

ATHENA ROUTE OPTIMIZATION

Education Logistics, Inc.

Training Guide

Athena Route Optimization Training Guide

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Date Modified: 12/13/24

Version: 1.68

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INTRODUCTION

Athena's Route Optimization feature allows you to develop the most efficient bus routes within the guidelines of your district's transportation policies. You can rapidly generate efficient routes with the runs in your system and quickly review the impact of changes in school times or in the number of vehicles used. You can create and examine these solutions, even as you use the system for your daily transportation work. If you decide you want to use one of these solutions to modify your existing data, you can easily incorporate it into the actual transportation system.

Route Optimization uses your geographic and transportation data to help you accomplish these tasks more efficiently and easily. The system performs previously routine and repetitive tasks automatically, reducing the amount of time required to prepare for a new school year or respond to changes in transportation requirements. You can use the various optimization features (Stop, Run, and Route) to perform a variety of transportation management tasks. These components are sold separately, so the items that appear in your system will reflect those which you have purchased.

Route optimization is simulation software. The data used in the optimization process is based on your existing transportation data, but it is a totally distinct data set. Think of optimization as a simulation which is based on your current transportation data but which you can modify safely without affecting your actual transportation data. What you do in Route Optimization does not affect your transportation system unless you choose to confirm the route solution (incorporate it into your actual data).

We encourage you to experiment with the Route Optimization data. Try the same problem several times, making different changes each time to see how well each approach works. You can then combine the best features of each approach to create the most efficient solution. This approach will enable you to develop specific strategies in optimizing your data. You can also use the automated optimization functions which often reveal improvements you may not have noticed.

Keep in mind that we are continuously updating and improving our software, so changes may be made to the program after the printing date of this guide. As a result, you may encounter parts of the system that vary somewhat from the steps and illustrations in this guide. Such differences should be minor, however, and the primary concepts that it discusses still apply.

Again, we encourage you to experiment with the various optimization features, to play with different scenarios, and compare the results. Changes will not affect your regular data unless you decide to confirm the run solution, so you can easily abandon results you do not like.

OPTIMIZATION PREP WORK

Listed below are prep work items you will need for optimization

1. **Up to date map** - A very important part of prep work for transportation studies. It is the indicator whether the stop times Athena produces are close enough to real life stop time values. If you adjust times in Athena frequently, you may not be calibrated. The better calibration is, the less guess work must be done in the project.

- 2. **Student Match Rate** Having kids matched is important for these studies so that the proper eligibility for ridership can be determined, and the distance to stops and stop assignments can be in place.
 - a. What are unmatched students? Students whose address cannot be located on the map.
 - b. Recognizing unmatched students Students that Geolocation is unmatched in the student import module.
- 3. **School Changes** Any school changes should be handled before Optimization is done. School data input, Bell times in place, Boundaries posted, and Eligibility updated.
- 4. **Student Assignment to Stops** If any work on student to stop assignments needs to be done; it should be done before run optimization takes place. The following changes can affect student assignment.
- 5. **Student Eligibility** Again, any boundary changes should be posted to their schools so that eligibility of students can be updated, any students who do not need stops anymore can be removed from them and any students who become eligible for transportation can have a stop assigned, creating new stops as needed. Stop locations could come from other schools formerly transporting students in that area.
- 6. Walk to school distances Any changes to walk to school boundaries should be posted as they affect eligibility as mentioned above. Depending upon the change stops and stop assignments may need to be added or removed for this work.
- 7. Walk to stop distance Changes in walk to Stop distance can affect the number of stops used for eligible students, this could mean more stop locations needing to be created (for reduction in distance) or less stop locations needed (for increases in distance)
- 8. **Transportation Accuracy** if using existing data in the study (for fleet reductions and evaluations), your transportation data needs to properly represent what is currently being done as much as possible.

GETTING STARTED

1. Once logged in, go to Routing Management.



2. In the action bar, under Route Planning Operations, select Routes.



3. On the Route landing page, create a task.

Route Opt		
🖺 Create		
0		

4. Select the routes you want to work with in the Augment Context window.

	Cance	el 🛛 O
Available Routes To Load		
- Route ↑	Description	
☑ 100	Gallatin Elementary	*
☑ 139	Carter, Petroleum, and Park	
☑ 140	Gallatin Elementary	
□ 141	Madison and Ravalli	
142	Carter, Rosebud, and Liberty	
□ 143	Daniels, Park, and Petroleum	
144	Carbon and Madison	
145	EC Carbon and Madison	
□ 147	Judith, Phillips, Park, and Richland	
148	EC Valley, Meagher, Liberty, and Park	
149	Glacier, Sheridan, and Meagher	
□ 150	Garfield, Liberty, and Rosebud	
□ 151	Phillips and Liberty	
□ 152	Deer Lodge Elementary	
153	Phillips. Lincoln, and Fergus	
□ 154	Musselshell and Richland	
☑ 155	Gallatin and Stillwater	
□ 156	Roosevelt and McCone	
□ 157	Rosebud and Liberty	
□ 158	Madison and Powder River	
_		

- 5. Select All Unassigned runs, then select OK.
- 6. Routes and Unassigned Runs will be listed in the data panel.

Q			Route	5		~
	Au	gment Context	Bell Times	+ Add New	- Delete	Columns
	Route	Descripti	on	Vehic	le	AM/PM
	100	Gallatin I	Elementary			Afternoon
	139	Carter, P	etroleum, and Pa	ark		All-Day
	140	Gallatin I	Elementary			All-Day
	155	Gallatin a	and Stillwater			All-Day
	209	Gallatin I	Elementary			All-Day
	222	Flathead	, Cuthbertson, ar	nd Li		All-Day
	236	Flathead	, Petroleum, Par	k		All-Day
	291	Gallatin				All-Day
	397	Flathead	, Sheridan, Rose	bud,		All-Day
	398	Flathead	, Rosebud, and I	Liberty		All-Day
	402	Flathead	, Sheridan, Petro	oleum		All-Day
	<mark>41</mark> 7	Gallatin a	and Sheridan			All-Day
4						÷.

