

GENERAL DYNAMICS

Land Systems



Cash Forecasting Implementation at General Dynamics Land Systems

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Cash Forecasting at GDLS

Agenda

- Company Overview
- Prior State
- Project Overview
- Solution
- Benefits
- Lessons Learned
- Next Steps



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Company Overview

- Land Systems provides a full spectrum of land and amphibious combat systems, subsystems and components worldwide, specifically to the domestic and foreign militaries
- Land Systems, like most GD Businesses was built through acquisition, specifically:
 - Chrysler Defense (1982)
 - General Motors (GM) Defense (2003)
- Land Systems is made up of a few key business units:
 - GDLS - US
 - GDLS - Canada
 - Robotics
- Land Systems has approximately 7,500 employees worldwide in Australia, Canada, Egypt, Kuwait, Morocco, Saudi Arabia and the United States.



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Background

- Land Systems was an early adopter of Hyperion Essbase (since 1999) and leveraged it within the Finance organization
- In late 2009, GDLS embarked upon a Data Governance and Performance Management initiative within Finance
- Phase I resulted in an integrated Direct project planning application to support creation and reporting of Actual, Operating Plan, Rolling Forecast (Current Estimate)
 - Introduction of DRM for hierarchy management
 - Installation of 11.1.1.3 Hyperion Platform
 - Re-development of Direct Planning application within Hyperion Planning (from pure Essbase)
 - Launch of Financial Reporting and Smartview

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Business Process

- The CASH application is centered around the calculation of forecasted Receipts and Disbursements

Components	Description
Receipts	The total cash inflow typically generated from sales; also a key component to calculating Net Cash.
Disbursements	The total cash payments planned during a forecasting period; also a key component to calculating Net Cash.
Net Cash	The calculated difference of Receipts less Disbursements. Represents a measure of the company's overall cash flow and is leveraged as a measure of the health of a company.

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Scenario Overview

Scenarios	Type	Description
Op Plan	Forecast	The Op Plan scenario is a process that takes place annually during Q3 to forecast cash for the current year and subsequent 5 years.
Deep Dive	Forecast	The Deep Dive scenario is a quarterly process that forecasts cash for the current month through December of the current year.
First Look	Forecast	The First Look scenario is a monthly process that forecasts cash for the current month and the applicable first look forecast month of the current year.
CE (Current Estimate)	Data Source	The CE scenario represents the monthly forecast prepared in the Direct application.
Actual	Data Source / Forecast (Disbursements)	The Actual scenario represents monthly actual data sourced from corporate data warehouse (EDW) as well as statistical measures input to the Direct application.

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Prior State

- Analysts using various offline Excel forecasting “models”
 - Inconsistent methodologies used for similar contracts
 - Manual effort / error prone
 - Difficult to layer in adjustments
 - Lag in time to consolidate and report
 - Insufficient reporting / analytic capabilities
- Monthly actual disbursement calculation performed in Direct application



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Project Calendar

- Project initiated in Feb. 2011 and was a co-development effort between GDLS and external consulting resources

2011																																		
January							February							March							April													
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S							
						1			1	2	3	4	5			1	2	3	4	5							1	2						
2	3	4	5	6	7	8	6	7	8	9	10	11	12	6	7	8	9	10	11	12	3	4	5	6	7	8	9							
9	10	11	12	13	14	15	13	14	15	16	17	18	19	13	14	15	16	17	18	19	10	11	12	13	14	15	16							
16	17	18	19	20	21	22	20	21	22	23	24	25	26	20	21	22	23	24	25	26	17	18	19	20	21	22	23							
23	24	25	26	27	28	29	27	28						27	28	29	30	31			24	25	26	27	28	29	30							
30	31						Requirements							Design							Build													
May							June							July							August													
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S							
1	2	3	4	5	6	7				1	2	3	4						1	2		1	2	3	4	5	6							
8	9	10	11	12	13	14	5	6	7	8	9	10	11	3	4	5	6	7	8	9	7	8	9	10	11	12	13							
15	16	17	18	19	20	21	12	13	14	15	16	17	18	10	11	12	13	14	15	16	14	15	16	17	18	19	20							
22	23	24	25	26	27	28	19	20	21	22	23	24	25	17	18	19	20	21	22	23	21	22	23	24	25	26	27							
29	30	31					26	27	28	29	30			24	25	26	27	28	29	30	28	29	30	31										
							Build							User Testing							Defect Resolution							Production Migration						

