Complete Insight

The Path to Faster, Better Decisions

Updated: Jan/2020

www.solverglobal.com

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Introduction

The purpose of this white paper is to provide an overview of Solver. With frequent, automated cloud updates, the solution is continuously being enhanced to drive faster, better decisions across its global customer base. For the latest information or to discuss your specific needs, please contact your local Solver partner, visit Solver's web-site or email us at info@solverglobal.com.

Product Summary

Solver provides a single, cloud-based solution that automates reporting and planning processes, and supports faster and better decisions based on key information from across the organization's data sources.

Key benefits that Solver provides include:

- A top-rated Corporate Performance Management (CPM) solution by G2 based on user satisfaction
- Global partner channel with industry expertise to help you whenever and wherever
- Cloud software, support, and upgrades, packaged into a subscription price, providing unmatched ROI over traditional CPM solutions
- Built for business users to manage the entire solution without the need for developers
- Executive and management data from across the organization that is easily accessible in ONE place with Solver's intelligent *Data Warehouse*
- Solver's multi-tenant cloud application provides quick initiation, SOC 2 compliance, automatic software upgrades, and scalability at one's convenience
- Solver provides the power and the familiarity of cloud-connected Excel to solve the most complex formula and layout requirements for reporting and planning template designers
- Easy-to-use, pre-built integration to Power BI, the world's #1 visualization solution
- Fast and cost effective integrations provided with Solver's wizard-driven CSV, SQL, and prebuilt ERP/CRM Connectors
- Unlimited access to reports and dashboards from secure web portal
- Hybrid cloud option provides customers with real-time cloud reporting capabilities for their on-premise ERP system
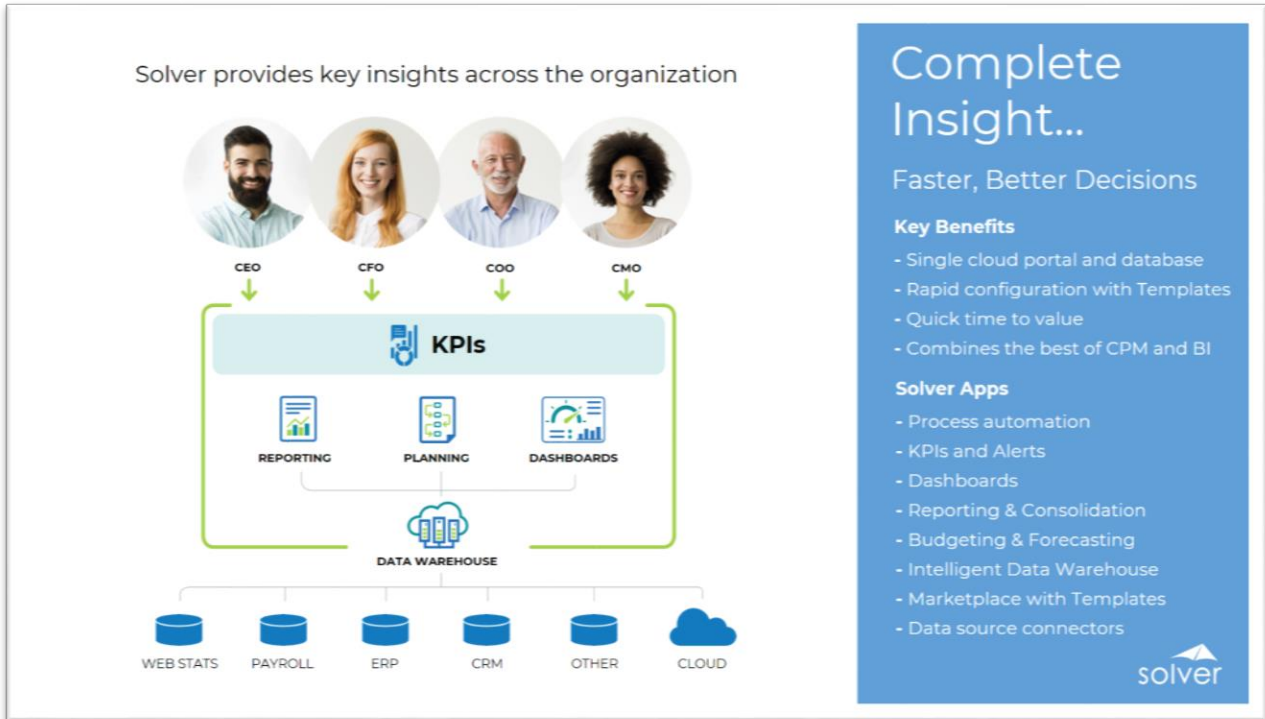
Figure 1. Solver architecture overview

Company Summary

Solver, Inc. is redefining the category of cloud-based reporting and planning. The Solver solution is built to enable faster and better business decisions across the entire organization. Solver combines financial and other key data into a single tool, powered by the most flexible report and planning form designer on the market. Organizations use this solution to automate and streamline financial and operational reports, consolidations, and budgeting and forecasting processes. Solver empowers users with complete insight that drives intelligent decisions and competitive advantages. Headquartered in the United States, Solver, Inc. has more than a dozen offices and hundreds of partners globally that provide local and industry expertise. To learn more, visit www.solverglobal.com.

Reporting

Solver *Reporting* consists of a modern *Web Portal* where users can run and view reports in their web browser, along with a flexible Excel add-in where power users design and edit reports. The latter has been designed with the latest Microsoft technologies and follows Microsoft best practices for interface design and usability.

Using Solver's modern, cloud-connected Excel add-in, power users (Designers) open and edit reports directly in Excel from the Solver *Web Portal*. While many CPM suites have two report writers, one in their web portal and one in Excel, Solver has a *single* report designer in Excel with a single web portal where end users access reports and where power users manage, run and publish reports. This provides Solver users with the "best of both worlds" by combining the unprecedented formatting, familiarity and formulas of Excel for report template <u>design</u>, with the ease-of-access, control and zero footprint of a web portal where end users can run and view reports.

Solver *Reporting* is a powerful solution for financial reporting and consolidations, as well as operational reporting, giving your managers one single location to access all key their critical business information.

With all or a majority of their reports built with Solver *Reporting*, organizations typically find that they can complete 80% of their analysis and reporting, with 20% of the effort previously required. In other words, some of the key reasons for implementing Solver *Reporting* are:

1. Cloud-based with automated updates
2. Single report designer replacing many internal reporting tools
3. Excel report designer interface that business users are comfortable with
4. Easy to build reports with drag and drop wizards and pre-built formulas
5. Reporting on General Ledger (GL), sub-ledgers, as well as other data sources
6. Reporting on Solver's *Data Warehouse* (data can come from any data source)
7. Optional reporting live on ERP databases (for supported ERP systems)
8. Consolidations across companies
9. Currency conversion
10. Handle special needs such as allocations and reconciliations
11. Eliminate any manual exports to Excel for formatting, printing, etc.
12. Design of Solver input forms (for budgeting, forecasting, elimination entries, consolidation adjustments and other types of data entry)
13. Ad-hoc reporting for quick answers
14. Automatically integrate reports to PowerPoint and Word using Microsoft Office integration

As referenced in the architecture diagram earlier in this document (figure 1), Solver *Reporting* is browser-based, with reports and security managed through a modern

Web Portal, and a cloud-connected Excel add-in for report design. Solver *Reporting* is one of the main modules in the Solver suite. The other two main modules are:

1. Solver *Data Warehouse* – configuration and management of data sources. The Solver *Data Warehouse* allows you to integrate data from different systems across the organization, into one single database for reporting, planning and dashboards.
2. Solver *Planning* – input and workflow for budgeting, forecasting and other data entry needs (e.g. financial adjustments, allocations)

Additional module features:
3. *Dashboards* – Optional use of Excel charts, graphs and conditional formatting by using Solver *Reporting*, or for professional dashboards with advanced visualizations, Solver integrates directly with Microsoft Power BI.

In summary, Solver *Reporting* serves as a report writer, report viewer and report analysis solution for any type of data populated in the Solver *Data Warehouse*. In addition, it offers real time (live) reporting on a number of popular ERP systems.

Here are some scenarios for when to use Solver *Reporting* with the *Data Warehouse*:
- Reporting across multiple source systems (like multiple ERP systems or ERP and CRM data).
- Advanced currency conversion.
- Consolidations and eliminations.
- Allocations.
- Performance (want faster reporting without slowing down the source ERP system).
- Budget and forecast reports (either for Solver's *Planning* module or for other budget system).
- Designing budget templates and other business input forms (with Solver's *Planning* module).

For users, typically accountants, requiring <u>real time</u> reporting on their ERP database, Solver has a technology referred to as *Hybrid Cloud* that provides real time access from the cloud and into a select number of pre-integrated on-premise ERP systems. The *Hybrid Cloud* integration has a meta data layer which displays user friendly field names. This shields users from complex technical field and table names within the ERP by translating them into plain English business terms. This provides Solver with major advantages over standard query tools and report writers that connect directly to a data source without any form of meta data translation. More importantly, Solver has already pre-defined important logic such as time logic, which then can eliminate the use of otherwise complex period formulas when users design reports.

> Note: For a number of popular ERP and CRM systems the Solver *Hybrid Cloud* live integration is already developed and out-of-the box (contact Solver for the latest list of pre-built integrations).

Reporting Components

Web Portal

Solver's *Web Portal* is where you manage, refresh and view reports. It is typically the *only* place where end-users will ever interact with reports, unless they decide to export reports to Excel or PDF.
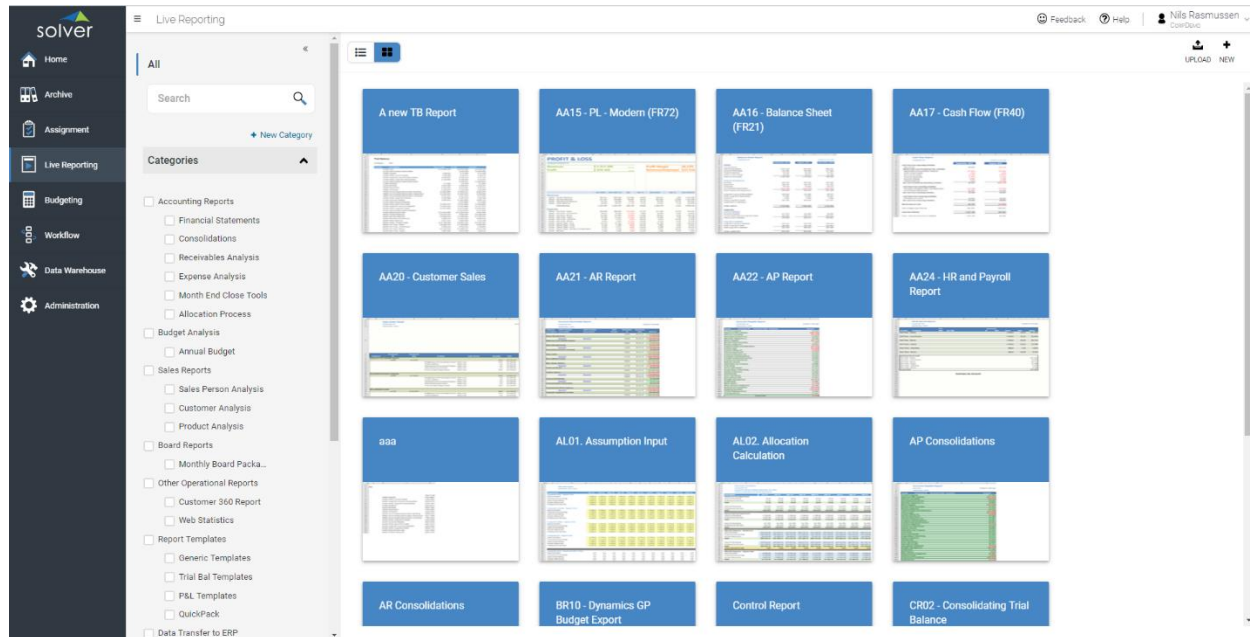

Figure 2. Web Portal view of live reporting menu

In the *Live Reporting* menu (figure 2), users can run reports on demand, while in the *Archive* menu, users can view reports that have been executed and shared to their archive. A typical example would be at month end where a controller closes the books in the ERP system and then executes and reviews financial statements before posting them to the *Archive* where managers can review and analyze the reports. In other words, it allows the report generators (Designers and *Live Reporting* users) to control when other Solver users will see the completed financials.