			Una	issigned	Runs			~
		All	All-F	Clear	Clear-F	+ ⊯ Assign	III C	olumns
Run	1D	Fred	quency	Туре		E Anchor B	ell 3	E NeedE
	302.003-R	MT	WUF	FROM	1_SCHOOL	302 - 2:0	0 PM	No 🔺
	302.008-R	MT	WUF	FROM	1_SCHOOL	302 - 2:0	0 PM	No
	304.107	MT	WUF	FROM	1_SCHOOL	304 - 2:0	0 PM	No
	311.012	MT	WUF	TO_S	CHOOL	311 - <mark>8</mark> :10	MA C	No
	<mark>311.018</mark>	MT	WUF	TO_S	CHOOL	<mark>311 - 8</mark> :10	MA 0	No
	311.113	MT	WUF	FROM	1_SCHOOL	311 - 3:0	5 PM	No
	314.109	MT	WUF	FROM	1_SCHOOL	314 - 4:0	5 PM	No
	314.853	MT	WUF	FROM	1_SCHOOL	314 - <mark>4</mark> :0	5 PM	No
	320.006	MT	WUF	TO_S	CHOOL	320 - 7:3	0 AM	No
	320.007	MT	WUF	TO_S	CHOOL	320 - 7:3	0 <mark>AM</mark>	No
	320.106	MT	WUF	FROM	1_SCHOOL	320 - 2:0	0 PM	No
	336.002	MT	WUF	TO_S	CHOOL	336 - 8:1	0 AM	No
	336.009	MT	WUF	TO_S	CHOOL	336 - 8:1	0 AM	No 🗸
4							_	×

7. Select your Routes and the Unassigned Runs that you want to work with.

	Routing »	Route Planning	Operations »	Routes »	Task: Ro	oute Opt										Ad	tive Data	Area: pla r	nB
Q		Routes		~	Q ton	10 Come	lius Kannapo	a de		5	1			-	Routes In Play	e.			~
Augmen	nt Context 🛛 🕼 Bel	ll Times 📘 🕇 Add N	ow – Delate	Columns		Hunte	rsville 🐨 Con	cord					@ Bulk Edit	🖪 Depots	🖪 Depots 🛛 🗸	TN Feas	H Paths 🛛 🎂	Times III Q	olumns
- Route	Description	`	ehicle Al	W/PM	121		Harrishurn		Albemark	e Nationa	I FCS	Route	Frequency	Vehicle	Pre Depot	Post Depot	Slack	Duration	Dist
100	Gallatin Elemen	tary	F	Afternoon	Gartonia		11	601			0	100	MTWUF						*
139	Carter, Petroleu	m, and Park	A	NI-Day	n	Belmont Char	lotte	Cocust		Mt Gile	ad be	o	MTWUF				Os	1h 3m	3
2 140	Gallatin Elemen	tary	F	NII-Day		N KK	74					140	MTWUF						
2 155	Gallatin and Stil	Iwater	ł	All-Day	Clover L	Lake Wylie	Matthews				8	o	MTWUF				7h 10m	2h 2m	5
209	Gallatin Elemen	tary	F	NI-Day		Pineville	Indian Trail					🗆 🚺 155	MTWUF						
222	Flathead, Cuthb	ertson, and Li	A	All-Day	Vork	Fort Mill	M	onroe Marshy	Ile 71		-		MTWUF				7h 3m 58s	1h 28m 2s	4
236	Flathead, Petrol	leum, Park	F	All-Day		Port Hill	Washing		W	Vadesboro	R	209	MTWUF						
291	Gallatin		F	NI-Day								-	MTWUF				7h 10m	1h 29m	4
397	Flathead, Sherid	dan, Rosebud,	F	NI-Day							T	291	MTWUF						
398	Flathead, Roset	bud, and Liberty	4	All-Day				Pageland	0			·	MTWUF				7h 15m	2h 14m	6
402	Flathead, Sherid	dan, Petroleum	F	NI-Day	Chester	Richburg 21	Lancaster		263 Ch	esterfield	+		MTWHE					_	
417	Gallatin and She	eridan	ł	All-Day	Man +	A am	nm stos sche	dots dhe othe			_			Ru	ins on Selected I	Route			~
					Cardo		pin sips sens	opes and purs			(az)			Directions	Solostad David	P Eronuonou			
C				•	Google	W Keyboard	shortcuts Map de	ta ©2023 Google	Terms of Use	Report a m	tap error			Directions i	or selected Rout	e a riequency			~
	Un	assigned Runs		^	Posto	Routes		704			DAM	10414	11.041	17814	1814	1911	2014	Sh	lowing 6
	All All-F	Clear Clear-F	+# Assign	III Columns	100	(none)			1	1				1					
Run ID	Frequency	Туре	E Anchor Bell	≡ NeedE	MTWU	IF, Dep: (none)													
302.003-R	MTWUF	FROM_SCHOO	L 302 - 2:00 F	PM No 📤	140	(none)			10	1								1	1
302.008-R	MTWUF	FROM_SCHOC	302 - 2:00 F	PM No	MTWU	IF, Dep: (none)						1							1
304.107	MTWUF	FROM_SCHOO	L 304 - 2:00 F	PM No	155	(none)			_	1	1						1		1
311.012	MTWUF	TO_SCHOOL	311 - 8:10 /	AM No	MTWU	IF. Dep: (none)													
311.018	MTWUF	TO_SCHOOL	311 - 8:10 4	M No	209	(0000)		_		-	-			-					-
311.113	MTWUF	FROM_SCHOO	L 311 - 3:05 F	PM No	MTM	(none)													-
314.109	MTWUF	FROM_SCHOO	L 314 - 4:05 F	PM No	004	(anne)			-	-	-			-					1
314.853	MTWUF	FROM_SCHOO	L 314 - 4:05 F	PM No	291	(none)			_		-	_	_	-					-
320.006	MTWUF	TO_SCHOOL	320 - 7:30/	MM No	MIWO	IF, Dep: (none)			-	1				-			1		1
320.007	MTWUF	TO_SCHOOL	320 - 7:30 /	NO NG	41/	(none)												1	1
320.106	MTWUF	FROM_SCHOO	L 320 - 2:00 P	PM No	MTWU	IF, Dep: (none)			-					1		-	_		
336.002	MTWUF	TO_SCHOOL	336 - 8:10/	M No	Unass	signed Runs			0				٥		Asn Impr I	Bld Dpts BTs			
336.009	MTWUF	TO_SCHOOL	336 - 8:10 /	M No .	-														

You will see the Unassigned Runs and Routes in the workspace and timeline.