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Requirements

- Driver-based to create standardized process
- Utilize existing infrastructure: DRM/ODI for Dimension management; Planning/Workspace for user experience
- Integration with existing GDLS applications to reduce manual data inputs
- Improve timing accuracy (weekly detail)
- Support for Cash-specific forecast scenarios (First Look/Deep Dive)
- Flexibility in determining how to seed forecast months/scenarios
- Enforce data integrity (e.g. user can't enter data to Week 5 in 4-week month)
- Facilitate What-if Modeling
- Improve Reporting Capabilities/Variance Analysis



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Challenges

- Multiple projects / transition to hosted infrastructure during development
- Contract Accounting
- Prior period actuals not static
- Differences between CE process and First Look/Deep Dive
- 4/4/5 Accounting Calendar
- New Disbursement Logic
- Offline template loading
- Suppress calculations on certain contracts
- Minimal time for users to ramp up



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Design Approach

- Focus on most common Contract Types for developing the model logic
- Member formulas utilized to extent possible to house common logic across scenarios
- Calculation scripts / business rules utilized to control point-of-view for calculations (scenario/year/period(s))
- Technical Design: Endeavor to define Week as a Dense dimension as it is a logical extension of Time

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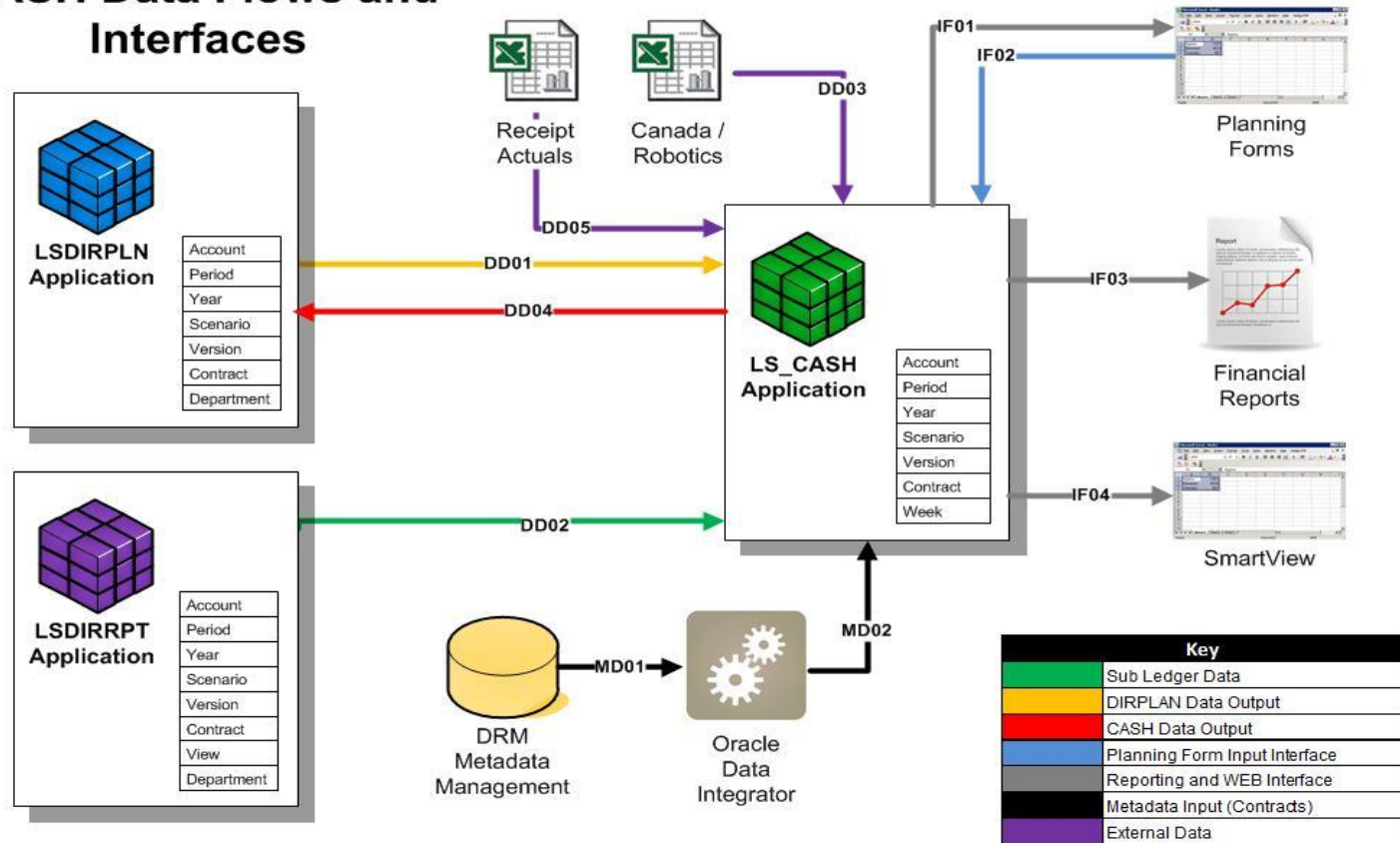
Model Types (based on Contract)

