Other Support			

Challenge: Scholarly Appointments

o Postdoc and Research Scientist appointment process requires the collection of detailed information from faculty members and faculty support staff.

o Many appointments need to be renewed annually.

o Tracking up-to-date appointment start and end dates and Visa expiration dates is time consuming.

Scholarly Appointments

BI Solution:

- Gather the needed documents for incoming staff via Quickbase form, with required fields customized by appointment type.

- After scholar is hired, import data from SAP to maintain an up-to-date record of appointment start and end dates and Visa expiration date.

- When appointment end date approaches, send a notification to faculty member, scholar, administrative assistant and finance team member regarding appointment renewal.

Notification of Appointment Expiration

Appointment Expiration for ▓▓▓▓▓▓

○ **cheme-hr@mit.edu (via Quickbase) <notify@quickbase.com>**

Today at 9:42 AM

To: ▓▓▓▓

Good day,

The appointment for ▓▓▓▓ will expire on 01-15-2025.

Please reply to this email by **11-27-2024** to indicate whether the appointment will or will not be renewed.

Appointment:

Scholar's name: ▓▓▓▓

Original Hire Date: **01-16-2024**

Visa type: **F-1**

Visa expiration date: **01-15-2025**

Appointment Expiration Date: **01-15-2025**

Country of Citizenship: **India**

A copy of this email was sent to ▓▓▓▓, ▓▓▓▓, ▓▓▓▓, ▓▓▓▓, ▓▓▓▓, ▓▓▓▓.

How can BI help my DLC?

Finding space for a data professional on your team simply means making a case for it. Is your DLC drowning in data or finding it more and more difficult to manage your business processes? Do you feel like you're not getting the one-on-one support you need from the central offices?

Start a conversation with your DAF about the improvements that a business intelligence staff member could bring to your entire department. Have your DAF meet with leadership at the Dean's Office level to discuss the need for this role.

No budget for an additional headcount? Consider sharing a BI role with a partner DLC, where the solutions that are designed are for shared needs.

Contact us by email or Slack

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THANKS FOR STOPPING BY!