8. Route Opt tools are in the Timeline Panel.

Asn	Impr	Bld	Dpts	BTs
		:		

- a. Opt Assign
- b. Opt Improve
- c. Opt Build
- d. Opt Depots
- e. Opt Bell Times

USING ROUTE OPTIMIZATION TOOLS

Optimize Assign

As a user, I would like to take a group of unassigned runs and assign them to routes.

1. After creating your task, select your routes in the Augment Context window.

		Cance	el 🚺
Availa	ble Routes To Load	1	
	■ Route ↑	Description	
	☑ 100	Gallatin Elementary	
	☑ 139	Carter, Petroleum, and Park	
	☑ 140	Gallatin Elementary	
	□ 141	Madison and Ravalli	
	□ 142	Carter, Rosebud, and Liberty	
	□ 143	Daniels, Park, and Petroleum	
	□ 144	Carbon and Madison	
	□ 145	EC Carbon and Madison	
	□ 147	Judith, Phillips, Park, and Richland	
	148	EC Valley, Meagher, Liberty, and Park	
	□ 149	Glacier, Sheridan, and Meagher	
	□ 150	Garfield, Liberty, and Rosebud	
	□ 151	Phillips and Liberty	
	152	Deer Lodge Elementary	
	□ 153	Phillips. Lincoln, and Fergus	
	□ 154	Musselshell and Richland	
	☑ 155	Gallatin and Stillwater	
	□ 156	Roosevelt and McCone	
	□ 157	Rosebud and Liberty	
	□ 158	Madison and Powder River	+
Run	s To Load: 🔳	All Unassigned 🗌 None	16

2. Then select your routes and the Unassigned Runs in the data panel.

	Routing »	Route Planning (Operations » Rol	utes »	Task: TTA	Route Opt											Ac	tive Data	Area: pla	in 8
Q		Routes		~	Q ton	to Com	elius Kannap	olis	- Nel	1	A				Routes In	n Play				~
Augme	ent Context 🛛 🕼 Bell	Times + Add Nev	v – Delete III Co	olumns		Hunt	ersville 😨 Co	ncord					C Bulk Edit	E Depots	📕 🗎 Depots	✓ TN Fe	as 🖬 Di	H Paths 🛛 🕸	Times III (Columns
Route	Description	Vet	nicle AM/PN				Harrisbur		Albemar	Nationa	IF S C	Route	Frequency	Vehicle	Pre D	epot Po	st Depot	Slack	Duration	Dist
100	Gallatin Element	ary	Aftern	icon	Castonia				() ()		0	100	MTWUF							-
140	Gallatin Element	ary	All-Da	iy	in B	elmont Cha	rlotte	Locust		Mt Gile	ad		MTWUF					0s	1h 3m	3
155	Gallatin and Still	water	All-Da	iy		VICH	14					140	MTWUF							- 1
209	Gallatin Element	ary	All-Da	iy	Clover La	ke.Wylie	Matthews				8		MTWUF					7h 10m	2h 2m	5
278	Garfield and Pow	vell/Mineral	All-Da	iy		Pinovi	lo Indian Tra					155	MTWUF							
291	Gallatin		All-Da	iy	York	Fort Mill	0-	Monroe Marsl	wille 23		-		MTWUF					7h 3m 58s	1h 28m 2:	s 4
417	Gallatin and She	ridan	All-Da	iy		Rock Hill	Waxhaw			Nadesboro	74 Rt	209	MTWUF							
													MTWUF					7h 10m	1h 29m	4
											-	291	MTWUF							
								Pagela	nd 💿				MTWUF					7h 15m	2h 14m	6'
					Chester	Richburg 21	Lancaster		(365) CI	hesterfield	+	m = 417	MTWHE						_	, '
					Map +		pm stps schs	dpts dhs pth	sh Y		- 11			R	uns on Seleo	cted Route				*
					Gorde	Creat Fa		/	22/		2			Directions	for Selected	Route & Fr	requency			
4				•		Keyboard	shortcuts Map.c	ata @2023 Googe	e leims at Us	e : Report a n	hap error		1311100							
	Una	ssigned Runs		^	Route	Vehicle	6AM	7AM	84	м	9AM	10444	11AM	12PM	1PM	2PM	3PM	4PM	Showing 1-3	of 6
	All All-F	Clear Clear-F	+J# Assign Co	olumns	100	(none)														
Run ID	Frequency	Туре	Anchor Bell	NeedE	MTWUF,	Dep: (none)														
TTA.017	MTWUF	TO_SCHOOL	367 - 9:50 AM	No *	140	(none)														
TTA.018	MTWUF	TO_SCHOOL	367 - 9:50 AM	No	MTWUF,	Dep: (none)										-	-			
TTA.019	MTWUF	TO_SCHOOL	367 - 9:50 AM	No	155	(none)					1									53
LI TTA.020	MTWUF	TO_SCHOOL	367 - 9:50 AM	No	MTWUF,	Dep: (none)														
D TIA.101	MTWUF	FROM_SCHOOL	367 - 4:20 PM	NO																
□ TIA.103	MIWUF	FROM_SCHOOL	367 - 4:20 PM	NO	Unassid	ned Runs			0 0	0		$\oplus \Theta$	4		Asn Impr	Bid Dpt	s BTs		Showing 1-3	of 8
U TIA.104	MTWUF	FROM_SCHOOL	367 - 4:20 PM	NO	TT	A.001							1 1 1							
☑ TIA.105	MIWUF	FROM_SCHOOL	367 - 4:20 PM	NO	M	TWUE					1					-				12
1 1A.106	MIWUF	FROM_SCHOOL	367 - 4:20 PM	NO	TT	A.003														
C	1.4773.4 (F) 1077	FROM SCHOOL	367 - 4:20 PM	NO							-			-	-		-	-		
TTA.107	MTWUF	FROM COUCOI	207 4:20 014	No	M	MUE		- E			Terror Committee							0 3		
□ TTA.107 □ TTA.108	MTWUF MTWUF	FROM_SCHOOL	367 - 4:20 PM	No				-								-	_		_	
TTA.107 TTA.108 TTA.109 TTA.110	MTWUF MTWUF MTWUF	FROM_SCHOOL FROM_SCHOOL	367 - 4:20 PM 367 - 4:20 PM	N0 N0	TT	1WUF 4.004														8

3. Then select the Assign button located on the timeline.



4. The Confirm the RouteOpt action window will open.



- a. The window will tell you what you are about to Opt Assign with.
- b. You can check the box to Consider AM/PM Run Mirroring.
- c. Then Name the new route with the Prefix and Start at.
- d. Then select Proceed.
- 5. Then confirm the change. Verify the before and after information.