Cash Model Type	Description
Cost Plus	Standard modeling type that takes incurred costs and applies a negotiated rate that is entered by Users to determine total forecasted receipts (calculated). If applicable, an incentive fee can be entered by Users to further determine total forecasted receipts to include the incentive fee. This cash model type is primarily used for Cost Plus Fixed Fee and Cost Plus Incentive Fee contracts.
Cost Reimbursable	A variation of the standard cost plus cash model. Monthly billings of incurred cost, but with a % cap that is entered by Users and a zero fee.
Generic	A modeling type that will be primarily used for contracts that will be managed offline such as IDI, LOE, PBP Multi-Vehicle, etc. This model type will have total by month, and will calculate Disbursements for Op Plan and Deep Dive.
Performance Based Payments	A method of financing on firm fixed price contracts. Involves a schedule of negotiated milestones targets and values, up to 90% of the contract value.
Progress Based Payments	On fixed price contracts, cost is progress billed during production at a pre-determined rate with the remainder collected on delivery.
No Cash	Cash Model Attribute Tag to prevent codes from appearing in the Cash Model Data Forms. Also prevents Disbursements from being calculated (i.e. GDRS, GDLS-C, etc.)

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System Diagram (Logical)

CASH Data Flows and Interfaces



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Dimension Overview

#	Dimension Name	CASH (Planning Application)		
		Lowest Level	Example	D/S
1	Account	Plan Acct.	AC_TMATL	Dense
2	Week	Week	Week00	Dense
3	Period	Month	JAN	Dense
4	Years	Year	FY11	Sparse
5	Scenario	Scenario	SC_1QDD	Sparse
6	Version	Version	VR_Working	Sparse
7	Contract	Group Code	BSEP	Sparse

Block size = ~64k

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Dimension Maintenance

- Oracle Data Integrator (ODI)
 - Uses Extract Transform, and Load (ETL) technology (similar to Hyperion Application Link (HAL), Informatica, etc.) that provides the ability to gather data from a source system, transform the data and load it to the target database
 - Hyperion Planning leverages ODI to load data or metadata from a source system for loading into Hyperion Planning

