Surviving Unpredictability

Kristi Gieseke Demand Solutions Northeast

Velocity

CONNECT + ACCELERATE + INNOVATE





IGC



Always vs. Sometimes

"Computers are good at *always* and people are good at *sometimes."* -Paul Secraw

- One of the challenges that we all face is that there seem to be fewer and fewer "always" events, and more and more "sometimes" events ... and we need to find ways to help you deal with them."
- Fortunately, there are tools in DSX that help you address these sometime events ... most of the time.





Challenges

Face Competition from every Aspect

Quality-Cost-Time

Continuous Improvement is Essential

- Innovative yet flexible
- Reduce Costs while improving service levels



Utilize DSX to incorporate strategic plans for the "sometimes" events



Planned Interruptions

- Not all interruptions are unexpected. Many times they are planned but still disruptive.
 - Chinese New Year
 - Plant Shutdowns
 - Equipment Maintenance
 - Restricted receiving days
 - Cleaning or Sanitizing production units
 - Other Holidays



Strategic, integrated planning during these periods is vital

DSX Functions to Manage Planned Interruptions

Supply Planning

Closed Day Calendars

- Applied within Order Plan by:
 - Vendor
 - Production Line
 - Category
- Etc.Safety Time
 - Vary based on plan
 - Normal operation
 - Temporary increase or decrease of inventory

Vendor

Temporary Vendor Change

Demand Planning

Curves

Restrain or force demand seasonality



Seasonal Forecast



Every business that we've ever worked with exhibits some degree of seasonality in their sales

Level Sourcing Capacity



- No matter how well you can predict the seasonality of your sales, one planning challenge is that most businesses have fairly "flat" production (or sourcing) capabilities
- Goal is to have enough inventory to handle the peaks, yet not too much at the end of the season

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Weekly Planning Challenge



Now, looking at this at a more granular, weekly level, with supplier and plant shutdowns factored in, the challenge of planning our products and raw materials is magnified

Week 11/19 will be Closed for Receiving

	10/29/2018	11/5/2018	11/12/2018	11/19/2018	11/26/2018	12/3/2018	12/10/2018
AdjFcst	3,749	3,940	3,906	3,855	3,855	3,640	3,640
CustOrders	0	0	4,500	0	0	0	0
Gross Req	3,749	3,940	4,500	3,855	3,855	3,640	3,640
SchReceipts	0	0	0	0	0	0	0
PInReceipts	3,900	3,852	4,416	3,636	3,636	3,600	3,444
PInOrders	4,416	3,636	3,636	3,600	3,444	3,192	2,652
Safety Time	2.17	2.17	2.17	2.17	2.17	2.17	2.17
DEI	8,482	8,397	8,310	8,095	7,875	7,837	7,641
PEI	18,494	18,406	18,322	18,103	17,884	17,845	17,649

DSX Closed Day Calendars Can be Created



Multiple Closed Day Calendars May Exist

Closed Day Calendar Settings			×
		Create 🥒 Edi	it 🗈 Copy 前 Delete 🗙 Close
Name	Access	Author	Description
Closed 2019_6_1-15	System	Administrator	Closed 2019_6_1-15
CNY 18-19	System	Administrator	CNY 18-19
Pitts Plant Closed Calendar 2018-19	System	Administrator	Pitts Plant Closed Calendar 2018-19

- Different Closed Day calendars can be setup and selected in the Order Plan, depending upon the planned event & associated resource
- Or a universal calendar could be applied to all planned records



Rescheduling: Select the Closed Day Calendar in Order Plan

Closed Day Calendars are used only in the Order Plan and do NOT replace the System calendars

= Order Plan		×		
🔅 Detail 🔅 Options 🔅 Rescheduling	🔅 Measurements	S Finish	Closed Day Calend	ar None
			Move Orders	None
		Next Cancel		Closed 2019_6_1-
		<u> </u>		CNY 18-19
Rescheduling Options	Closed Day Calendar	Pitts Plant Closed Calendar 20 🔹		Pitts Plant Closed 2018-19
Reschedule Firm Planned Orders	Move Orders	○ Forward Backward		

- Reschedule Work Orders
- **Rescheduling Priority Based On**
- O Balanced Rescheduling
- The Following Three Data Fields

First Priority	Priority Code	
Second Priority	ABC 1	-
Third Priority	Item	•

- When selecting "Move Orders Forward," DSX will push the orders from the closed days to the first available date in the future.
- When selecting "Move Orders Backward," DSX will pull the orders into the first available period before the closed days.