Confirm this change?				
Before	#Runs	Slack	Duration	Distance
UNASSIGNED	2	Os	48m 55s	13.71 mi
Route 007	2	6h 2m 53s	57m 46s	14.67 mi
Route 008	5	-3m 54s	2h 7m 6s	39.59 mi
TOTAL	9	5h 58m 59s	3h 53m 47s	67.96 mi
After	#Runs	Slack	Duration	Distance
UNASSIGNED	0	Os	Os	O ft
Route 007	4	27m 48s	1h 56m 22s	30.07 mi
Route 008	5	48s	2h 3m 49s	39.09 mi
TOTAL	9	28m 36s	4h 11s	69.16 mi
V Proceed			Cancel	

6. Then select Proceed.

7. You will see the changes reflect in the timeline. Runs have been assigned to existing routes.

	Routing »	Route Planning (Operations » R	outes »	Task: TTA Ro	oute Opt								A	ctive Data	Area: plan	8
Q		Routes		~	Q ton	6 Cornelius	Kannapolis		\int				Routes In Play	у			^
Augme	nt Context 🛛 🕼 Bel	ll Times 🛛 🕇 Add Nev	- Delete	Columns		Huntersville	Concord				🛛 🖓 Bulk Edit	Ei Depots	🗏 Depots 💽	✓ TN Feas	DH Paths 🛛 🚇	Times Cole	imns
Route	Description	Vet	nicle AM/F	PM		A HA	mshum	Albemarle National	ES C	Route	Frequency	Vehicle	Pre Depot	Post Depot	Slack	Duration	Dist
Image: 100	Galiatin Elemen	tary	Afte	moon					0	100	MTWUF						-
140	Gallatin Elemen	tary	All-I	Day	in Belm	ont Charlotte	Locust	Mt Gllead			MTWUF				0s	1h 3m	3
🗹 📕 155	Gallatin and Stil	Iwater	All-I	Day		74				140	MTWUF						
209	Gallatin Elemen	tary	All-I	Day	Clover Lake W	ylie Matthe	ws		8	o	MTWUF				59m 51s	4h 42m 36s	1.
278	Garfield and Po	well/Mineral	All-I	Day		Pineville Indi	an Trail			155	MTWUF						
291	Gallatin		All-I	Day	York	Fort Mill	Monroe Marsh	ville 2		o —	MTWUF				1h 26m 7s	3h 33m 36s	9
417	Gallatin and She	eridan	All-I	Day	The second	A L	- All	Wadesboro	Re	209	MTWUF						
					HOCK	Pill Waxnay				·	MTWUF				46m 41s	5h 25m 25s	1
										291	MTWUF						
					670		Pagelar	nd O		o	MTWUF				59m 35s	5h 40m 23s	1
					Chester Rich	burg (21) Lancaster		(265) Chesterfield	+ 🔛	- 417	MTWIE						
					Man + @ 7	am nm stns	scha dota dha otha		_ 1			Ru	ins on Selected I	Route			~
					Gorde	Creat Falls			1			Directions f	or Selected Rout	te & Frequency			
•		The second second		E F	90 90	Keyboard shortcuts	Map data 62023 Google	Terms of Use Report a ma	p error						J		
				^	Route	tS Vehicle I	IAM 7AM	SAM	DAM	10AM	11AM	12FM	1PM 2P	м зем	4PM	Show 5PM	ing 6
	All All-F	Clear Clear-F	+# Assign 🛛 🔢	Columns	Route 100	rs Vehicle ((none)	IAM 7AM	BAM	BAM	10AM	11AM	12PM	1PM 2P	M 3PM	4PM	Show 5PM	ving 6
Run ID	All All F Frequency	Clear Clear-F Type	+#Assign Ⅲ ≣ Anchor Bell	Columns E NeedE	Route 100 MTWUF, Dep	Vehicle (none)	DAM 7AM	BAM	BAM	10AM	11AM	12PM	1PM 2P	PM 3PM	4PM	Show	ring 6
Run ID	All All-F Frequency MTWUF	Clear Clear.F Type FROM_SCHOOL	+≰Assign III ≡ Anchor Bell 302 - 2:00 PM	Columns E NeedE No *	Route 100 MTWUF, Dep 140	Vehicle 1 (none)	IAM 7AM	BAM	BAM		11AM	12PM	1PM 2P	M 3PM	4PM	Show SPM	/ing 6
Run ID 302.003-R 302.008-R	All AILF Frequency MTWUF MTWUF	Clear Clear.F Type FROM_SCHOOL FROM_SCHOOL	+# Assign III ≡ Anchor Bell 302 - 2:00 PM 302 - 2:00 PM	Columns E NeedE No * No	Route Route 100 MTWUF, Dep 140 MTWUF, Dep	Vehicle 1 (none) 1 (none) 1 (none) 1 (none) 1	DAM 7AM	BAM .	DAM	10AM	11AM	12PM	1PM 2P	9M 3PAX	4PM	Show	/ing 6
Run ID 302.003-R 302.008-R 304.107	All All.F Frequency MTWUF MTWUF MTWUF	Clear Clear.F Type FROM_SCHOOL FROM_SCHOOL FROM_SCHOOL		Columns E NeedE No No No	Route Route 100 MTWUF, Dep 140 MTWUF, Dep 155	S Vehicle (none) (none) (none) (none) (none) (none) (none) (none) (none) (none)	JAM 7AM	BAM 1	DAM		51AM	12PM	1PM 2P	PM JPM	4PM	Show SPM	/ing 6
Run ID 302.003-R 302.008-R 304.107 311.012	All All.F Frequency MTWUF MTWUF MTWUF MTWUF	Clear Clear.F Type FROM_SCHOOL FROM_SCHOOL FROM_SCHOOL	+ 2 Assign Ⅲ Ξ Anchor Bell 302 - 2:00 PM 302 - 2:00 PM 304 - 2:00 PM 311 - 8:10 AM	Columns E NeedE No No No No	Route Route 100 MTWUF, Dep 140 MTWUF, Dep 155 MTWUF, Dep	Vehicle (none) (none) (none) (none) (none) (none) (none) (none) (none)	JAM 7AM	BAM	9AM		STAM	12PM	1PM 2P		4PM	Show SPM	ring 6
Run ID 302.003-R 302.008-R 304.107 311.012 311.018	All All-F Frequency MTWUF MTWUF MTWUF MTWUF	Clear Clear F Type FROM_SCHOOL FROM_SCHOOL FROM_SCHOOL TO_SCHOOL TO_SCHOOL	+	Columns E NeedE No No No No No	Route Route 100 MTWUF, Dep 140 MTWUF, Dep 155 MTWUF, Dep 209	S Vehicle (none) (none) (none) (none) (none) (none) (none) (none) (none) (none)	JAM 7AM	SAM	BAM		STAM	12PM	1PM 2P		4PM	Show SPM	ving 6