Users with access to the *Live Reporting* menu can run their own reports on demand in the *Web Portal* (figure 3), and use parameters (based on their access rights) to filter the data based on any criteria such as company, department and period.
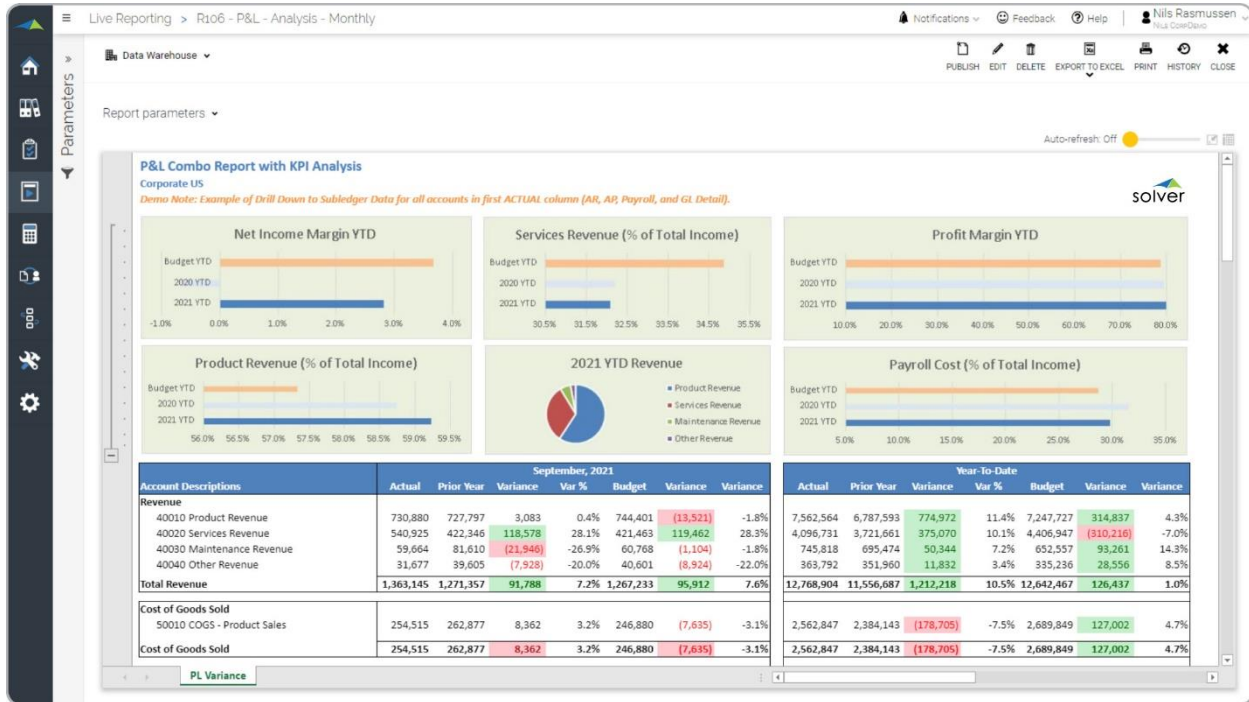
Figure 3. Live report executed by user in the Web Portal

Excel Add-in

Solver's *Report Designer* uses an Excel add-in that installs (for first time users) and launches from the Solver *Web Portal*. The *Report Designer* consists of two menus within Excel: The Excel ribbon and the Excel task pane.

Excel Add-in Ribbon

The Excel ribbon has buttons that provide access to key functions such as:

- Design new reports (either from scratch or based on an existing Excel report).
- Manage configuration of the current report.
- Manage report properties and setting options.
- Open/close Task pane and Design windows.
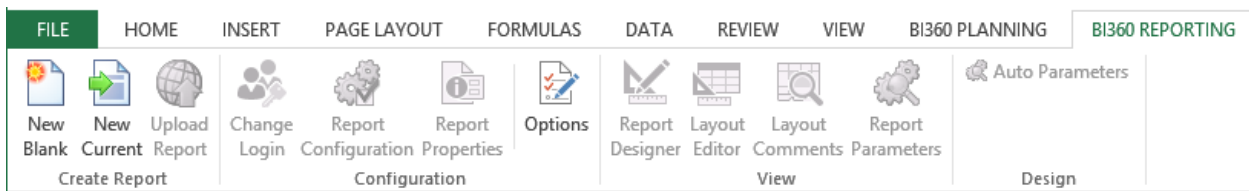- Manage report parameters (prompts).

Figure 4. View of the Solver Add-in in the Excel Ribbon

Excel Add-in Task Pane

Solver's *Reporting* task pane features the popular Microsoft Outlook-style menu bar. It comes in two main flavors:

1. Solver *Reporting* - Designer: Gives access to both design and run reports (convenient for power users as they want to test reports immediately after building them).
2. Solver *Reporting* - Player: Gives access to run reports in Excel if desirable (as an alternative to running them in the *Web Portal*). Data will then load from the cloud and into the report as it executes.

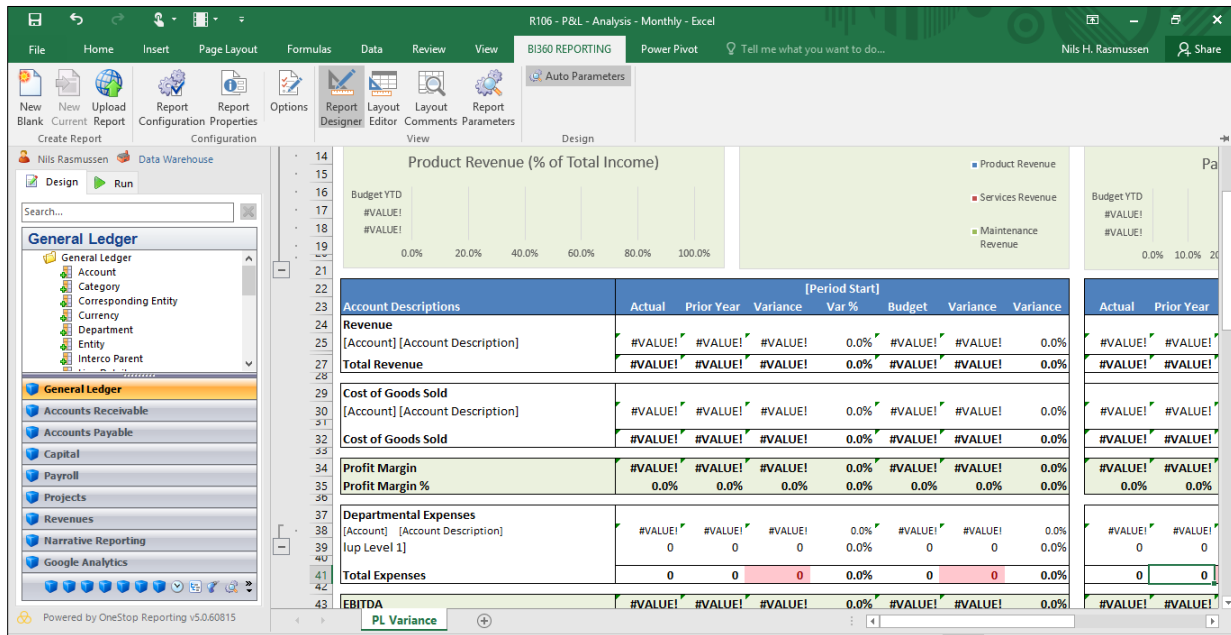The Report Design menu is shown on the left side of figure 5 below:

Figure 5. Excel Add-in showing report and design menu

The Report Design menu offers the following main features:

- Access to dimensions and fields in different modules in the *Data Warehouse* or ERP source database (using Solver *Hybrid Reporting* for live ERP queries).
- KPIs (KPIs can be pre-defined and dragged into any report).
- Functions (pre-defined period calculations such as: Current Month, Year-to-Date, Last-Year-to-Date, Rolling 12 Month and many more).
- Trees (pre-defined account hierarchy trees, such as for P&L, balance sheet or consolidations can be dragged into any report).
- Report Parameters (access to the parameters that will display for the users as filters when they run a report).

When designing a report, the user selects fields, trees, periods, etc. from the Report Design menu and "drags and drops" these items into the appropriate location in the Excel Worksheet. Many reports can be designed without entering a single formula. Some reports will need an Excel formula, for example a standard Excel formula that deducts one Excel cell from another to calculate the variance between a column containing actual figures and a column containing budget figures.

Composer for Ad-Hoc Reporting*

Solver also offers an optional module called *Composer*. The *Composer* is engineered to solve ad-hoc (on the fly, instant) reporting needs as compared to the Solver *Reporting* Excel add-in (Designer) which is focused on creating professionally formatted reports. Typical ad-hoc users are accountants needing to see e.g., how much has been paid to a certain vendor so far this year, or a sales manager that wants to see what they have actually invoiced to a customer and if they have been paid yet.

The Solver *Composer* is very easy to use and requires minimal training. Everything is accomplished with drag and drop design to create a report.

**Composer* is coming in 2020, when it will surface in the Solver *Web Portal*.

Report Publisher

Solver *Report Publisher* provides automated report scheduling and distribution. It is ideal for organizations that need to process a large number of reports on a periodical basis and/or that needs to distribute reports (to e-mail or Solver *Archive*) to a large number of users.
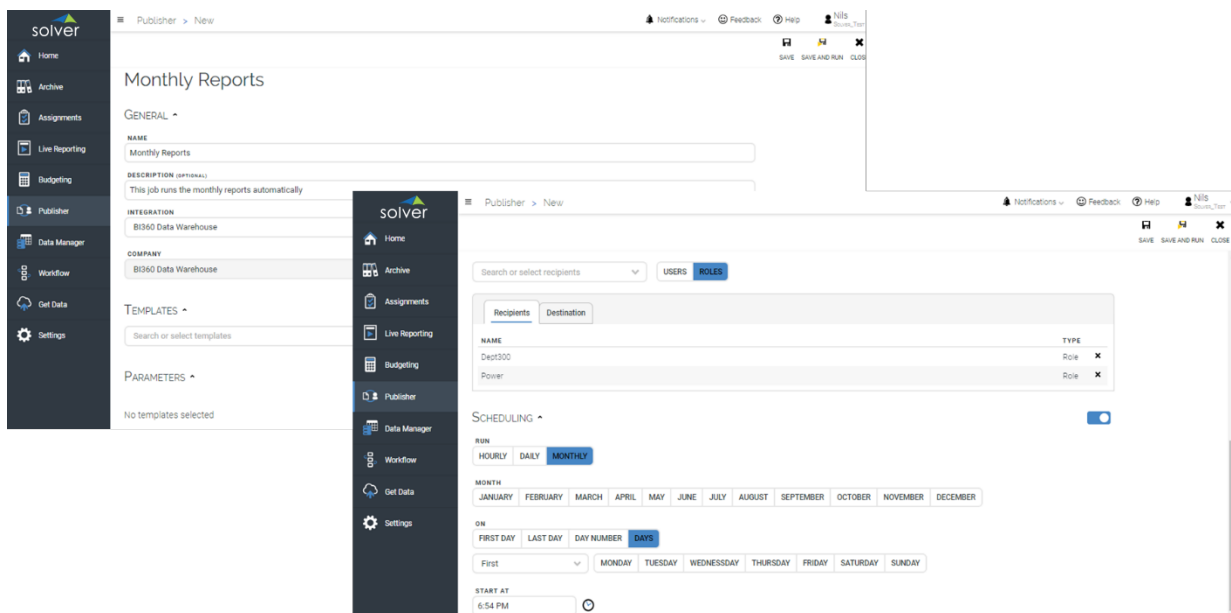

Figure 6. View of the Report Publisher tool to set-up automated report distribution

Practical Usage Examples

In most cases, Solver *Reporting* will be used as a reporting and ad-hoc query tool, either stand-alone or as part of the Solver suite. In all cases, there are two main components:

1. The Solver *Excel add-in* where Designer users create reports
2. The Solver *Web Portal* where *Live Reporting* users run and view reports, including use of features like drill down, report playlists (similar to a slide show), etc.