Create>Review Order Plan Detail (Before Rescheduling)

	Primar	ry Key		Pittsburg	jh	Sec	condary Ke	ey	В	ottling			Reschedule
	Adjust	t Type			•	Ad	ljust Value		0				Adjust
	Per	riod Beginnii	ng	Units		Original To	otal Units		Revised T	otal Units	PO Numb	er	Tag All
	s	elect Item :	11201		Add Item								^
	Div	vision	Customer	Ship To	Total On Hand	Order Units	Units		Total	Order Date	Required Date	PO Number	Tag All
					10,000	3,636	1		3,636	11/5/2018	11/19/2018	P100008006	
	10/29/20	018	11/5/201	18	11/12/2018	11/19/2018		11/26/2	018				
Fcst		3,74	9	3,940	3,906	5	3,855		3,855				
tOrders			D	0	4,500)	0		0	In this ca	se, we're l	ooking at	the summarized Plan
ss Req		3,74	9	3,940	4,500)	3,855		3,855	Orders fo	or the Vend	dor: PITTS	BURGH- Item: 11201
Receipts		(0	0	()	0		0				
Receipts		3,90	0	3,852	4,416	i (3,636	$\mathbf{)}$	3,636	Drill into	the Order	Plan Deta	ils for a specific perio
Orders		4,41	6 (3,636	3,636	5	3,600		3,444	this case	click on th	ne week o	f 11/5/2018.
ty Time		2.1	7	2.17	2.17	7	2.17		2.17	/			. ,
		8,48	2	8,397	8,310)	8,095		7,875	Rememb	er: Week 1	11/19/201	8 is within the Close
		18,49	4	18,406	18,322	2	18,103		17,884	Calendar		, , -	
proved Orders		(0	0	()	0		0				

After Rescheduling Order Plan

	Period Beginning		Uni	Units			Original Total Units				Revised To	otal Units	PO Numb	PO Number		III ✓ Tag All	
	Select Item :	11201		•	Add Item												
	Division	Custome	er Ship To	T	otal On Hand	Order	Units	Units		Total		Order Date	Required Date	PO Number	⊡Tag All		
				1	0,000	3,636		1		3,636	(11/2/2018	11/16/2018	P100008006		^	
	10/29/2018	;	11/5/2018		11/12/2018		11/19/20)18	11/26	/2018							
AdjFcst		3,749		3,940		3,906		3,855			3,855	After rescheduling, the detail reflect the update					
CustOrders		0		0		4,500		0			0	Order	Date and Du	ie Date.		•	
Gross Req		3,749		3,940		4,500		3,855			3,855						
SchReceipts		0		0		0		0			0	The Or	der Date is	now 11/2/	/2018 & tl	ne PO's	
PInReceipts		3,900		3,852		4,416		3,636	\mathbf{D}		3,636	Requir	ed Date is n	ow 11/16,	/2018, pri	or to the	
PInOrders		4,416	C	3,636	$\mathbf{>}$	3,636		3,600			3,444	closed	week becau	use we hav	ve selecte	d to Move t	
Safety Time		2.17		2.17		2.17		2.17			2.17	Orders	Backward (not forwa	rd) within	the Order	
DEI		8,482		8,397		8,310		8,095			7,875	Plan se	etting.		, ,		
PEI		18,494		18,406		18,322		18,103			17,884	Remer	nber the dat	ta on the r	ecord's s	oreadsheet	
Approved Orders		0		0		0		0			0	panel	will not char	nge. Howe	ever, the c	order plan	

output is updated.