Run ID 302.003-R 302.008-R 304.107 311.012 311.018 311.113 211.113	All All F Frequency MTWUF MTWUF MTWUF MTWUF MTWUF	Clear ClearF Type FROM_SCHOOL FROM_SCHOOL FROM_SCHOOL TO_SCHOOL FROM_SCHOOL FROM_SCHOOL	+	Columns	Route 100 MTWUF, Dep 140 MTWUF, Dep 155 MTWUF, Dep 209 MTWUF, Dep	S Vehicle I (none) (none) (none)	AM 7AM	EAM	9AM	10AM	51AM	12PM	1PM 2P		4PM	Show	ving 6
Run ID 302.003-R 302.008-R 304.107 311.012 311.018 311.113 314.109	All All F Frequency MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF	Clear ClearF Type FROM_SCHOOL FROM_SCHOOL FROM_SCHOOL TO_SCHOOL FROM_SCHOOL FROM_SCHOOL FROM_SCHOOL	★	Columns	Route 100 MTWUF, Dep 140 MTWUF, Dep 155 MTWUF, Dep 209 MTWUF, Dep 209	S venide I (none) (inone) (inone) (none) (inone) (inone) (none) (inone) (inone) (none) (inone) (inone)		CAM	9AM		15AM	12PM	1PM 2P		47M	Show SPM	ving 6
Run ID 302.003-R 302.008-R 304.107 311.012 311.018 311.113 314.109 314.853 24.853	All ALE Frequency MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF	Clear Clear F Type FROM_SCHOOL FROM_SCHOOL FROM_SCHOOL TO_SCHOOL FROM_SCHOOL FROM_SCHOOL FROM_SCHOOL	★ Assign III ■ Anchor Bell 302 - 2:00 PM 304 - 2:00 PM 311 - 8:10 AM 311 - 8:10 AM 311 - 8:05 PM 314 - 4:05 PM	Columns E NeedE No No No No No No No No No No	Route 100 MTWUF, Dep 140 MTWUF, Dep 155 MTWUF, Dep 209 MTWUF, Dep 209 MTWUF, Dep 291	S Venice (none) (none)			9AM		11AM	12PM	1PM 2P		47M	Show grM	ving 6
Run ID 302.003-R 302.008-R 304.107 311.012 311.012 311.113 314.109 314.853 320.006 202.027	All AILF Frequency MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF	Clear Clear F Type FROM_SCHOOL FROM_SCHOOL FROM_SCHOOL TO_SCHOOL FROM_SCHOOL FROM_SCHOOL FROM_SCHOOL TO_SCHOOL		Columns E NeedE No No No No No No No No No No	Route 100 MTWUF, Dep 140 MTWUF, Dep 155 MTWUF, Dep 209 MTWUF, Dep 291 291 417	S venice (none) (none) (venice) (none) (venice) (none) (none) (none) (venice) (none) (venice)					11AM	12PM		PM 3.PM	47M	Show grui	ving 6
Run ID 302.003-R 302.008-R 304.107 311.012 311.018 311.113 314.109 314.853 320.006 320.007	All ALF Frequency MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF	Chear Crear F Type FROM_SCHOOL FROM_SCHOOL FROM_SCHOOL TO_SCHOOL FROM_SCHOOL FROM_SCHOOL TO_SCHOOL TO_SCHOOL TO_SCHOOL	★# Assign ■ ■ Anchor Bell 302 - 2:00 PM 302 - 2:00 PM 302 - 2:00 PM 304 - 2:00 PM 311 - 8:10 AM 311 - 8:10 AM 311 - 8:10 AM 311 - 3:05 PM 314 - 4:05 PM 320 - 7:30 AM	Columnas E NeedE No	Route 100 MTWUF, Dep 140 MTWUF, Dep 155 MTWUF, Dep 209 MTWUF, Dep 291 MTWUF, Dep 417 MTWUF, Dep	S vehice (none)						12PM			47M	Show	ving 6
Run ID 302.003-R 302.008-R 304.107 311.012 311.018 311.113 314.109 314.853 320.006 320.007 320.106	All ALF Frequency MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF	Cleve Cleve Cleve F Type FROM_SCHOOL FROM_SCHOOL TO_SCHOOL TO_SCHOOL FROM_SCHOOL FROM_SCHOOL FROM_SCHOOL FROM_SCHOOL FROM_SCHOOL FROM_SCHOOL	+# Assign III E Anchor Bell 302 - 2:00 PM 302 - 2:00 PM 304 - 2:00 PM 304 - 2:00 PM 314 - 8:10 AM 311 - 8:10 AM 311 - 8:10 AM 314 - 4:05 PM 314 - 4:05 PM 320 - 7:30 AM 320 - 7:30 AM 320 - 2:00 PM 320 - 7:30 AM	Columnas E NeedE No	Route 100 MTWUF, Dep 140 MTWUF, Dep 155 MTWUF, Dep 209 MTWUF, Dep 291 MTWUF, Dep 417 MTWUF, Dep	S (none)					11AM					Show	ving 6
Run ID 302.003-R 304.107 311.012 311.012 311.018 314.109 314.853 320.006 320.007 320.106 336.002	All ALF Frequency MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF MTWUF	Cleve Cleve Court Type FROM_SCHOOL FROM_SCHOOL FROM_SCHOOL TO_SCHOOL FROM_SCHOOL TO_SCHOOL TO_SCHOOL TO_SCHOOL TO_SCHOOL TO_SCHOOL TO_SCHOOL TO_SCHOOL TO_SCHOOL	★ Assign ■ ■ Anchor Bell 302 - 2:00 PM 302 - 2:00 PM 302 - 2:00 PM 304 - 2:00 PM 311 - 8:10 AM 311 - 8:10 AM 311 - 8:10 AM 311 - 3:05 PM 314 - 4:05 PM 314 - 4:05 PM 320 - 7:30 AM 320 - 2:00 PM 336 - 8:10 AM 336 - 8:10 AM 330 - 2:00 PM 336 - 8:10 AM 346 - 8:10 AM 356 - 8:10 AM 356 - 8:10 AM 356 - 8:10 AM 3	Columns E NeedE No No No No No No No No No No	Route Route	S versite (none)							IPM 20	Bid Dpts BTs		Show	