Table 1. Listing of various deployment options

Deployment	Advantage	Comment
Designer users run reports centrally and distribute/e-mail to users	• No license required for end users	• End users cannot get reports on-demand • End users may want to see reports for other filter criteria • End users cannot drill down
Live Reporting users run reports and post to Solver *Archive* where end users can view and analyze them	• End users only need an Archive license • End users can view reports exactly when they need them • End users can drill down	• License required for end-user
Designer users create ad-hoc queries and export result to Excel and e-mail/print/save to server	• No license required for end users	• End users cannot answer instant questions when they need it and without requesting information from licensed users
End-users run their own reports as a *Live Reporting* user	• End users get reports exactly when they need them ("on-demand") • End users can run reports with different filter criteria • End users can drill down	• License required for end-user
End-users create ad-hoc queries	• End users can answer instant questions when they need it and without requesting information from power users	• License required for end-user

Below are additional examples of uses of Solver's *Reporting* module:

Table 2. Potential uses for **Reporting** module

Purpose	Usage Examples
Financial reporting	• Financial statements in various formats, like Profit & Loss, Balance Sheet and Cash Flow reports. • Consolidations, Adjustments and Eliminations
Operational reporting	• Sales reports • Vendor reports • Project reports • HR/payroll reports • Travel expense reports • Credit card analysis reports (incl. trends, exceptions, etc.)
Dashboard reports	• Create dashboards that combine metrics/KPIs with charts and indicators.
Scorecard reports	• Create scorecards with KPIs. • Management's scorecard comments can be entered using forms with Solver's *Planning* module.
KPI reports	• Create reports that generate and display KPIs.
Allocation reports	• Create Excel-based reports that calculate allocations. • To store the allocations, use Solvers *Planning* module. • Solver *Planning* can also be used to collect and store allocation drivers.
Commentary input	• Create reports (e.g. a P&L) and set up *Solver's Planning* module to collect and save text comments. • Create exception reports to show all comments made to certain accounts, for certain variances, etc.
Budget template design	• Create input forms for use with Solver's *Planning* module.
Budget reports	• Create reports to consolidate/view budgets and forecasts.

Typical Implementation Process

A typical implementation process of Solver *Reporting* may look like this:

1. Receive access to the Solver cloud tenant
2. Identify reporting needs
3. Prepare the Solver *Data Warehouse* (skip this step if Solver *Hybrid Reporting* will be used in order to do live reporting directly on the ERP system)
   a. Populate the *Data Warehouse* with data and dimensions from source systems - examples of dimensions are: Account, Department, Project, Product, Employee, Asset, etc.
   b. Enter any other dimensions or data directly in the *Data Warehouse* Manager if they do not already reside in another database from which they can be imported

4. Train power users, either in a classroom or using Solver Academy (eLearning – see Appendix)
5. Design Excel report templates with Solver Reporting and publish them to the Solver Web Portal
6. Set up security (if different users require different access rights)
7. Train end users on accessing the reports in the Solver Web Portal (will only take minutes as they just need to learn how to run reports and drill down)

Planning

The Solver *Planning* module offers a complete solution for budgeting, forecasting, planning, modelling, and other data entry needs such as for statistics or consolidation adjustments. Similar to Solver *Reporting*, input forms are designed with Solver's modern, cloud-connected Excel add-in, and, with a single click, published to the Solver *Web Portal* where end users access and populate them through their web browser. Below, is an example of what that power users, such as a budget manager, will see in the *Web Portal's* Budgeting menu (figure 7).
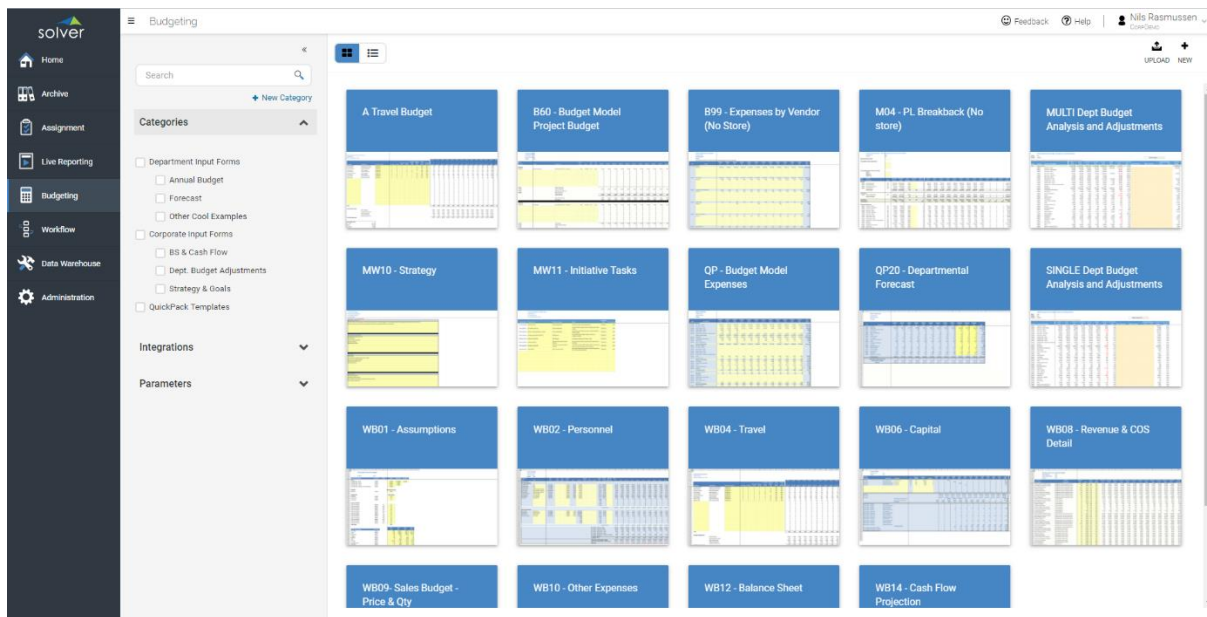

Figure 7. View of the budgeting menu from the Solver Web Portal

The portal above (figure 7) is where power users manage input forms, such as when they want to design a new form or edit an existing one, it will launch the form from the *Web Portal* and into the Solver *Reporting* Excel add-in on their desktop. During this time, the form stays connected to the Solver *Web Portal* in the cloud (see screenshot below of a form in edit mode in Excel) so that no information needs to be downloaded locally.
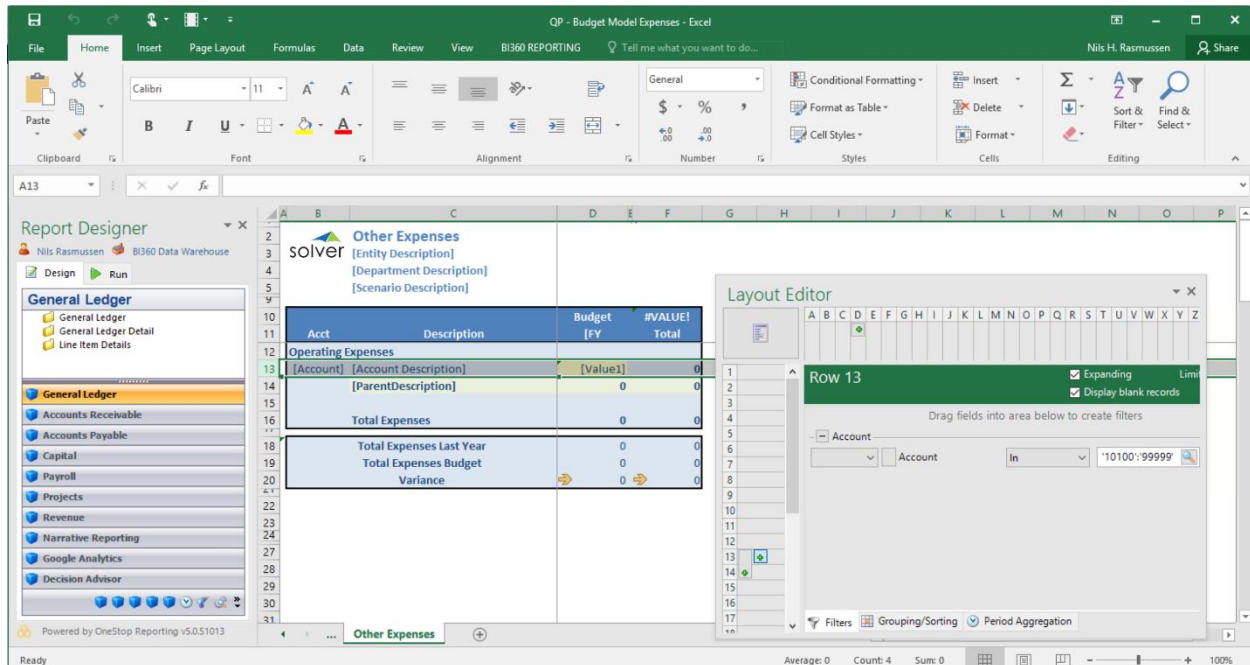
Figure 8. Solver Reporting view from Excel while designing a budget input form

While the most typical use of Solver *Planning* is for budgeting and forecasting, in reality, most organizations have numerous manual data collection processes that can be automated with Solver *Planning*.

As seen in the architecture diagram earlier in this document, *Planning* is one of the core Solver modules. There is also a complete workflow module to monitor and manage the data entry process and approvals.

After the users have entered and saved their data in the input forms in the Solver *Web Portal*, managers can start reporting on the entered data with Solver *Reporting*. Finally, if desirable, the data can be exported from the *Data Warehouse* database and back to other source systems such as a budget module inside the ERP general ledger.

In summary, Solver *Planning* is a modern cloud-based budgeting and forecasting solution with a powerful Excel add-in for design of anything from simple to highly complex input forms, and a complete *Web Portal* that includes key features such as end user data entry, workflow and reporting.

Planning Components

Solver *Planning* consists of two main components: The *Web Portal* and the same Excel add-in for template design as used by Solver *Reporting*.

Excel Add-in

- Used for design of budget, forecast and all other types of input forms.
- Same Excel add-in as the Solver Report Designer but with additional write-back features.

- Automatic upload/download of input templates between Excel and the Solver *Web Portal*.

Web Portal

The *Web Portal* is where everything except form design is handled. In other words, tasks like data entry, security, user administration, workflow, etc., are all managed in one location via the *Web Portal*.

The three main budgeting functions of the Solver *Web Portal* are described in the next section below.

Budgeting

This menu (figure 7), is where Designer users (power users), such as the budget manager, maintain all the input forms and set up assignments for budget contributors.