Results in the Order Plan Output

Vendor	ShipTo	RequiredDate	ltem	OrderQty	PONumber
Pittsburgh		2018-12-03 00:00:00.000	Global RP 11201	3600.0000000	P100008008
Pittsburgh		2018-12-10 00:00:00.000	Global RP 11201	3444.0000000	P100008009
Pittsburgh		2018-12-17 00:00:00.000	Global RP 11201	3192.0000000	P100008010
Pittsburgh		2018-12-21 00:00:00.000	Global RP 11201	2652.0000000	P100008011
Pittsburgh		2018-12-21 00:00:00.000	Global RP 11201	2772.0000000	P100008012
Pittsburgh		2018-10-15 00:00:00.000	Global RP 11201	12024.0000000	P100008001
Pittsburgh		2018-10-22 00:00:00.000	Global RP 11201	3936.0000000	P100008002
Pittsburgh		2018-10-29 00:00:00.000	Global RP 11201	3900.0000000	P100008003
Pittsburgh		2018-11-05 00:00:00.000	Global RP 11201	3852.0000000	P100008004
Pittsburgh		2018-11-12 00:00:00.000	Global RPI11201	4416.0000000	P100008005
Pittsburgh		2018-11-16 00:00:00.000	Global RP 11201	3636.0000000	P100008006

Although the results are not visible on the spreadsheet panel, the proper Order Quantity & Required Data of the PO is delivered in the Order Plan output file

Create Closed Day Calendar

- Closed Day Calendars are used only in the Order Plan and do NOT replace the System calendars
 - Different Closed Day calendars can be setup and selected in the Order Plan
 - Or a universal calendar could be applied to all planned records

- To create a Closed Day Calendar, select:
 - Admin tab
 - Closed Day Calendar icon
 - Click Create



Closed Day Calendar Settings			×
	(Create 🥢 Edit 🕅	Copy 🗊 Delete 🗙 Close
Name	Access	Author	Description
2019_6_1-15_Closed	System	Administrator	2019_6_1-15_Closed
CNY 18-19	System	Administrator	CNY 18-19
Pitts Plant Closed Calendar 2018-19	System	Administrator	Pitts Plant Closed Calendar 2018-19



Definition: Set Horizon

- Select a Calendar Start Date
- Enter the Number of Years of the calendar's horizon
- Click Next

😑 Closed Day Calendar Setting:	5	×
O Definition	Weeks 📀 Months 📀 Finish	
		Next X Cancel
Calendar Start Date	1/2019	
Number of Years	3	

Weeks: Determine Days

Closed Day Calendar Settings		×
😟 Definition 🔷 😟 Weeks	🔅 Months 🔅 F	Finish
	Closed Day Calendar Settings	×
Days of the Week Eligible for Orders	🔅 Definition 🛛 🔅 Weeks	🐼 Months 🔅 Finish
 Sunday Monday 	Days of the Week Eligible for Orders	Next Cancel
Tuesday	Monday	Determine the days aligible for
Wednesday	✓ Tuesday	Orders
Thursday	✓ Wednesday	In these 2 examples:
Friday	Thursday Friday	 Sunday and Saturday are eliminated Or only Mondays could be selected
Saturday	Saturday	- Of Only Mondays could be selected
Days of the Week Eligible for Orders Sunday Monday Tuesday Wednesday Thursday Friday Saturday	 Definition Weeks Constant of the Week Eligible for Orders Sunday Sunday Monday Tuesday Tuesday Wednesday Thursday Friday Saturday 	 Month Yext Image: Cancel Determine the days eligible for Orders In these 2 examples: Sunday and Saturday are eliminated Or only Mondays could be selected

Months: Reflect the Weeks Setting



Multiple Future Months are Set



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Finish & Name Closed Day Calendar



Optimizing Inventory – Supply Chain

- Use of closed day calendars is just one of the tools in your DSX toolbox
- Keep in mind that moving requirements forward or backward may result in a sudden surge in inventory.



If capacity is a concern, gradually increasing inventory, in the right locations, prior to the interruption, then decreasing inventory after the event, will enable a collaboration of all members of the supply chain

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Safety Stock-Safety Time

- Safety Stock is a quantity of inventory which serves as a buffer to cover unplanned demand
 - Strategically, an item that is more forecastable requires less safety stock than an item which is less forecastable
- DSX offers an option to use Safety Time as well as Safety Stock
- Use of Safety Time allows DSX customers to stay ahead of seasonal changes
- As demand increases, safety time automatically triggers an increase in onhand inventory
 - A 2 week safety time as we approach peak season, will deliver an increase of inventory when required, while the same 2 week safety time at the end of the season, will deliver a decrease of inventory





Use Pareto's Law & DSX's ABC Ranking



DSX analysis tools enables standards to be set based on the business requirements