#	Dimension	Dimension Build - Technology	Maintenance	Approx. Members	Dimension Build – Source
1	Account	Hyperion Planning	Manual	100	DIRPLAN
2	Week	Hyperion Planning	Manual	6	None
3	Period	Hyperion Planning	Manual	13	DIRPLAN
4	Years	Hyperion Planning	Manual	14	DIRPLAN
5	Scenario	Hyperion Planning	Manual	33	None
6	Version	Hyperion Planning	Manual	6	DIRPLAN
7	Contract	Oracle Data Integrator (ODI)	Automated	3,000	EDW (DRM)

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Attribute Dimensions

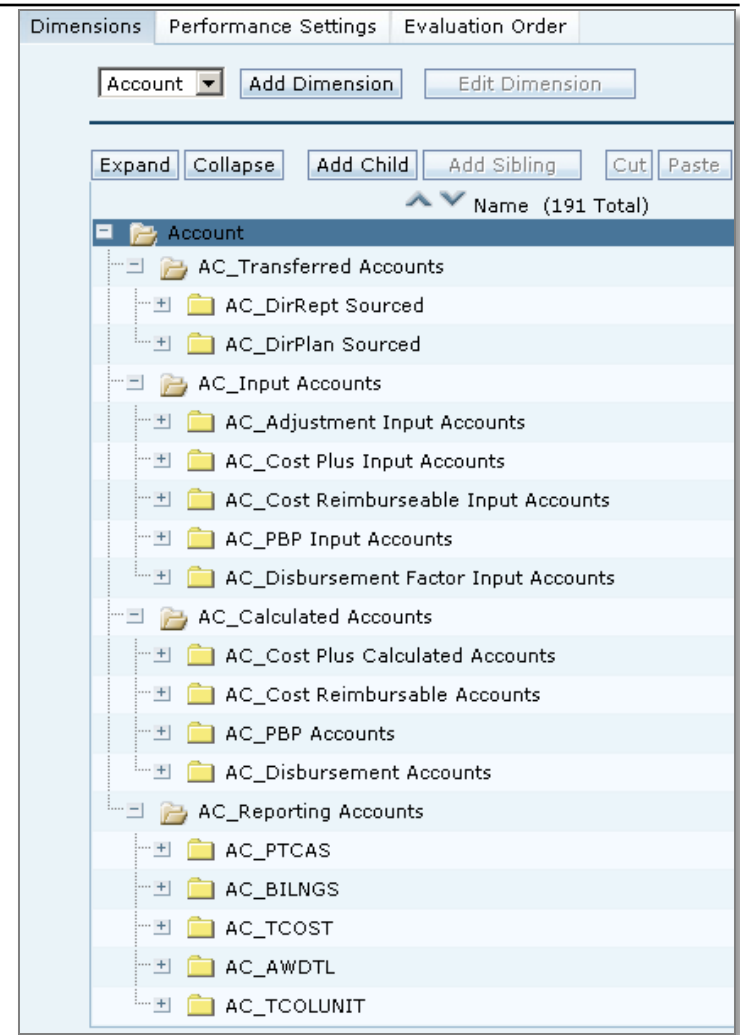
#	Attribute	Dimension Build - Technology	Maintenance	# Members	Dimension Build - Source
1	Cash Model Type	ODI	Automated	7	EDW (DRM)
2	Award Status	ODI	Automated	7	EDW (DRM)
3	Contract Type	ODI	Automated	17	EDW (DRM)
4	Delivery Order	ODI	Automated	121	EDW (DRM)
5	Fin Plan Class	ODI	Automated	34	EDW (DRM)
6	Program Analyst	ODI	Automated	118	EDW (DRM)
7	Program Manager	ODI	Automated	30	EDW (DRM)
8	Prime Scope	ODI	Automated	60	EDW (DRM)
9	Project Owning Org	ODI	Automated	11	EDW (DRM)
10	Sales Type	ODI	Automated	14	EDW (DRM)
11	Super Group Code	ODI	Automated	36	EDW (DRM)
12	Support Type	ODI	Automated	11	EDW (DRM)