Workflow

Here, the power user sets up deadlines for data submission, defines which input forms are accessible to different end users and views the submission status per user, budget reviewer, budget approver, etc.
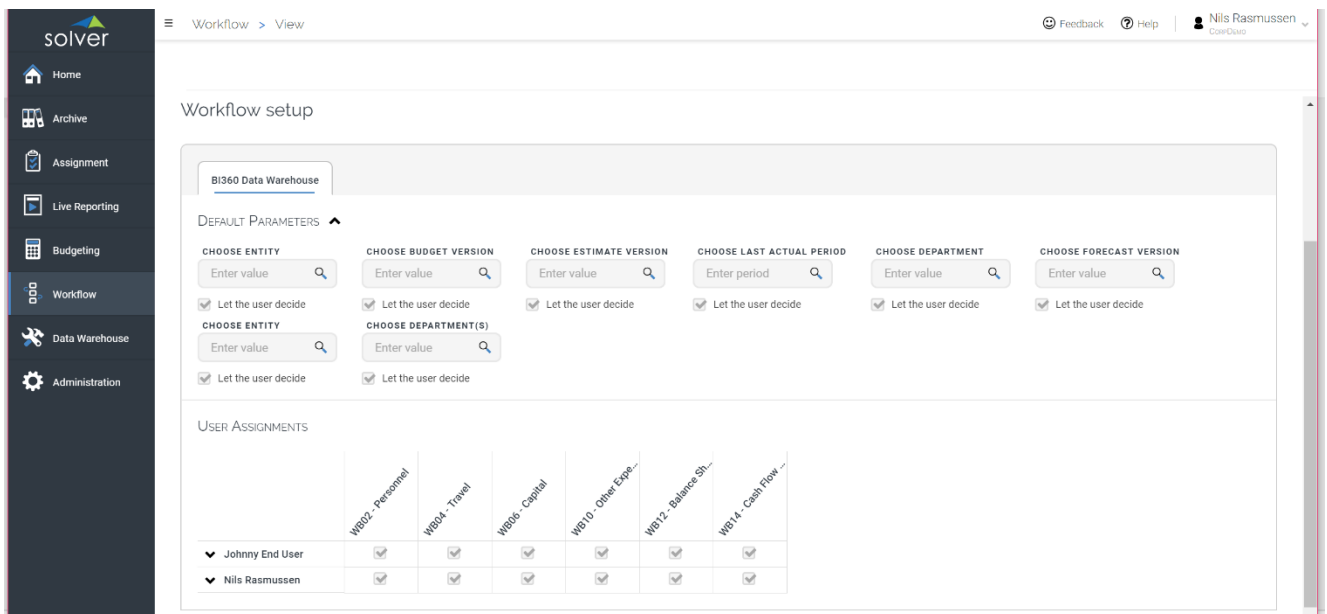
Figure 9. *Workflow setup menu from within the Web Portal, used to assign tasks to end users*
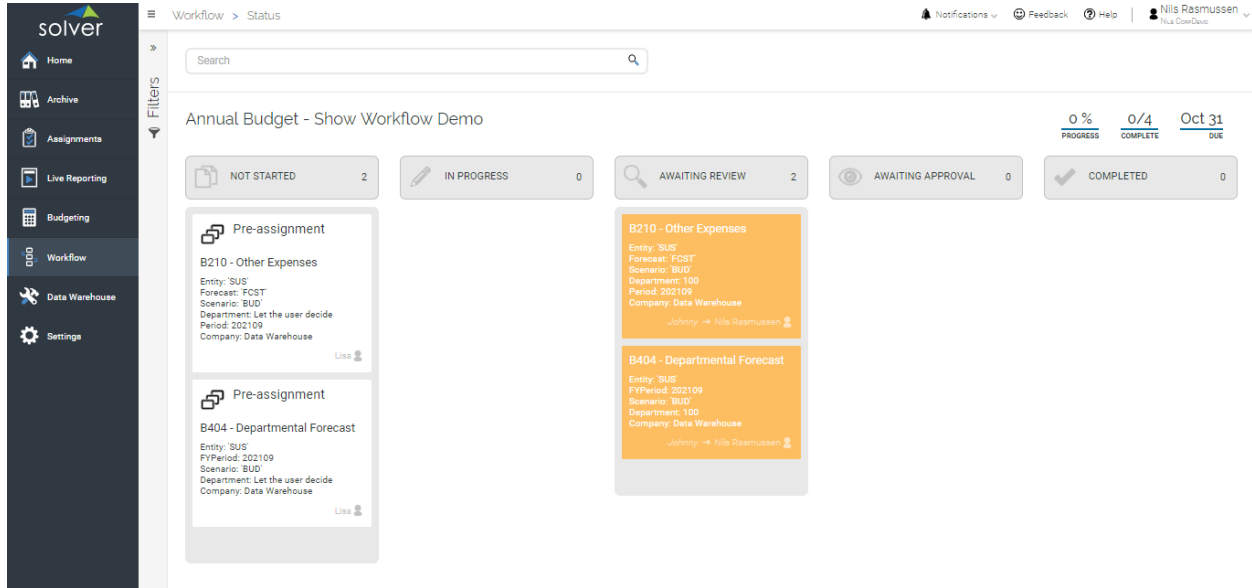
Figure 10. Workflow status tracking window showing assignment status

Assignments

End users access the assignment menu to view and complete any tasks assigned to them. As part of the assignment workflow, the end user also has a "chat" window where he or she can ask questions and share thoughts with the budget manager during the budget process. All chat is tracked in the database with that instance of the form, so that, in the future, it is easy to go back and look at discussions that took place around a particular users' budget. End users have access to all key *Planning* features in their assignment such as data input, drill-down, spreading, line item detail input (e.g. detailing many different trips under the "travel expense" account) and text comments.
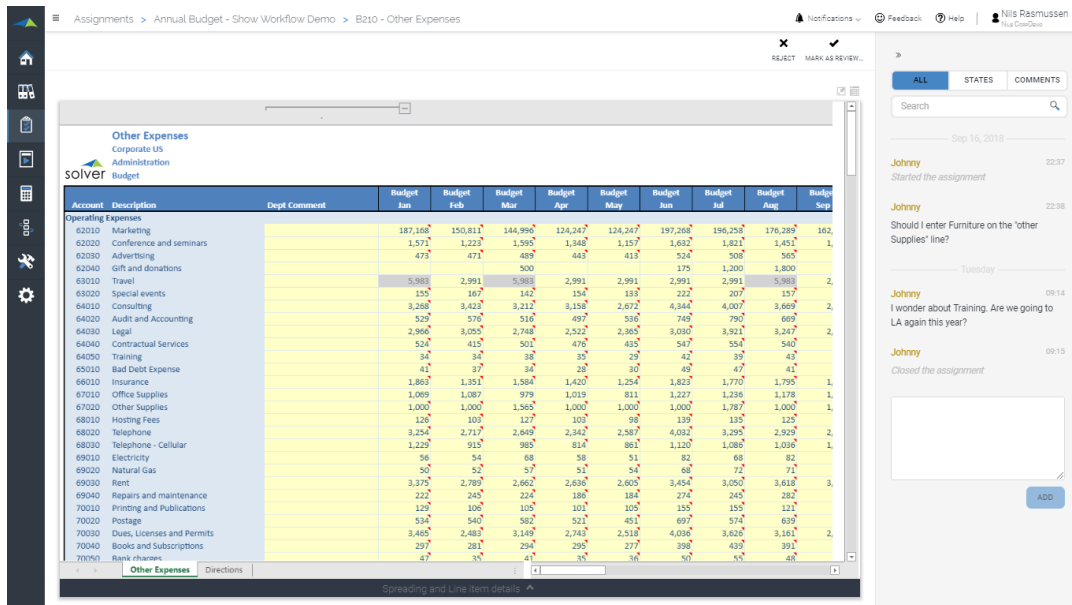
Figure 11. *View from within an end user assignment, showing input form and "chat" window*

Practical Usage Examples

In most cases, companies deploy Solver *Planning* as a budgeting and forecasting tool. Below is a list of the most typical use cases for budget model configurations for Solver *Planning*.

Input Form Configuration	Examples	Typical Distribution
Multiple different workbooks, each with a single budget form.	• Departmental Revenue • Departmental Expenses • Personnel	• Input done by central staff • "Bottom-up" budget process with data entry done by end-users
Single workbook with multiple budget forms with the <u>same</u> layout.	• Different departments on different forms • Different products on different forms	Input done by central staff
Multiple similar workbooks with multiple different budget forms in each workbook	Workbook with: • Summary Profit & Loss or Expense form • Revenue Detail • Employee Detail • Capital Expenses	"Bottom-up" budget process with data entry done by end-users

Other potential uses of Solver *Planning* as a data collection tool are described below:

Table 4. *Additional uses of the Solver Planning tool with examples*

Excel Configuration and Input Type	Usage Examples
Modeling	Create a product or service price model. Use Solver *Planning* to store each scenario to the Solver *Data Warehouse* and then use Solver *Reporting* to output reports/charts.
Break-back analysis	Use one of Solver's special break-back templates (or design one from scratch), to simulate items such as net profit and have Solver auto-generate the related budget or forecast revenues and expenses based historical trends.
Allocations	Create the allocations model to create automated, parameter-driven allocation calculations and use Solver *Planning* to store the allocated numbers to the Solver *Data Warehouse*. From there, use the allocations in Solver reports or import the allocated numbers back to the ERP system.

Electronic data entry of: • Statistics • Key Performance Indicators (KPIs) • Other organizational information	Create input forms for any text or numerical information and use Solver *Planning* to store it to the Solver *Data Warehouse*. From there create reports with the Solver *Reporting*, or transfer the collected data to other systems such as Power BI dashboards or the ERP system.
Commentary input for: • Monthly actual/budget variance reports • Scorecard KPIs • Quarterly/Annual reports	Add comment columns to Solver financial statements or scorecards (e.g. generated dynamically with Solver *Reporting*), and use Solver *Planning* to save the text to the Solver *Data Warehouse*. Use Solver *Reporting* to create reports that pulls the text comments back up from the database.

Typical Implementation Process

A typical implementation process of Solver *Planning* would look like this:

1. Receive access to Solver cloud tenant
2. Identify budgeting needs
3. Preparation of the Solver *Data Warehouse*
4. Populate the *Data Warehouse* with historical figures and dimensions from General Ledger (and if needed also from systems like Payroll and Fixed Assets). Examples of dimensions are: Account, Department, Project, Product, Employee, Asset, etc.
5. Enter any other dimensions or historical data directly in the Data Warehouse if they do not already reside in another database from which they can be imported
6. Train power users, either in a classroom or using *Solver Academy* (eLearning – see Appendix)
7. Design budget and forecast forms (or use Solver's pre-defined templates). They will now be dynamic and parameter driven based on the dimensions and data populated to the *Data Warehouse* in step 1 above
8. Deploy to Solver *Web Portal* for end user data entry and set up workflow to manage the budget process and approvals
9. Train and end users

Note: Solver *Planning* also allows for data entry in Excel itself using the Solver *Reporting* Excel add-in. Users still open the input form from the *Web Portal* and data is saved directly back to the Solver cloud tenant.

Dashboards

Microsoft Power BI has become the world's leading dashboard solution. Solver customers can reuse their Power BI licenses and connect to the Solver *Data Warehouse* using its pre-built Power BI connector. Dashboard designer users immediately benefit from the highly organized structure of the Solver *Data Warehouse*.

Some organizations also prefer to have basic dashboards or charts embedded inside of their financial reports, and in this case, they simply add charts with Solver's Report Designer (Excel add-in) at no additional license cost.

Both the Excel-designed dashboards and the professional Power BI dashboard options supported through Solver's secure API are described below.