Normal Operations Safety Time

- Best practice standards drive the assignment of Safety Time based on priority
- More forecastable "A" items are assigned a shorter Safety Time value
 - A records result in more frequent inventory turns
- B & C records are less forecastable and are assigned longer Safety Times or higher Safety Stocks
 - C and/or D records may be designated as Make to Order vs Make to Stock

DSX's ABC Analysis & Global Changes can make these assignments to reduce inventory and improve service

Results of Safety Time Variations

Ramping up of Safety Time, before the season, increases inventory
 Better prepared for seasonal, unplanned demand

	10/8/2018	10/15/2018	10/22/2018	10/29/2018	11/5/2018	11/12/2018	11/19/2018	11/26/2018	12/3/2018	12/10/2018
AdjFcst	1,487	1,460	1,453	1,424	1,379	1,367	1,349	1,349	1,318	1,318
CustOrders	0	3,600	0	0	3,600	0	0	0	4,800	0
Gross Req	1,487	3,600	1,453	1,424	3,600	1,367	1,349	1,349	4,800	1,318
SchReceipts	0	0	0	0	0	0	0	0	0	0
PInReceipts	0	9,684	1,380	1,368	5,016	1,320	1,308	1,308	8,568	1,716
PInOrders	1,380	1,368	5,016	1,320	1,308	1,308	8,568	1,716	1,704	1,692
Safety Time	2.17	2.17	2.17	2.17	3.25	3.25	3.25	3.25	5.41	5.41
DEI	3,148	3,104	3,029	2,969	4,392	4,342	4,308	4,261	8,024	8,422
PEI	-574	5,510	5,437	5,381	6,797	6,750	6,709	6,667	10,435	10,834

What if Safety Time allows the Inventory to fall below Safety Stock Quantities?



Greater of Safety Stock & Safety Time

DSX can also be set to observe the Greater of Safety Stock or Safety Time for customers that have traditionally relied on Safety Stock values

	10/8/2018	10/15/2018	10/22/2018	10/29/2018	11/5/2018	11/12/2018	11/19/2018	11/26/2018	12/3/2018	12/10/2018	12/17/2
AdjFcst	1,487	1,460	1,453	1,424	1,379	1,367	1,349	1,349	1,318	1,318	
CustOrders	0	3,600	0	0	3,600	0	0	0	4,800	0	
Gross Req	1,487	3,600	1,453	1,424	3,600	1,367	1,349	1,349	4,800	1,318	
SchReceipts	0	0	0	0	0	0	0	0	0	0	
PInReceipts	0	9,684	1,380	1,392	4,992	1,320	1,308	1,308	8,568	1,716	
PInOrders	1,380	1,392	4,992	1,320	1,308	1,308	8,568	1,716	1,704	1,692	
Safety Time	2.17	2.17	2.17	2.17	3.25	3.25	3.25	3.25	5.41	5.41	
	2.1.0	2.104	2 0 2 0	2 000	4 202	4 2 4 2	Safaty St	Safety Stock / Safety			
↓ DEI	3,148	3,104	5,029	5,000	4,592	4,542	Salety St	ock / Salety	Options:		
PEI	3,148 - 574	5,510	5,437	5,405	6,797	6,750	Time Usa	age Indicator	Options:		
PEI	- 574	5,510	5,437	5,405	6,797	4,342 6 750	Time Usa	age Indicator	Safety Stoc	k Only	
PEI PIanning Data ×	3,148 -574 Item Master ×	5,510	5,437	5,405	6,797	4,342	Time Usa	age Indicator	Safety Stoc Safety Time	k Only e Only	
DEI PEI Current Safety Time	3,148 -574 Item Master × 0.50	5,510	5,437	5,405 Current Safety Stock	4,392 6,797 3,000.00	4,342	Time Usa	age Indicator	Safety Stoc Safety Time Safety Stoc	k Only e Only k + Safety Tim	ne
DEI PEI PIanning Data X Current Safety Time	3,148 -574 Item Master × 0.50	5,510	\$,029	5,405 Current Safety Stock	4,392 6,797 3,000.00	4,342 6 750	Time Usa	age Indicator	Safety Stoc Safety Time Safety Stoc Greater (of	k Only e Only k + Safety Tim f SS or ST)	ne