Note, the Assign tool will not interfere with your current route assignments. The current runs assigned are fixed. If it cannot find a place to assign the run, it will create a new route.

Optimize Improve

As a user, I would like to improve my routes for better efficiency.

1. After creating your task, select your routes in the Augment Context window.

Augm	ent Routes Co	ontext
		Cancel OK
Availab	le Routes To Load	
	D Davita	Description
	 Route 	Description
	212	Roosevelt, McCone, and Dawson
	221	Granite, Powell, Liberty, and Garfield
	□ 222	Flathead, Cuthbertson, and Liberty
	□ 223	Stillwater, Madison, Musselshell, Galla
	□ 229	Kensington, Golden, Rosebud, Liberty
	☑ 233	Silver Bow, Phillips, Lincoln
	234	Blaine, Petroleum, Park, Daniels
	☑ 236	Flathead, Petroleum, Park
	☑ 237	Cascade, Phillips, Lincoln, Shiloh
	☑ 240	Fergus, Phillips, Lincoln
	242	Fergus, Phillips, Lincoln
	243	Cascade, Phillips, Park, Silver, Sherid
	245	EC Valley, Sheridan, Musselshell
	248	EC Judith, Valley, Musselshell
	250	EC Valley, Liberty, Lincoln
	251	Fergus, Phillips, Lincoln
	252	Stillwater, Richland, Musselshell
	253	Lewis and Clark
	254	Powder River and Madison
	255	Glacier, Prairie, Meagher
Runs	To Load: 🗌 A	All Unassigned None

2. Then select your routes in the data panel.

Q	Routes											
	Augment Context	🕼 Bell Times	+ Add New	– Delete 🛛 📗								
Route	Description	Vehicle	AM/PM	≡ Frequ								
233	Silver Bow, Phillips, Lincoln	All-Day	MTV									
234	Blaine, Petroleum, Park, Dan	iels	All-Day	MTV								
236	Flathead, Petroleum, Park		All-Day	MTV								
237	Cascade, Phillips, Lincoln, S	All-Day	MTV									
240	Fergus, Phillips, Lincoln	All-Day	MTV									

3. The routes will display in the timeline. Note: All routes in pink have negative slack.

Ro	utes																Showing 5
Route	Vehicle	6AM	7AM		8AM	9/	AM	10A	M	11.AM	12F	M	1PM	2PM	3PM	 4PM	5PM
233	(none)																
MTWUF, I	Dep: (none)			-											-	- -	
234	(none)																
MTWUF, I	Dep: (none)														_		
236	(none)																
MTWUF, I	Dep: (none)			_	-												
237	(none)																
MTWUF, I	Dep: (none)			- 1	-										-	_	
240	(none)																
MTWUF, I	Dep: (none)			-											_	_	
Unassig	ned Runs				0	\otimes	$\langle \!$		$\oplus \Theta$				Asn	Impr Bld Dpts	BTs		

4. Select the Improve button located on the timeline.



- 5. The Confirm the RouteOpt action window will open.
 - a. The window will tell you what you are about to Opt Improve with.
 - b. You can check the box to Consider AM/PM Run Mirroring.
 - c. You can also check the box to Improve Depot Assignments as well.
 - d. Then you need to select Depots Available and move them over to Depots to use with the arrow in the middle of the two windows.
 - e. Then Name the new routes with the Prefix and Start at.

	Confirm	n the Ro	outeOpt a	ction									
A	bout to 🧕	<u>Opt Impro</u>	ove with:										
		35 runs	from 5 rout	tes									
C	Consid	ler AM/PN	A Run Mirro	oring									
C	Improv	ve Depot A	Assignmen	ts As Wel	I								
			Depots Ava	ailable						Depots To	Use		
	Depot	Сар	AdjCap	In Use	Free			Depot	Сар	AdjCap	In Use	Free	
	EBD1	20	20	0	20	*		MMS	50	50	0	50	-
	HBD	40	40	0	40								
	bus1	20	20	0	20								
						-							-
N	aming ne	ew routes	as follows										
		Prefix	OPT-										
		Start at	1000										
							oceed Cancel						

- f. Then select Proceed.
- 6. The Confirm this change window will open. Notice there is not negative slack.