Basic Dashboards – Using Excel Add-in

Below are two sample screenshots of dashboards designed with Solver *Reporting* using standard Excel charting and conditional formatting. Like all other Solver reports, these are automatically published to the Solver *Web Portal* where end users can refresh them and do analysis using their web browser. Charts built into reports have a couple of limitations versus Power BI, in that they are limited to Excel chart types and the lack of interactivity. For example, users cannot click on a chart to drill down. For these reasons, companies with full dashboard needs should opt for Power BI and the connector to Solver.
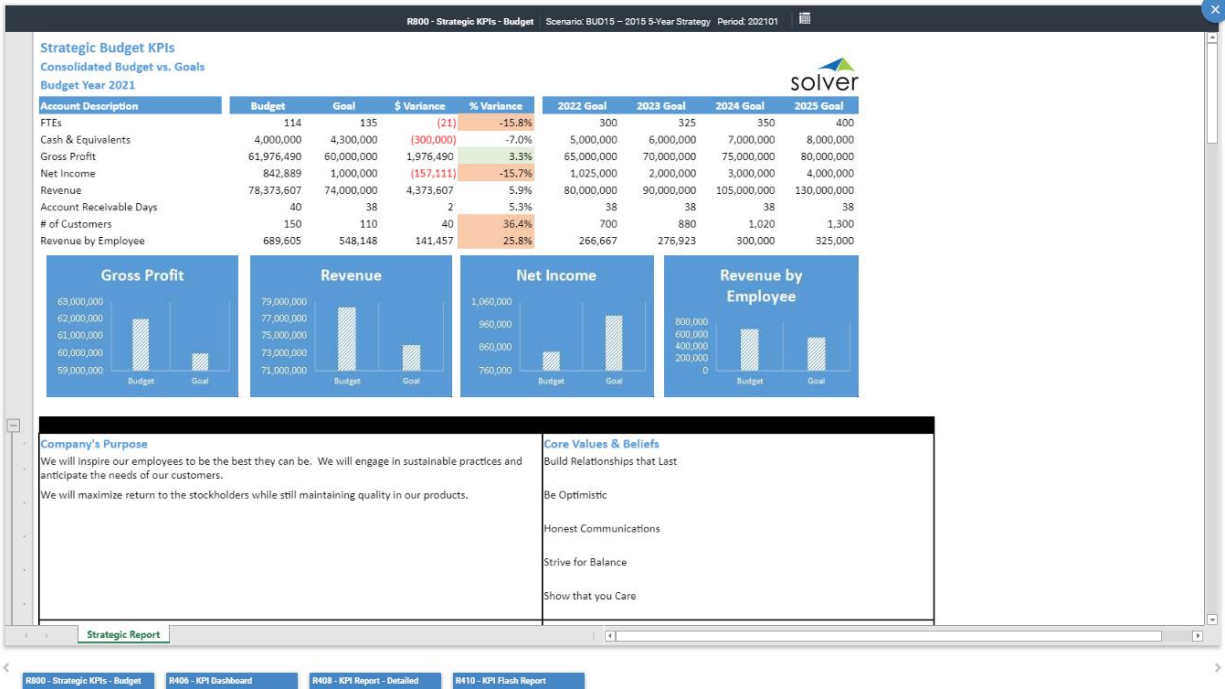
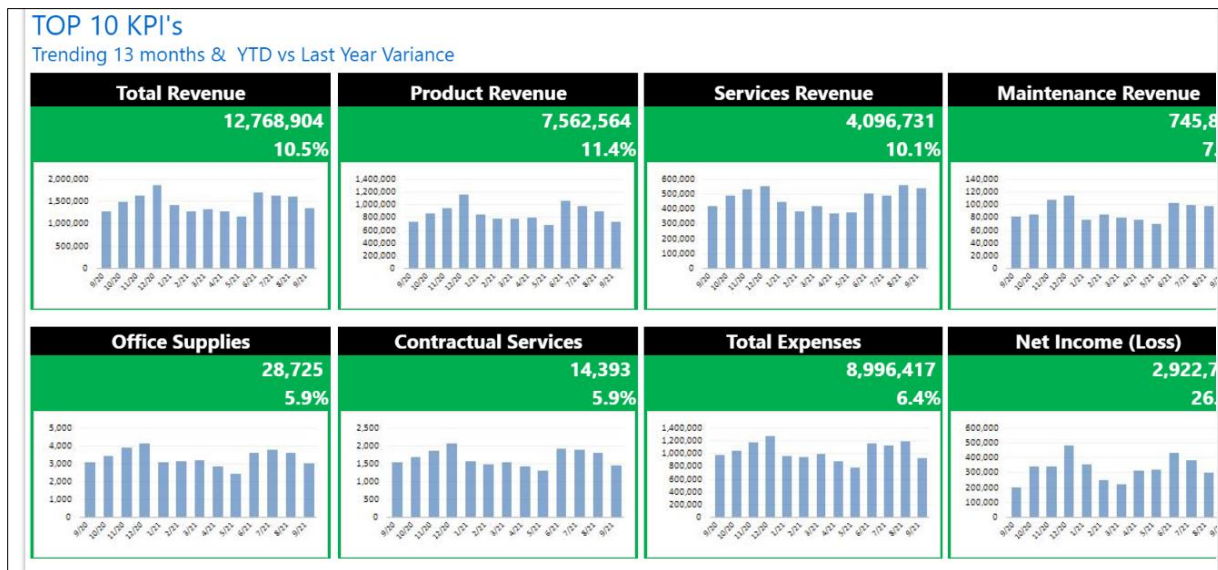*Figure 12.* Solver report that combines KPI figures with charts

Figure 13. Solver report that consists mostly of charts with KPIs above each chart

Advanced Dashboards – Using Power BI

For advanced, interactive dashboards, Solver leverages the capabilities of Power BI which is accessed through an easy-to-use, pre-built Power BI connector.
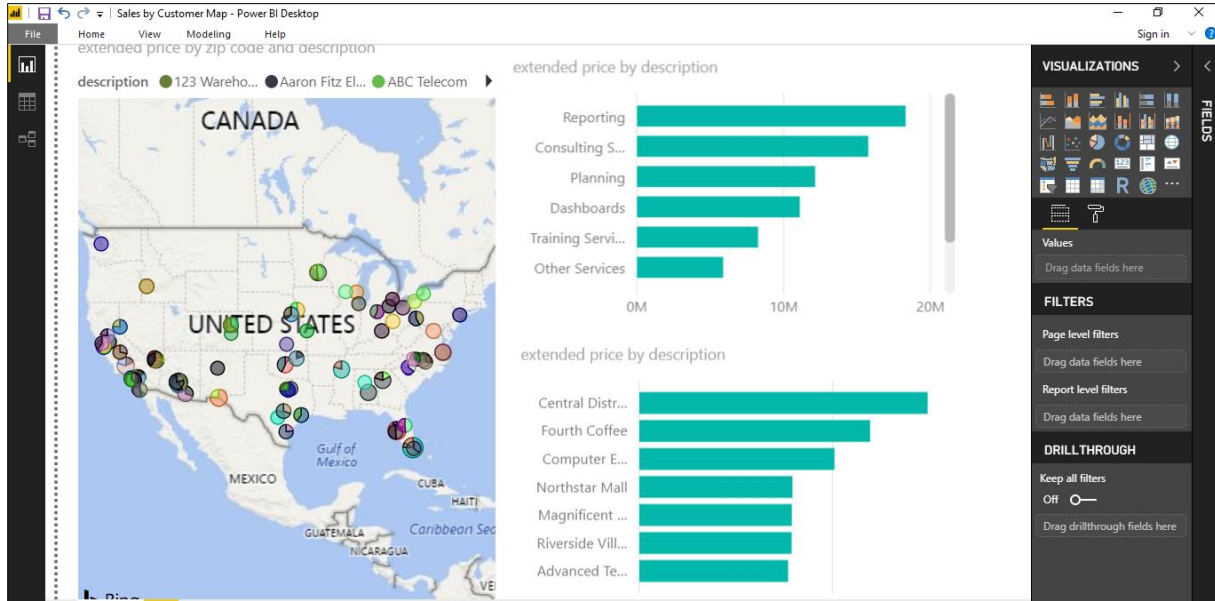

Figure 14. The Power BI Desktop designer – Where users design new dashboards
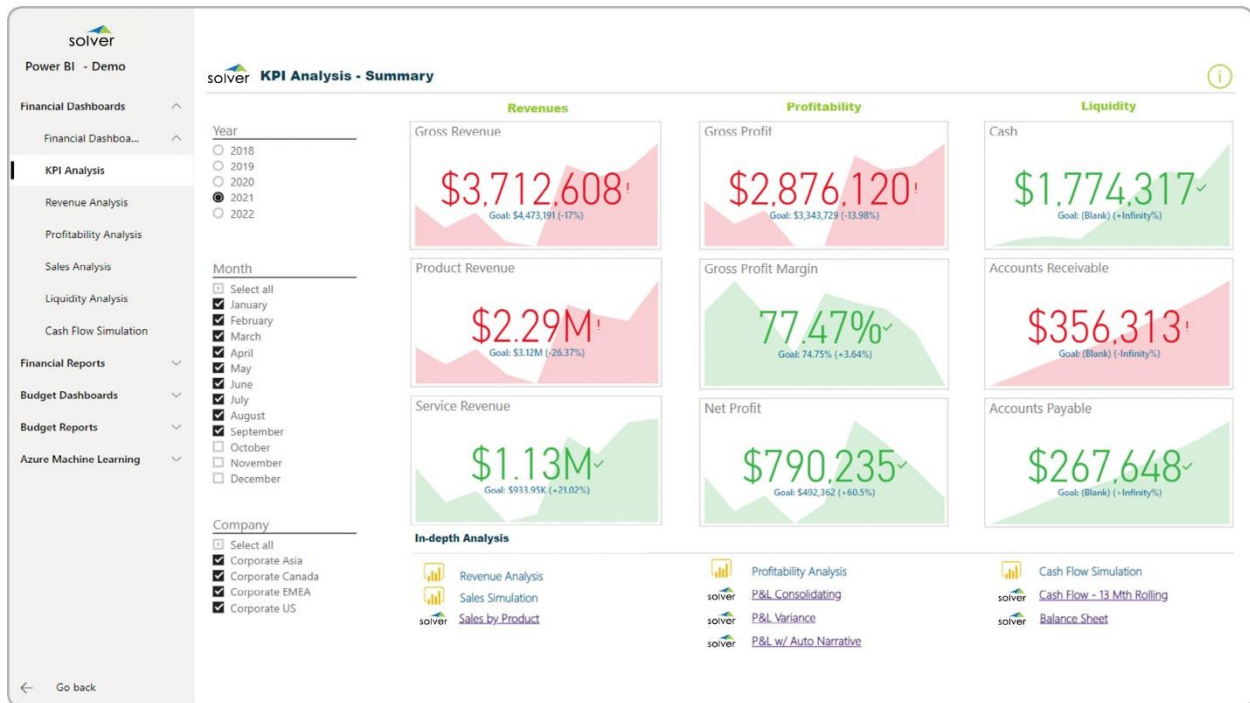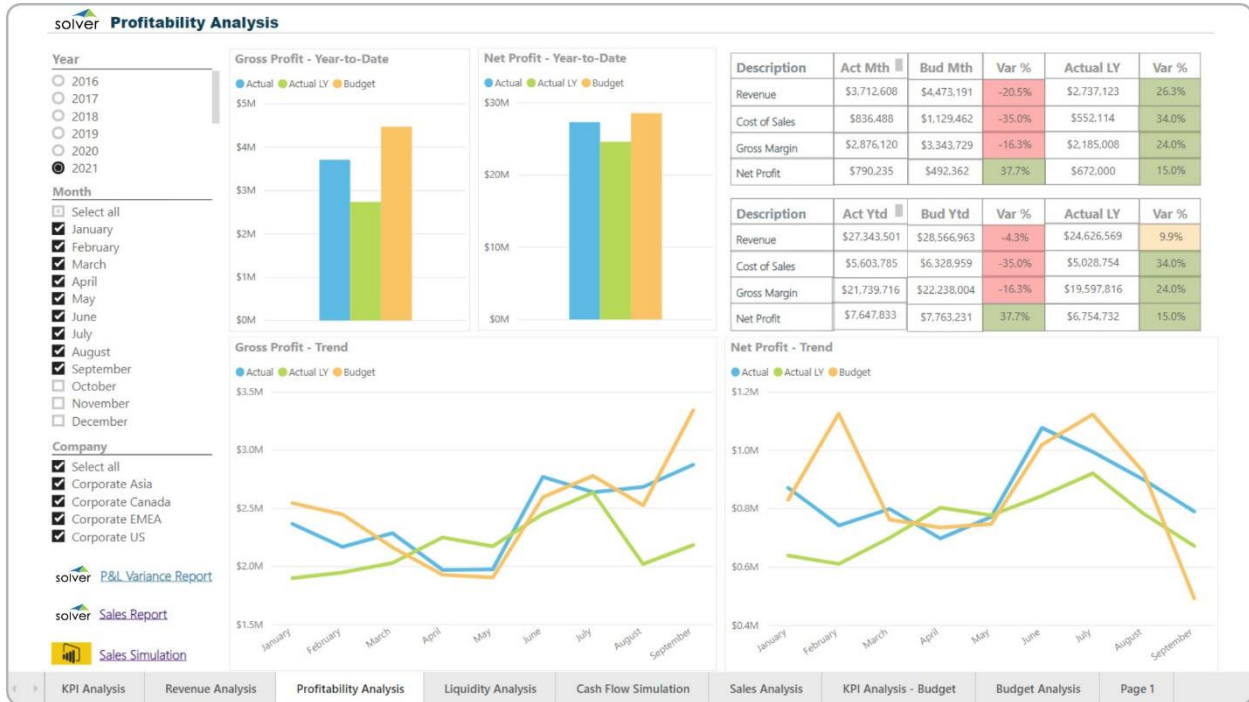