Temporary Vendor Change

- Many of our apparel customers that source from Asia temporarily use domestic sourcing, when necessary:
 - Excessive unplanned demand or new business
 - Labor disputes
- These vendors may be more expensive, but not as costly as lost sales or a decrease in service levels
- Consider other planning data such as lead times and plan minimums when alternate sources are used





DSX Global Changes

▶ By temporarily changing the Vendor in DSX, the Order Plan will reflect the domestic vendor

Global Change Settings								
😟 Data Cha	😵 Data Changes 💫 🔅 Finish							
Type of Periodic Global Change								
O Periods	Dates							
Descriptive Da	ata Change			Treat Nulls As Ze				
+ Add new	record							
	Activate	Specification	Changed Value	Clear Data				
1	\checkmark	Lead Time In Days	30					
1	\checkmark	Minimum Order Units	144					
1	\checkmark	Vendor	Baltimore	X				

Historical Seasonality Sometimes Doesn't Fit

Seasonality is generally evident

• More ice cream is sold in the summer & cold medicine spikes in the winter

Be aware, sometimes seasons change

 Some holidays and events which effect seasonality shift from year to year

Thanksgiving, Lent, tradeshows or promotions
 Look ahead & re-seasonalize the forecast to best reflect future demand



If the seasonal patterns that shape your history will shift in the future, be sure to appropriately shift the seasonal spread of your forecasts.

Forecast Spread with Curve

A curve can change the forecast for an item and force the desired seasonality
 An item that will now only be available 5 months of the year

	2019 AdjFcst	Curve '19
January	11,024	20,750 (
February	10,304	27,666
March	13,255	34,583
April	8,183	41,500
May	8,594	0
June	17,806	0
July	12,219	0
August	10,969	0
September	11,396	0
October	15,048	0
November	12,633	0
December	6,901	13,833 、
Total	138,332	138,332
Average	11,528	11,528
	-	



Force Seasonality: Curve Assignment

- Assignment of a curve to records may be executed via Global Changes or Manually
- Manual: Select the appropriate Curve from the list of curves created
- Global Changes/Batchbuilder:



Manual: Select the Curve Assignment Settings

Easter ×				💾 Spread
Assign Curve				Percent
	Colora T	Colore V	1	15.00 % 🔿
Interpolate Annual forecast from History	Select	Select	2	20.00 %
Interpolate Using 0 🌲 Periods of D	ata		3	25.00 %
			4	30.00 %
Spread Using Forecast	Forecast *	Adjusted Forecast	5	0.00 %
0			6	0.00 %
○ Spread Quarterly ● Spread Anr	nually		7	0.00 %
Forecast Start Date 1/1/2019			8	0.00 %
Number of Vears 1			9	0.00 %
			10	0.00 %
Store Curve To	Forecast *	Adjusted Forecast	11	0.00 %
-			12	10.00 % 🗸
Spread Start Date 1/1/2019				

Testing the curve spread may be done prior to mass deployment through global changes or batching the process



Global Change & Forecast Setting

 Assign the Curves via Global Changes Edit Forecast Setting to insure Curves are selected

	Activate	Specification	Changed Value	Forecast Settings	Loading ×
</th <th></th> <th>Assigned Curve 💌</th> <th>Easter 👻</th> <th>Fields Obstination</th> <th>ails 🔷 Finish</th>		Assigned Curve 💌	Easter 👻	Fields Obstination	ails 🔷 Finish
					Next Cancel
				Forecast Granularity	Spread Forecast
_				 Use granularity defined by item 	✓ Spread Forecast with Curve
🕨 Αι	utom	ate by adding to	batch job	Quarterly	Spread with Forecast
			-	Monthly	 Quarterly Annually
				Weekly	 Interpolate Annual forecast from History
					Interpolate Using 0
					 Interpolate Periods Based on Interpolation Counter
					History to Use
				Select Formulas	Limits
				 Allow System to choose the best 	Allow Negative Forecast
				Special Formula None +	🖌 Auto Alpha Flag
				Custom Choice	Alpha Percentage 0
					Growth Factor Range 999 To 50

Results of Deployment: Adjusted Forecast Spread with Curve

Forecast is now spread based on the assigned Curve percentages...