Contract is Base Dimension for all attributes

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Account Structure

- **Transferred Accounts:** categorizes all accounts that will be sourced from DIRPLAN and DIRREPT
- **Input Accounts:** categorizes all accounts that will be input via Planning
- **Calculated Accounts:** categorizes all accounts that have a member formula to calculate the value of the account
- **Reporting Accounts:** represents hierarchies of shared members required for reporting



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Contract Dimension Structure

- As a matrix organization, GDLS requires the ability to view Contracts across both Product Centers (e.g. Vehicles) and Process Centers (e.g. Engineering)

Product Hierarchy

Product Center

Product Line - Product

Sub Product Line - Product

Fin Planning Family - Product

Group Code

Process Hierarchy

Process Center

Product Line – Process

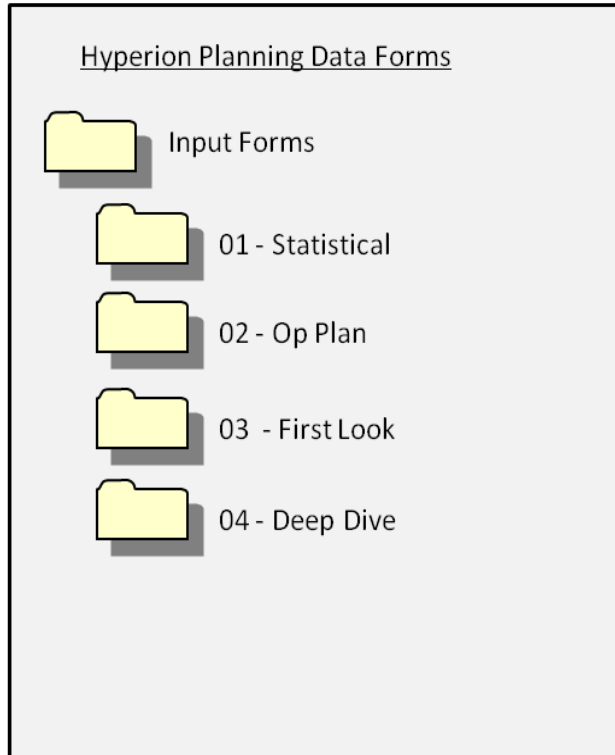
Sub Product Line – Process

Fin Planning Family - Process

Group Code (Shared)

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Data Form Structure



Folder Name	Folder Description
Statistical	Contains data forms for system data (e.g. disbursement factors), used by Administrators only
Op Plan	Contains all data forms related to the Op Plan Forecasting Process
First Look	Contains all data forms related to the First Look Forecasting Process
Deep Dive	Contains all data forms related to the Deep Dive Forecasting Process

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OpPlan Data Form Example

The screenshot displays the Oracle Enterprise Performance Management System interface. The browser title is "Oracle Enterprise Performance Management System ...". The application menu includes File, Edit, View, Favorites, Tools, Administration, and Help. The main window title is "LS_CASH".

The left sidebar shows a tree view of folders:

- 01. Input Forms
 - 01. Statistical
 - 02. Op Plan (selected)
 - 03. First Look
 - 04. Deep Dive

The main content area displays a table with two columns: "Data Form" and "Description".

Data Form	Description
<u>LS_CASH_OP_Cost_Plus</u>	Op Plan Cost Plus
<u>LS_CASH_OP_Cost_Reimbursable</u>	Op Plan Cost Reimbursable
<u>LS_CASH_OP_Generic_Input</u>	Op Plan Generic
<u>LS_CASH_OP_Performance_Based_Payments</u>	Op Plan Performance Based Payments
<u>LS_CASH_OP_Progress_Based_Payments</u>	Op Plan Progress Based Payments

At the bottom of the sidebar, a list of data forms is visible:

- LS_CASH_OP_Cost_Plus
- LS_CASH_OP_Cost_Reimbursable
- LS_CASH_OP_Generic_Input
- LS_CASH_OP_Performance_Based
- LS_CASH_OP_Progress_Based_Pa