Figure 15. Example of completed Power BI dashboard showing KPI summary

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Figure 15. *Example of completed Power BI dashboard showing company profitability*
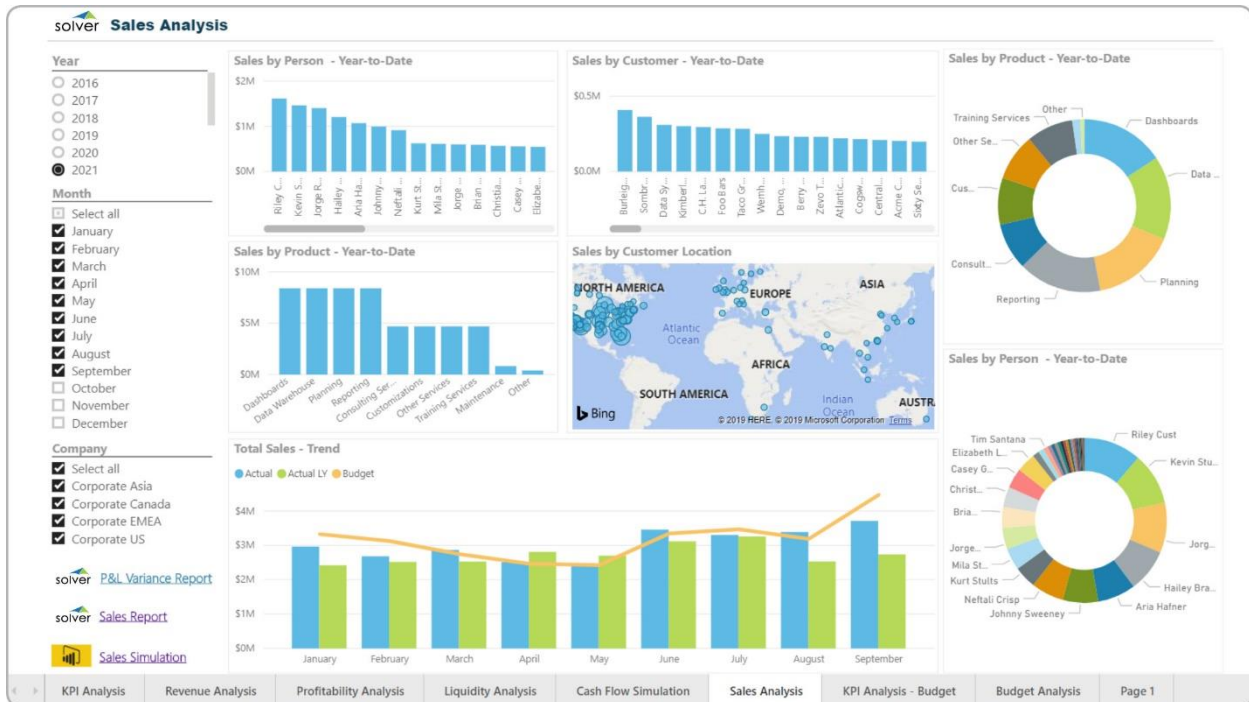
Figure 16. *Example of completed Power BI dashboard showing analysis of sales data*
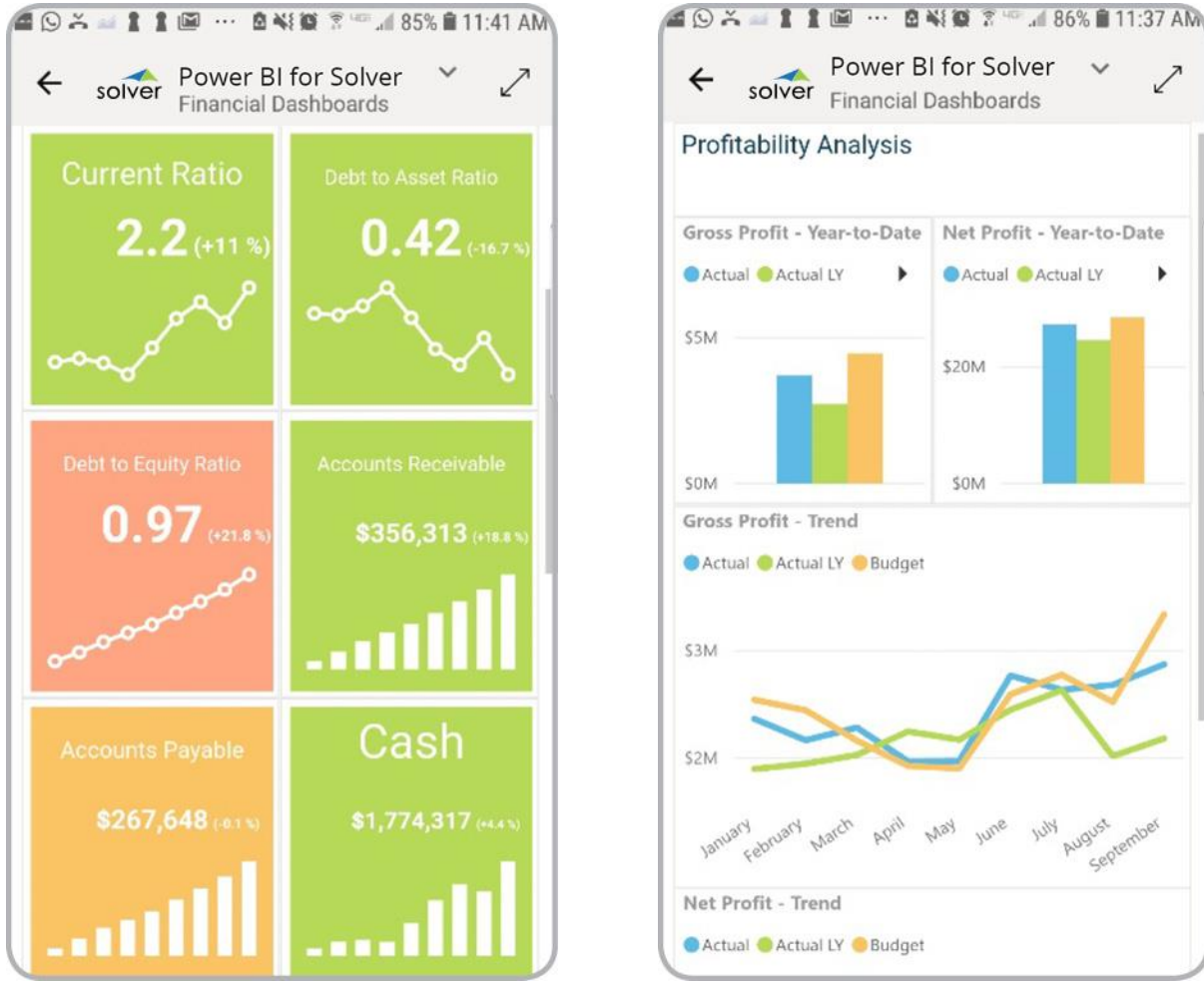
Figure 16. Example of completed Power BI dashboard viewed from mobile application

Data Warehouse

The *Data Warehouse* (DW) is Solver's powerful, yet easy to configure module for consolidating the data needed for reporting, planning and dashboards. The *Data Warehouse* database is fully integrated with Solver's *Web Portal* and its *Reporting* and *Planning* options. This enables immediate access to advanced financial and operational reporting capabilities as well as fully customizable budgeting, forecasting and data entry features. The *Data Warehouse* is a key component of the Solver *Web Portal* where administrators can configure and manage the *Data Warehouse,* and using the native Solver integration tool, data can be loaded without the need for much technical skills or developers.

The *Data Warehouse* is a Microsoft SQL Azure database residing in Solver's multi-tenant cloud, located in Microsoft's global data centers.

Data Warehouse Interface

The *Data Warehouse* interface has been designed to be managed by business users for rapid setup and easy ongoing management of data, dimensions, trees and integrations.
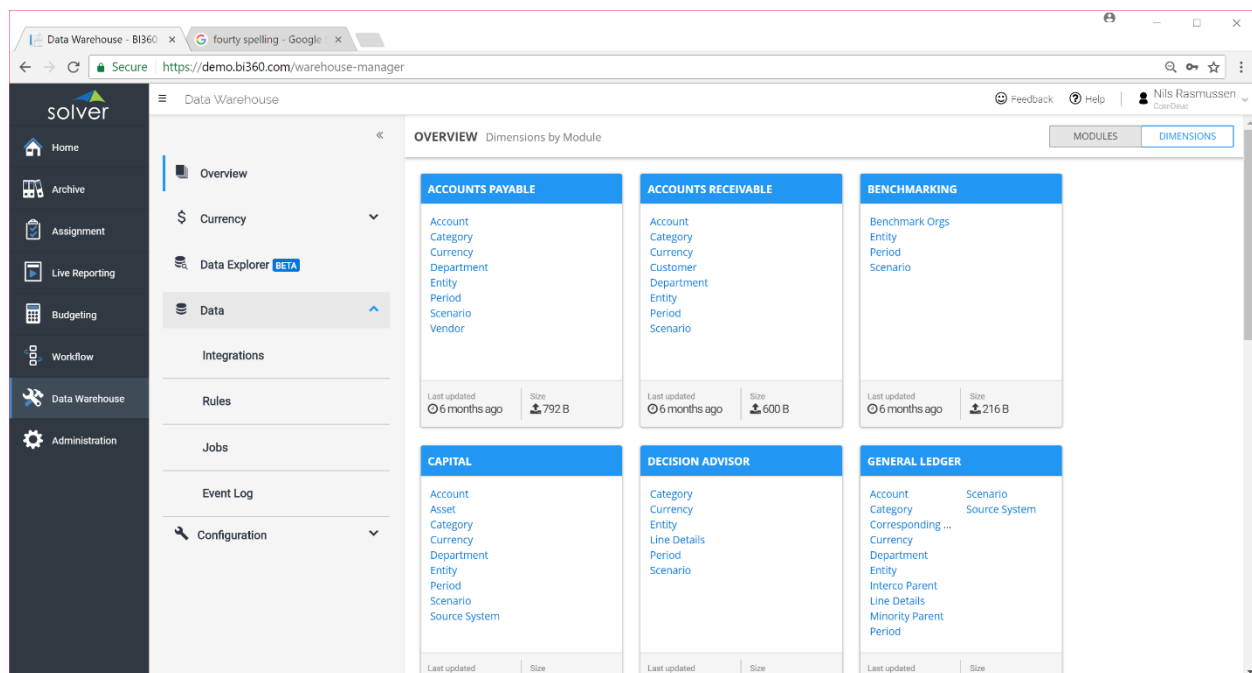

Figure 17. *View of the Data Warehouse module within the Web Portal*

Data Warehouse Components

Integrations

The Solver *Data Warehouse* comes with a powerful integration tool. It includes a generic connector to load data from .CSV files as well as numerous pre-built connectors to populate data from different sources across the organization. In addition to connectors to cloud data sources, Solver Cloud can also load data from on-premise data sources using the Solver *Gateway* to access databases on a local or privately hosted network.