	2019 AdjFcst	Percent
January	20,750	15.00 %
February	27,666	20.00 %
March	34,583	25.00 %
April	41,500	30.00 %
May	0	0.00 %
June	0	0.00 %
July	0	0.00 %
August	0	0.00 %
September	0	0.00 %
October	0	0.00 %
November	0	0.00 %
December	13,833	10.00 %
Total	138,332	
Average	11,528	-

Create New Curve



- From the Data tab, use the drop-down below the Curves icon
- Select Manage Curves



Choose Data to Base Curve

Click the Create button



Select the data to create the curve from, such as Original History or Adjusted History or a forecast stream

Manage Curve Settin	ıgs		×
Settings	🔿 📀 Results 📄 😒 Finish		
			Next Cancel
Create Curve From	Select	•	
	History	^	
Туре	····· Adjusted History	Calculation Paramet	ers
Seasonality	Original History	The First Period Cont	ains a Value
C Lifecycle	Adjusted Forecast	Choose Specific Start	ing Period
Start Date	SaveFcst12month	Start Date	2/1/2017
Length of Curve		Number Of Years	1
Store Curve To	Select.	•	

Curve Setting: Type & Calculation

- Choose Seasonality or Lifecycle
- Select the Start Date of the Curve and Length of Curve
- Select the data to use in the Calculation of the curve spread
- Store Curve to...Adjusted
 Forecast

Curve Settings						
Settings	Results	🔪 🛇 Fir	nish			
					- I	🕑 Next 🙁 Cancel
Create Curve From	History		•			
Туре	Order History		•	Calculation Parame	ters	
Seasonality				○ The First Period Co	ntains a Value	
○ Lifecycle				Ochoose Specific State	rting Period	
Start Date	1/1/2019	Ē		Start Date	1/1/2016	Ē
Length of Curve	1	* *		Number of Years	3	*
Store Curve To	Forecast		•			
	Additional Forecast 1		•			

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Review Curve Percentage

- Results display the percentage spread based on the period selected
 - Month 1=January
- User may edit the percentages if season or event has shifted
- Some user create their own curves

	Manage Curve Settings		×
	Settings Settings	S Finish	
			Next Cancel
	SequenceNumber		Value %
	1		7.78
	2		7.78
	3		15.56
Curve Settings			×
Settings	Results O Einich		
Settings		_	
		0	Next Cancel
Sequence Numbe	er	Value %	
1		15.00	^
2		20.00	
3		25.00	
4		30.00	
5		0.00	
6		0.00	
7		0.00	
8		0.00	
9		0.00	
10		0.00	~
Total 100.00 %			

Create a Library of Curves to Choose From

- Finish by naming the curve
- REMEMBER, these curves are created but now they must be assigned

Curve Settings			 >
😧 Settings	Results	📀 Finish	
			💾 Save 🛛 Cancel
	F . 1		
Name*	Easter		
Description *	Easter		
		×	
	_		

E Curve Settings

Create	🖉 Edit	Copy	🛍 Delete
--------	--------	------	----------

Name	Author	Access	Description	
BackToSchool	Administrator	System	BackToSchool	/
Easter	Administrator	System	Easter	
Summer Promo #1	Administrator	System	Summer Promo #1	
Thanksgiving	Administrator	System	Thanksgiving	

Force Seasonality for New Records

New records' flat forecasts can also be seasonalized by applying a curve

Item to be promoted only May – August (Summer Promo #1)

	2019 SysFcst	2019 AdjFcst	2020 AdjFcst	2019 AdjFcst	2020 AdjFcst	Percent
October	1,000	1,000	1,000	0	0	0.00 %
November	1,000	1,000	1,000	0	0	0.00 %
December	1,000	1,000	1,000	0	0	0.00 %
January	1,000	1,000	1,000	0	0	0.00 %
February	1,000	1,000	1,000	0	0	0.00 %
March	1,000	1,000	1,000	0	0	0.00 %
April	1,000	1,000	1,000	0	0	0.00 %
May	1,000	1,000	1,000	1,200	1,200	10.00 %
June	1,000	1,000	1,000	3,000	3,000	25.00 %
July	1,000	1,000	1,000	4,800	4,800	40.00 %
August	1,000	1,000	1,000	3,000	3,000	25.00 %
September	1,000	1,000	1,000	0	0	0.00 %
	12,000	12,000	12,000	12,000	12,000	



THANKYOU