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Data Form Example: Cost + Fixed Fee Contract

Scenario: 2012 Op Plan

Page: [redacted] M CY2014 Working Go

		Jan	Feb	Mar	Apr	May	Jun
Total Cost	Total Month	1209765	1286098	1423796	1311822	0	0
Negotiated Rate (%)	No Week	8%	8%	8%	8%	8%	8%
Incentive Fee (\$)	No Week						
Calculated Billings	Week 01						
	Week 02	611613	673883	654786	661732	354192	0
	Week 03						
	Week 04	653273	694493		708384	0	
	Week 05			922619			0
Billing Adj.	Week 01						
	Week 02						
	Week 03						
	Week 04						
	Week 05						
Total Billings	Total Month	1264886	1368376	1577406	1370116	354192	0
Calculated Receipts	Week 01		611613	673883		661732	354192
	Week 02						
	Week 03	854929	653273	694493	922619	708384	0
	Week 04						
	Week 05			654786			0
Cash Receipt Adj.	No Week						
Total Receipts	Total Month	854929	1264886	2023162	922619	1370116	354192
Cash Disb. Calculated	Total Month	1053736	1190694	1482968	1276867	730477	275000
Cash Disb. Adj.	No Week						
Total Disbursements	Total Month	1053736	1190694	1482968	1276867	730477	275000
Cash	Total Month	-198807	74192	540194	-354247	639639	79192

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Cost + Fixed Fee Sample Logic (Receipts)

- Methodology (unique by Contract Type):
 - Calculate Billings
 - Apply Fixed Fee %
 - Derive Receipts
- Billings & Receipts Calculated by Week
 - Based on AR analysis, customized logic defined for each Week/Month combination
 - Analysts always have flexibility to adjust as necessary
- Example: April
 - Billings for Week 2 is based on 20% of March Costs and 25% of April Costs
 - Negotiated Rate is then applied to derive Billed Fee
 - Receipts for Week 3 is based on Week 5 Billings from March
- Similar process exists for calculating Disbursements

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Disbursement Calculation

- **Disbursement Calculation consists of following cost categories**
- **New disbursement factors based on historical data with payment lags**
- **Responsibility for cash disbursement variance resides with Financial Planning & Revenue Management**

Categories
Material
Labor
Fringe
G&A
Overhead
Procurement
ODC
INSEG
Major End Item
Total Cost Adjustment

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Calc Script Design

Category	Purpose	Example
Calculation	Calculate distinct combinations of Cash Model Type and scenario. Corresponding business rules exist for each combination and are attached to appropriate data forms.	Calculate Cost Plus model type for OpPlan
Aggregation	Consolidate Contract dimension for each scenario.	Aggregate Contract dimension for First Look
Seed	Seed scenarios within Cash application with appropriate source data.	Copy data to Deep Dive scenario from desired source scenario
Data Transfer	Facilitate data transfers across applications.	Clear Actual Billings / Extract Deep Dive data

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What-If Functionality

- **Purpose:** Provide the analysts the ability to model out a scenario in a sandbox without changing their current data. Once complete, provide the ability to copy it back.
- **Functionality:**
 - Provides the ability to copy the data in the Working Version to a What-if Version to play out a scenario
 - Provides the ability to copy back the results of the What-if Version to the Working Version

Business Rule	Purpose
CASH_Copy_Current_to_What_If	This business rule will run “manually” when executed by a user, it will copy the data in the current version of the data form to the “what if” version.
CASH_Copy_Current_to_Working	This business rule will run “manually” when executed by a user, it will copy the data in the current version of the data form to the “working” version.