The Solver *Connectors* automatically create *Data Warehouse* modules and dimensions the first time you run an integration or you can set these up manually through the Solver *Web Portal* user interface (as described later in this chapter).
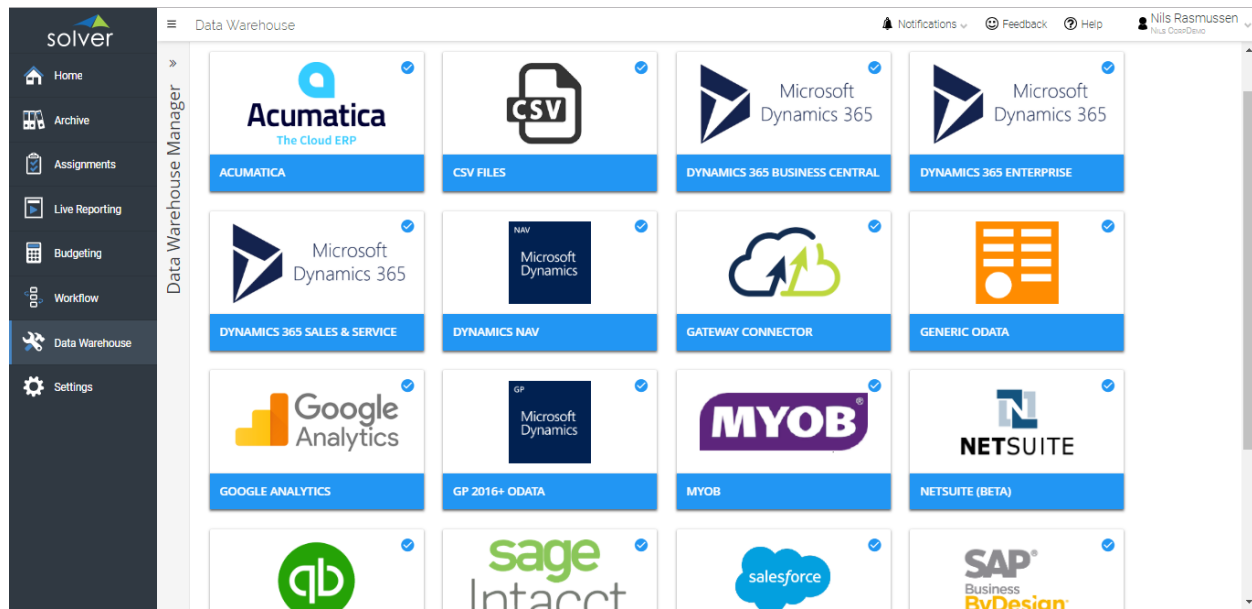
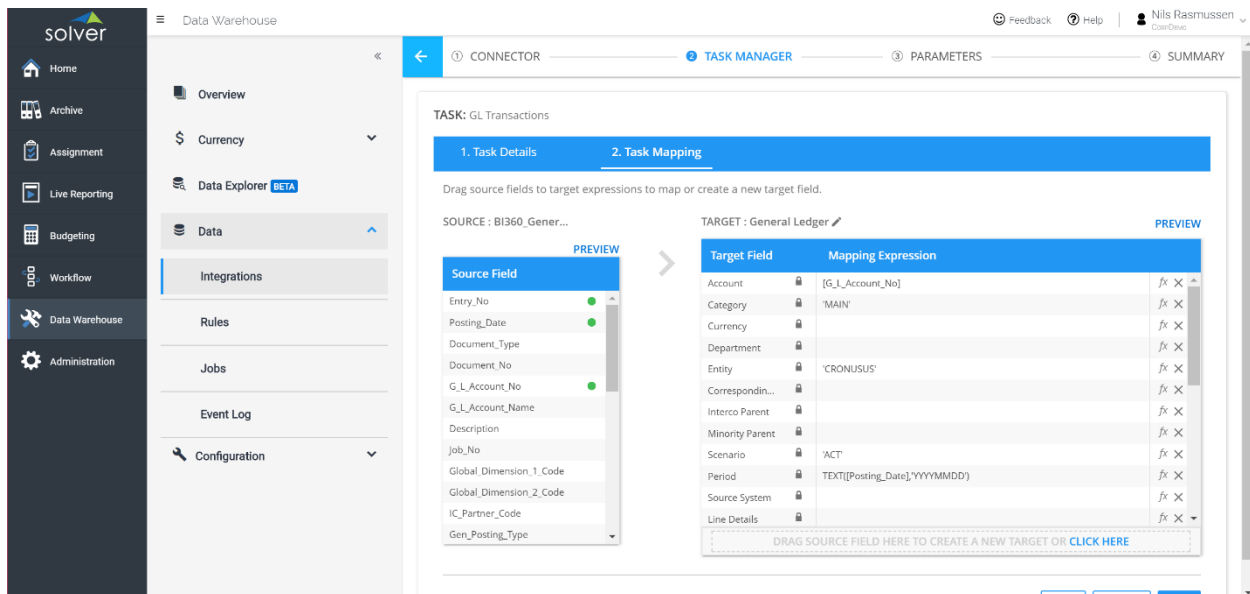*Figure 18. View of Solver Connectors from within the Data Warehouse module*

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Figure 19. *Integration wizard screen showing mapping source system data to Data Warehouse*

Modules

The Solver *Data Warehouse* always comes with two pre-defined financial modules, General Ledger and General Ledger Detail. Users can effortlessly turn on additional modules (up to 100) and dimensions, referred to as user-defined modules, for all other types of data including sub ledger and operational data.

To dramatically reduce implementation time, each module contains pre-defined fields specific to that module/area. The modules can be renamed using the *Data Warehouse* interface. Without any need for customization, an unlimited number of user defined fields can be added using the *Data Warehouse* menu in the Solver *Web Portal* to further extend the content of the transaction tables.

Dimensions

The Solver *Data Warehouse* contains pre-defined dimensions specific to each module but can be expanded up to 100 dimensions which can be shared across modules. Using the *Data Warehouse* interface, the dimensions can be mapped to each module and labeled as needed. Each dimension contains many attributes specific to the dimension. Each of the custom dimensions also contains attributes to customize the dimensions to match a customer's specific data model.

Dimension Management

Dimensions can be managed within the *Data Warehouse* interface. There are several ways to load dimensions into the *Data Warehouse*:

1. Automatic import from the source database via the Solver *Web Portal* integration tool.
2. Manual entry: Manual entry is specifically useful for budgeting and forecasting. Since the *Data Warehouse* has a friendly user interface, accounts and other dimensions that do not exist in the source system(s) can be created and maintained directly within the *Data Warehouse* environment.
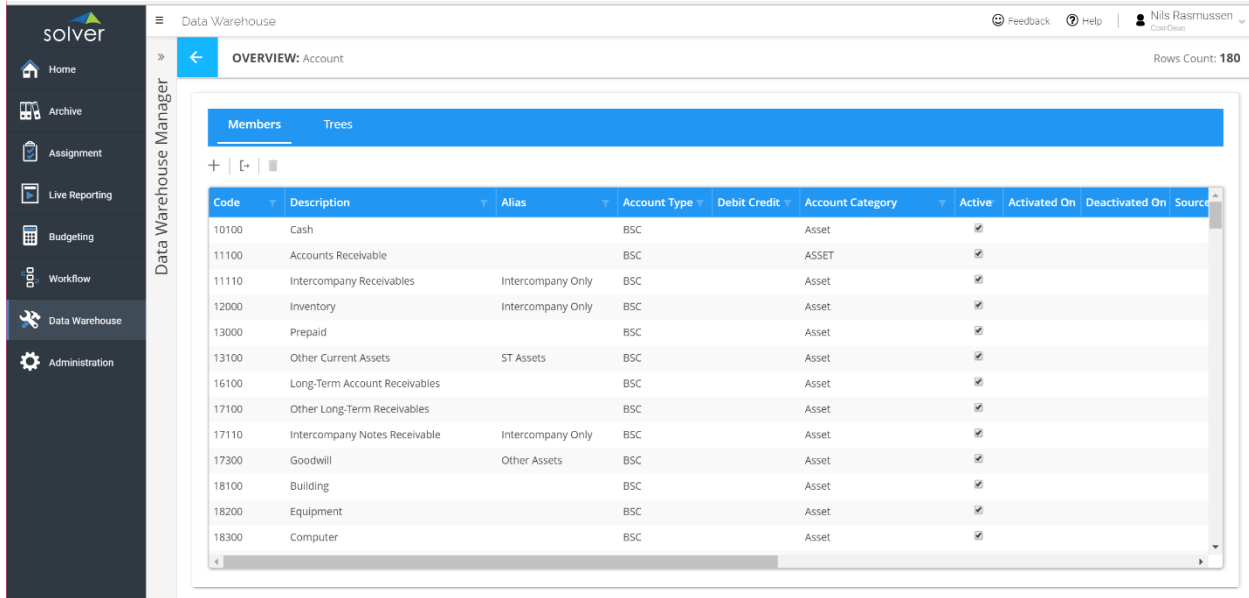

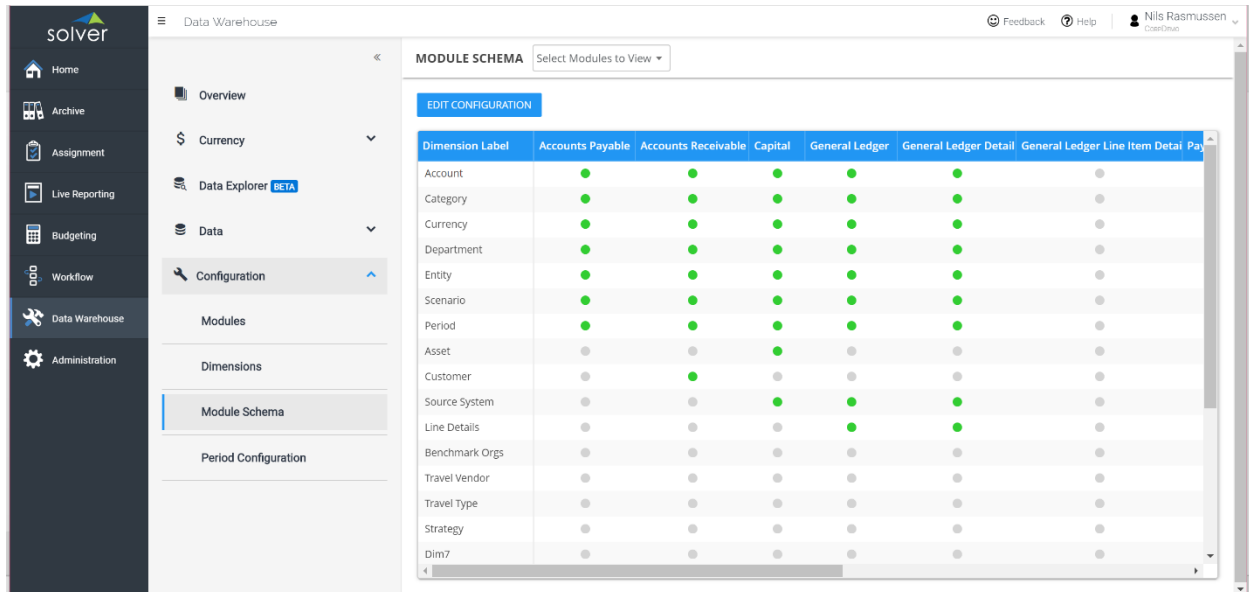*Figure 20.* View of the Data Warehouse module within the Web Portal

Figure 21. View of the Data Warehouse module schema set-up used to activate dimensions

Module and Dimension Mapping

Pre-configured modules in Solver *Data Warehouse* come pre-built with financial and time logic. Both the General Ledger and General Ledger Detail modules require that Account, Entity, Scenario and Period dimensions are populated with data for the transactions being loaded.

Data Warehouse user-defined modules do not have these constraints, allowing customers to load in any data, even data that has no financial content.