Confirm this cl	nange?				
Before	#Runs	Slack	Duration	Distance	
UNASSIGNED	0	0s	0s	0 ft	
Route 233	7	37s	5h 6m 49s	111.35 mi	
Route 234	6	-7m 3s	5h 5m 57s	110.73 mi	
Route 236	7	-32s	4h 29m 26s	118.68 mi	
Route 237	8	-2m 2s	3h 34m 6s	77.45 mi	
Route 240	7	1m 40s	3h 11m 14s	74.44 mi	
TOTAL	35	-7m 20s	21h 27m 32s	492.65 mi	
After	#Runs	Slack	Duration	Distance	
UNASSIGNED	0	0s	0s	0 ft	-
Route 233	3	1h 38m 51s	3h 2m 5s	79.97 mi	
Route 234	4	52s	4h 46m 15s	133.23 mi	
Route 236	6	1m 53s	4h 50m	164.50 mi	
Route 237	4	11m 53s	3h 21m 33s	100.59 mi	
Route 240	6	14m 36s	3h 37m 29s	104.10 mi	
Route OPT-1000	6	2m 35s	5h 9m 11s	133.23 mi	
Route OPT-1001	6	5m 26s	3h 37m 42s	101.04 mi	-
	✓ Proceed		Ca	incel	

7. Routes have been improved and new Opt routes have been created.

Ro	utes											Showin	1g 7
Route	Vehicle	6AM	7AM	8AM	9AM	10AM	11AM	12PM	1PM	2PM	3PM 4PM	5PM	6PM
236	(none)												
MTWUF,	Dep: MMS	_	_							_			
237	(none)												
MTWUF,	Dep: MMS												
240	(none)												
MTWUF,	Dep: MMS												
OPT-1000	(none)												
MTWUF,	Dep: MMS											-	
OPT-1001	(none)												
MTWUF,	Dep: MMS	_								-	-		

Optimize Build

As a user, I would like to take a selected group of and build efficient routes.

Note: you can include existing routes in this data and the runs from those routes will be added to the build process. Those routes will be gone after optimized.

1. After creating your task, select the All Unassigned runs at the bottom of the Augment Context Window.

	U	nassigned Runs		^
		All All-F Clear	Clear-F 🕇 🕂 🖋 As	sign III
Run ID	Frequency	Туре	■ Anchor Bell ■	NeedEnbl
MMS.203	U	FROM_SCHOOL	308 - 12:00 PM	No 🔷
☑ TTA.001	MTWUF	TO_SCHOOL	367 - 9:50 AM	No
☑ TTA.003	MTWUF	TO_SCHOOL	367 - 9:50 AM	No
☑ TTA.004	MTWUF	TO_SCHOOL	367 - 9:50 AM	No
☑ TTA.005	MTWUF	TO_SCHOOL	367 - 9:50 AM	No
TTA.006	MTWUF	TO_SCHOOL	367 - 9:50 AM	No
TTA.104	MTWUF	FROM_SCHOOL	367 - 4:20 PM	No 🔺
TTA.105	MTWUF	FROM_SCHOOL	367 - 4:20 PM	No
TTA.106	MTWUF	FROM_SCHOOL	367 - 4:20 PM	No
TTA.107	MTWUF	FROM_SCHOOL	367 - 4:20 PM	No
☑ TTA.108	MTWUF	FROM_SCHOOL	367 - 4:20 PM	No
TTA.109	MTWUF	FROM_SCHOOL	367 - 4:20 PM	No
☑ TTA.110	MTWUF	FROM_SCHOOL	367 - 4:20 PM	No

2. All unassigned runs will be listed at the bottom of the Data Panel.

3. Unassiged runs will display in the Timeline Panel.



4. Next, select the build opt button.

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Asn	Impr	Bld	Dpts	BTs
-----	------	-----	------	-----

5. The Confirm the RouteOpt action window will open.

Confir	m the Ro	uteOpt a	ction										
About to	<u>Opt Build</u>	with:											
	10 unas	signed run	s										
0 routes													
Consi	der AM/PN	A Run Mirro	oring										
Assign	n Depots A	s Well											
		Depots Ava	ailable							Depots To	Use		
Depot	Сар	AdjCap	In Use	Free				Depot	Сар	AdjCap	In Use	Free	
EBD1	20	20	0	20	-			MMS	50	43	0	43	-
HBD	40	40	0	40									
bus1	20	20	0	20									
					-								-
Naming n	ew routes	as follows:											
	Prefix	OPT-											
	Start at	2000											
						Proceed Car	ncel						

- 6. Then select Proceed.
- 7. The Confirm the change window will open.

Confirm this change?											
Before	#Runs	Slack	Duration	Distance	ľ						
UNASSIGNED	10	0s	8h 30m 45s	233.48 mi							
TOTAL	10	0s	8h 30m 45s	233.48 mi							
After	#Runs	Slack	Duration	Distance							
UNASSIGNED	0	0s	0s	0 ft							
Route OPT-2000	2	6h 55m	3h 29m 48s	116.73 mi							
Route OPT-2001	2	6h 55m	2h 3m 12s	75.78 mi							
Route OPT-2002	2	6h 55m	2h 19m 8s	75.89 mi							
Route OPT-2003	2	6h 55m	3h 7m 56s	97.29 mi							
Route OPT-2004	1	0s	1h 47m 53s	64.43 mi							
Route OPT-2005	1	0s	1h 25m 52s	49.46 mi							
TOTAL	10	27h 40m	14h 13m 49s	479.58 mi							
	✓ Proceed		Ca	incel							

8. Select Proceed.

9. Routes have been created.

	OPT-2000	All-Day
1	OPT-2001	All-Day
•	OPT-2002	All-Day
1	OPT-2003	All-Day
v	OPT-2004	Afternoon
1	OPT-2005	Afternoon



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Optimize Depots

As a user, I would like to assign depots to my routes.

1. In the data panel, select the routes you want to work with.

OPT-2000	All-Day
OPT-2001	All-Day
OPT-2002	All-Day
OPT-2003	All-Day
OPT-2004	Afternoon
OPT-2005	Afternoon

2. Then select the Depots opt tool.



3. The Confirm RouteOpt action window will open.

Confirm	Confirm the RouteOpt action												
About to	<u>Opt Depo</u>	ots with:											
	6 routes	3											
		Depots Ava	ailable							Depots To	Use		
Depot	Сар	AdjCap	In Use	Free				Depot	Сар	AdjCap	In Use	Free	
EBD1	20	20	0	20	-			MMS	50	43	6	37	-
HBD	40	40	0	40									
bus1	20	20	0	20									
					Ŧ	_							-
						Proceed	Cancel						

- a. It will show you about the Opt Depots you will be working with.
- b. Then select the Depots available and move them over to Depots to Use with the arrow in the middle of the two windows.
- 4. Then select Proceed.
- 5. The Confirm this change window will open.