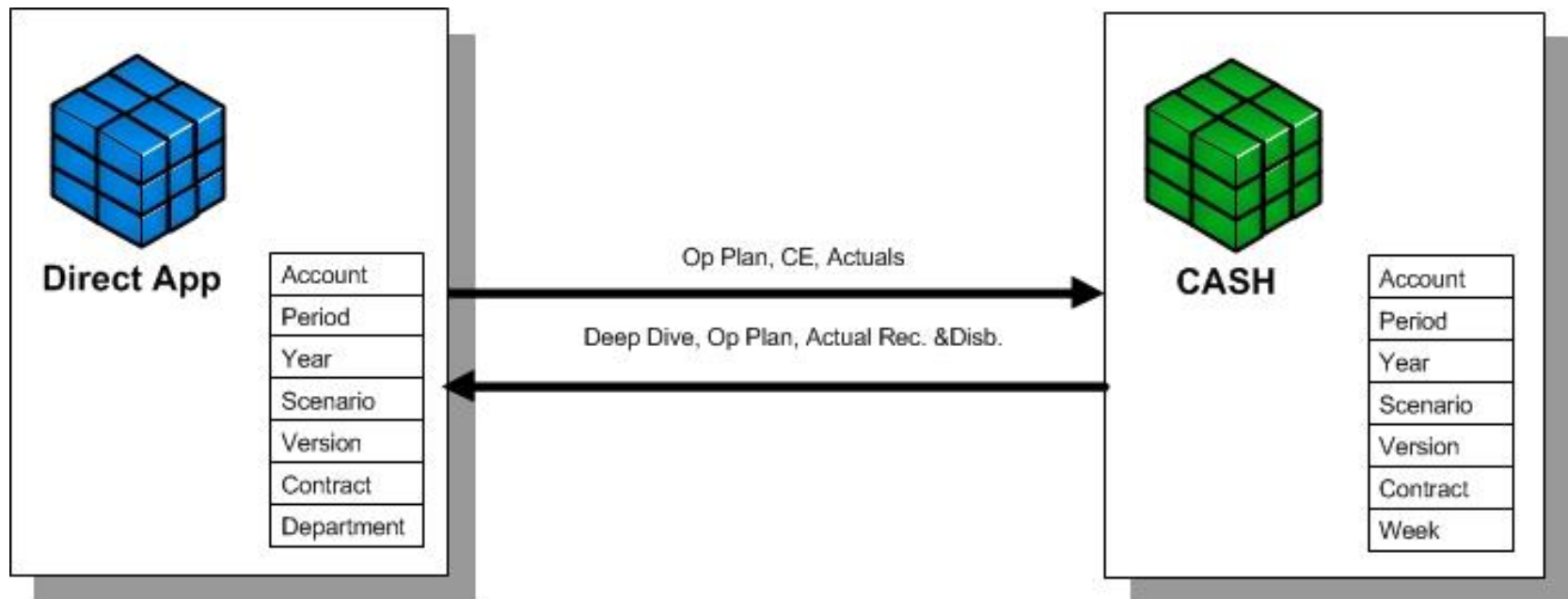
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Security

- Dimensional security mirrors Direct Planning application
- Defined against Contract, Scenario, Version, Account
- Example: LS_DIRPLN_STRYKER_PROD_AM group has Write security defined as follows:
 - Contract: Descendants of STRYKPDS
 - Scenario: SC_4QDD (for open periods)
 - Version: VR_Working and VR_Whatif
 - Account: Descendants of AC_Input Accounts

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Automation - Nightly Cash Data Transfers



First Look scenario only exists in Cash application

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Benefits

- Standard Forecasting Methodology / Central Repository
- Reduced risk and errors related to manual consolidation and reporting of cash data
- Reduced manual effort required to perform Cash Forecast
- Improving accuracy in Actual and Forecast data
- Standardized reports / faster turnaround to management
- Flexibility (use of Substitution Variables)
- Security based on user groups
- Data transfer and calculation processes fully automated
- Inclusion of data from offsite locations:
Robotics and GDLS-C



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Lessons Learned



- Cash Model Type – Defined as attribute against Contract dimension (does not work well if changing over time). Issue with initial application set-up and configuration.
- Time Lag between Production Migration and Go-Live

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Next Steps

- Executive Dashboard Launch
- Rate Development
- EAC Reporting



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Q&A