Each module can contain *unique* dimensions as well as dimensions which can be shared across all modules. Each module also contains *standard* dimensions, e.g. Period, Entity, Currency, Scenario, Category, etc. Additionally, each module contains system defined attributes including three amount fields and one text comment field.

Currency

The *Data Warehouse* contains advanced currency features which calculate foreign currency exchange. The tables accommodate exchange rates that can be directly entered into the *Data Warehouse* interface or imported. By combining several advanced backend features, the end user experience is very simple, yet advanced. The currency conversion process has several elements.

1. Rate Types: Rate types can be manually entered, directly imported or imported via an integration. Rate types such as Average, Closing, Historical, and Budget are typical.
2. Monthly Rates: Rates can be loaded or manually entered.
3. Rate Configuration: The configuration ties together the Account type, such as Balance Sheet, the Scenario such as Actual and the Rate Type such as Average.
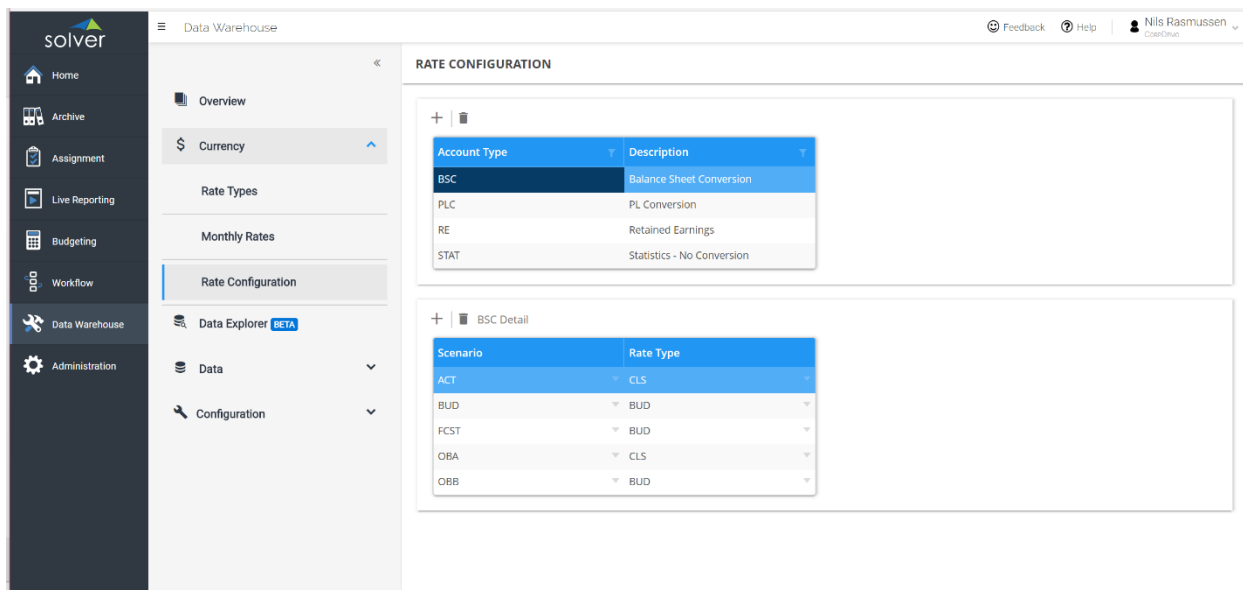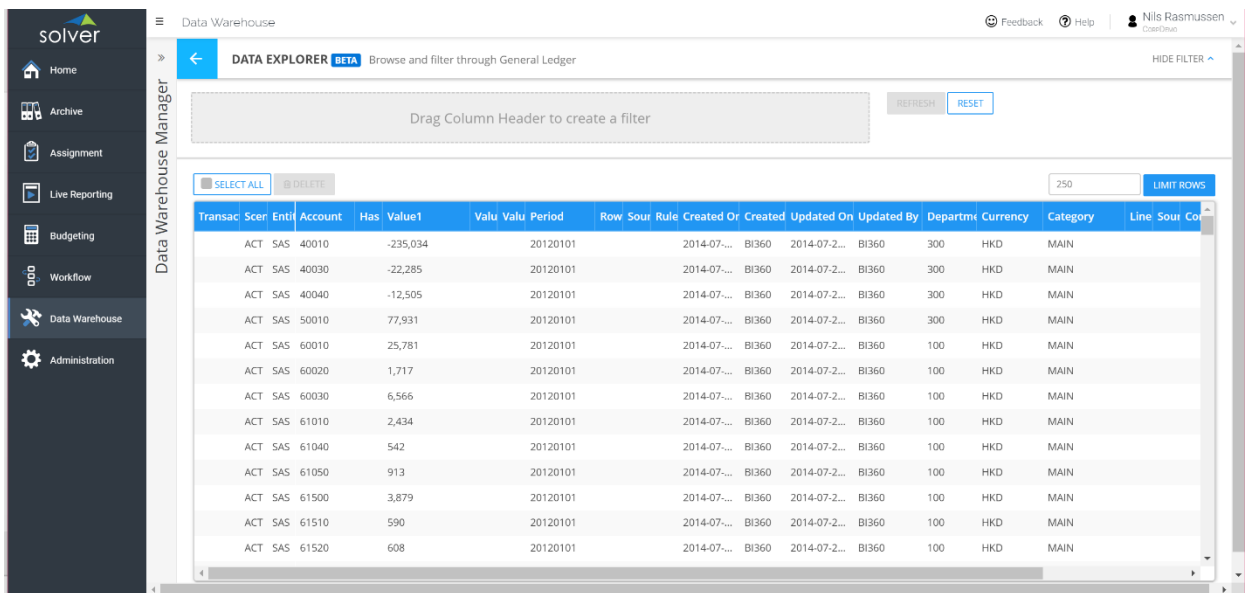

Figure 22. Rate configuration setup for currency translation rules with the Data Warehouse

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Data Explorer

The Data Explorer is used to filter, group and display data for each *Data Warehouse* module so that an administrator, at any time, can see and validate what is stored in the *Data Warehouse* without the need to perform SQL queries or running reports. The data can be viewed within the *Data Warehouse* interface or exported to Excel.

Figure 23. Transactional data viewed using the Data Explorer

Processes

Processes are SQL procedure-based rules which enable data transformation and movement within the *Data Warehouse*. Because rules are created as stored procedures within the *Data Warehouse*, the rules can be loaded into the warehouse via an XML file. The XML file contains information about the parameters used to execute the rule as well as the SQL for the data manipulation.

Practical applications of rules include:

- Currency conversion
- Data aggregation
- Entity eliminations
- Allocations
- Data movement
- Other transformations

Practical Usage Examples

The following are examples of various practical uses of Solver's *Data Warehouse*:

Data Warehouse	Usage Examples
Multi-source consolidation *Data Warehouse*	• Load data from any ERP • Load data from external system (ADP, FAS, Ceridian, etc.) • Store multiple scenarios of budgets & forecasts
Powerful reporting, budgeting and modeling with Solver's *Reporting* and *Planning* modules	• The Solver *Data Warehouse*'s pre-defined integration to *Reporting* and *Planning* enables immediate reporting and budgeting capabilities as changes are made.
Dimension & data integration	• File import/export capabilities for all dimensions and data modules. • Solver integration tool.
Customize modules, dimensions & attribute names	• Labels can be modified to fit with the organization's requirements and to enhance the BI and CPM user experience.
Exchange rate administration	• Automatically calculate monthly average and closing rates as well as any other user configured rate type • Enter monthly rates directly into the database
Business rules engine	• Complex currency calculations for multi-national organizations
Data Explorer	• Filter, view and validate data loaded into each module

Typical Implementation Process

A typical implementation process of the Solver *Data Warehouse* would encompass the following:

1. Receive access to Solver cloud tenant
2. Determine source systems and data to be integrated with each system and map to Solver *Data Warehouse* modules and dimensions (see below).
3. Configure Solver *Data Warehouse* periods and tailor module and dimension names as needed (or leave default). *Note: Custom labels will also be visible in Reporting, Planning & Dashboards.*
4. Configure currency (as needed). Determine if exchange rates will be loaded from external system or monthly average/closing, etc. rates will be loaded directly into the *Data Warehouse* currency table. If it set up as an automated process, then configure the integration to update rates in the *Data Warehouse*. Determine import method (Solver integration tool or manual input into the exchange rate screen):
5. Configure integration tool and map to *Data Warehouse* module & dimension mappings

6. Business Rules: If business rules, such as currency conversion are to be used, ensure step #5 is completed. No additional steps required, other than running rule.
7. Document integration decisions.
8. Quick training required (walk through can be done in 1-2 hours).

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Appendix – Additional Resources

Solver Academy

The *Academy* is Solver's modern, cloud-based eLearning portal. With a full-time staff, Solver *Academy* is continuously updated with new training videos, tests and other learning resources. With the Academy, you can be anywhere in the world with an internet connection and a browser and get the same quality training as in a classroom, but on-demand and when it fits your own schedule.
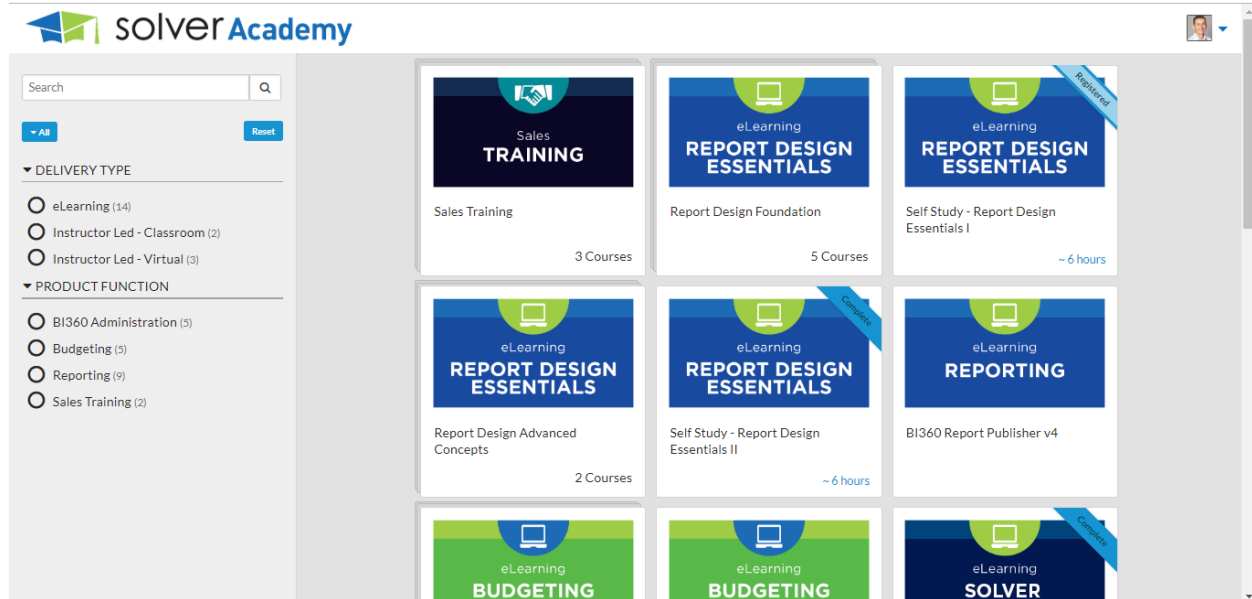
Support Portal

The Solver Support Portal (support.solverglobal.com) is the centralized location for users to learn more about the Solver suite. From opening and managing your support tickets to reading knowledgebase articles about the product, the Solver Support Portal has everything a user will need.

Users can access the Solver Knowledgebase for more information about the entire Solver Suite. From user guides, white papers, training manuals and much more, the Solver Support Portal has everything a user will need to get started with the application.

Additional Information about the Solver solution

Please contact us or review our web-site to request access to demo videos, white papers that specific to an industry, integrations or consolidations, etc.