Confirm this ch	ange?			
Before	#Runs	Slack	Duration	Distance
UNASSIGNED	0	0s	0s	0 ft
Route OPT-2000	2	6h 55m	3h 29m 48s	116.73 mi
Route OPT-2001	2	6h 55m	2h 3m 12s	75.78 mi
Route OPT-2002	2	6h 55m	2h 19m 8s	75.89 mi
Route OPT-2003	2	6h 55m	3h 7m 56s	97.29 mi
Route OPT-2004	1	0s	1h 47m 53s	64.43 mi
Route OPT-2005	1	0s	1h 25m 52s	49.46 mi
TOTAL	10	27h 40m	14h 13m 49s	479.58 mi
After	#Runs	Slack	Duration	Distance
UNASSIGNED	0	0s	0s	0 ft
Route OPT-2000	2	6h 55m	3h 29m 48s	116.73 mi
Route OPT-2001	2	6h 55m	2h 3m 12s	75.78 mi
Route OPT-2002	2	6h 55m	2h 19m 8s	75.89 mi
Route OPT-2003	2	6h 55m	3h 7m 56s	97.29 mi
Route OPT-2004	1	0s	1h 47m 53s	64.43 mi
Route OPT-2005	1	0s	1h 25m 52s	49.46 mi
TOTAL	10	27h 40m	14h 13m 49s	479.58 mi
	✓ Proceed		Ca	ncel

- 6. Select Proceed.
- 7. All routes have been assigned depots and you can see them in Routes in Play.

			Route	Routes In Play			
			🕼 Bulk Edit	🗊 Depots	🖹 Depots		
Route	Frequency	Vehicle	Pre Depot	Post Depot	Slack		
OPT-2000	MTWUF						
	MTWUF		MMS	MMS	6h 55m		
OPT-2001	MTWUF						
	MTWUF		MMS	MMS	6h 55m		
OPT-2002	MTWUF						
	MTWUF		MMS	MMS	6h 55m		
OPT-2003	MTWUF						
	MTWUF		MMS	MMS	6h 55m		
OPT-2004	MTWUF						
	MTWUF		MMS	MMS	0s		
OPT-2005	MTWUF						
	MTWUF		MMS	MMS	0s		

Optimize Bell Times

As a user, I would like to optimize my bell times to create efficient routes.

1. Select your routes.

OPT-2000	All-Day
OPT-2001	All-Day
OPT-2002	All-Day
OPT-2003	All-Day
OPT-2004	Afternoon
OPT-2005	Afternoon

2. Then select to Bell Time Opt tool.



3. The Confirm the RouteOpt action window will open.

Be Aware ...

×

Opt Bell Times is intended to be used with all of your runs. If you invoke it with fewer than that, it won't be privy to the full impact of a given bell time shift, and the solution it generates may be unsatisfactory.

4. The Confirm the RouteOpt action window will open.

ОК

	Confirm the	RouteOpt acti	on				
A	bout to Opt B	ell Times with:					
	10 r.	uns from 6 routes					
				_			
	Minimum Offset	5m Mi	nute – Minute +				
E	ell Time Range	es					
	School	Bell Time	Earliest	-Offset	Latest	+Offset	
	☑ 302	7:30 AM	7:25	-5m	7:35	5m	*
	☑ 302	2:00 PM	1:55	-5m	2:05	5m	
	⊘ 303	7:30 AM	7:25	-5m	7:35	5m	
	⊘ 303	2:00 PM	1:55	-5m	2:05	5m	
	☑ 304	7:30 AM	7:25	-5m	7:35	5m	
	☑ 304	2:00 PM	1:55	-5m	2:05	5m	
	☑ 305	7:30 AM	7:25	-5m	7:35	5m	
	☑ 305	2:00 PM	1:55	-5m	2:05	5m	
	⊘ 306	7:30 AM	7:25	-5m	7:35	5m	
	⊘ 306	2:00 PM	1:55	-5m	2:05	5m	-
			Adjusting Ra	anges For 113 Bel	l Times		
				_			
			Earliest	Earliest	+ Li	test - Latest +	
h	laming new rou	ites as follows:					
		OPT					
	Prefix	OP1-					
	Start	at 2006					
				✓ Proceed	Cancel		

- a. It will show you the Opt Bell Times it will be working with.
- b. You can set your Minimum Offset
- c. Then select your Bell Time Ranges
- d. Adjust your Ranges for Earliest and Latest offsets.
- e. Then name your new routes with the Prefix and Start at.
- f. The select Proceed.

5. The Confirm this change window will open.

Confirm this ch	ange?			
Before	#Runs	Slack	Duration	Distance
UNASSIGNED	0	0s	0s	0 ft
Route OPT-2000	2	6h 55m	3h 29m 48s	116.73 mi
Route OPT-2001	2	6h 55m	2h 3m 12s	75.78 mi
Route OPT-2002	2	6h 55m	2h 19m 8s	75.89 mi
Route OPT-2003	2	6h 55m	3h 7m 56s	97.29 mi
Route OPT-2004	1	0s	1h 47m 53s	64.43 mi
Route OPT-2005	1	0s	1h 25m 52s	49.46 mi
TOTAL	10	27h 40m	14h 13m 49s	479.58 mi
After	#Runs	Slack	Duration	Distance
UNASSIGNED	0	0s	0s	0 ft
Route OPT-2006	2	6h 55m	1h 52m 2s	49.60 mi
Route OPT-2007	2	6h 55m	1h 50m 26s	60.54 mi
Route OPT-2008	2	6h 55m	1h 27m 16s	40.89 mi
Route OPT-2009	2	6h 55m	1h 31m 57s	33.78 mi
Route OPT-2010	1	0s	53m 9s	25.21 mi
Route OPT-2011	1	0s	59m 28s	25.31 mi
TOTAL	10	27h 40m	8h 34m 18s	235.33 mi
	Proceed		Ca	incel

6. Select Proceed.