Amtrack Data Analysis

Date: 2024-12-09
Presented By: OnTrack Analytics

OnTrack Analysts

Rasika. P

Shriya. G

Megha. M

Devika. R

Presented By: OnTrack Analytics

Mission Statement

Our mission is to analyze Amtrak's on-time performance over the past three fiscal years to uncover key insights into travel trends, identify growth opportunities, and develop strategies for enhancing ridership across the network

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Data at a Glance

Route & Performance

Station

State

Employement

Budget

Ridership

Procurement

Guest Rewards

User Groups

The purpose of this project is to analyze Amtrak data to assist decision making for stakeholders:

- Amtrak Corporate Strategy Teams
- Amtrak Finance Teams
- Amtrak Research and Operations Teams

Mission Objectives

1

To analyze the on-time performance of states over a three-year period and determine which states consistently perform the best.

2

To analyze the relationship between ridership levels and Amtrak Guest Rewards enrollment to understand loyalty trend alignment with passenger volume

3

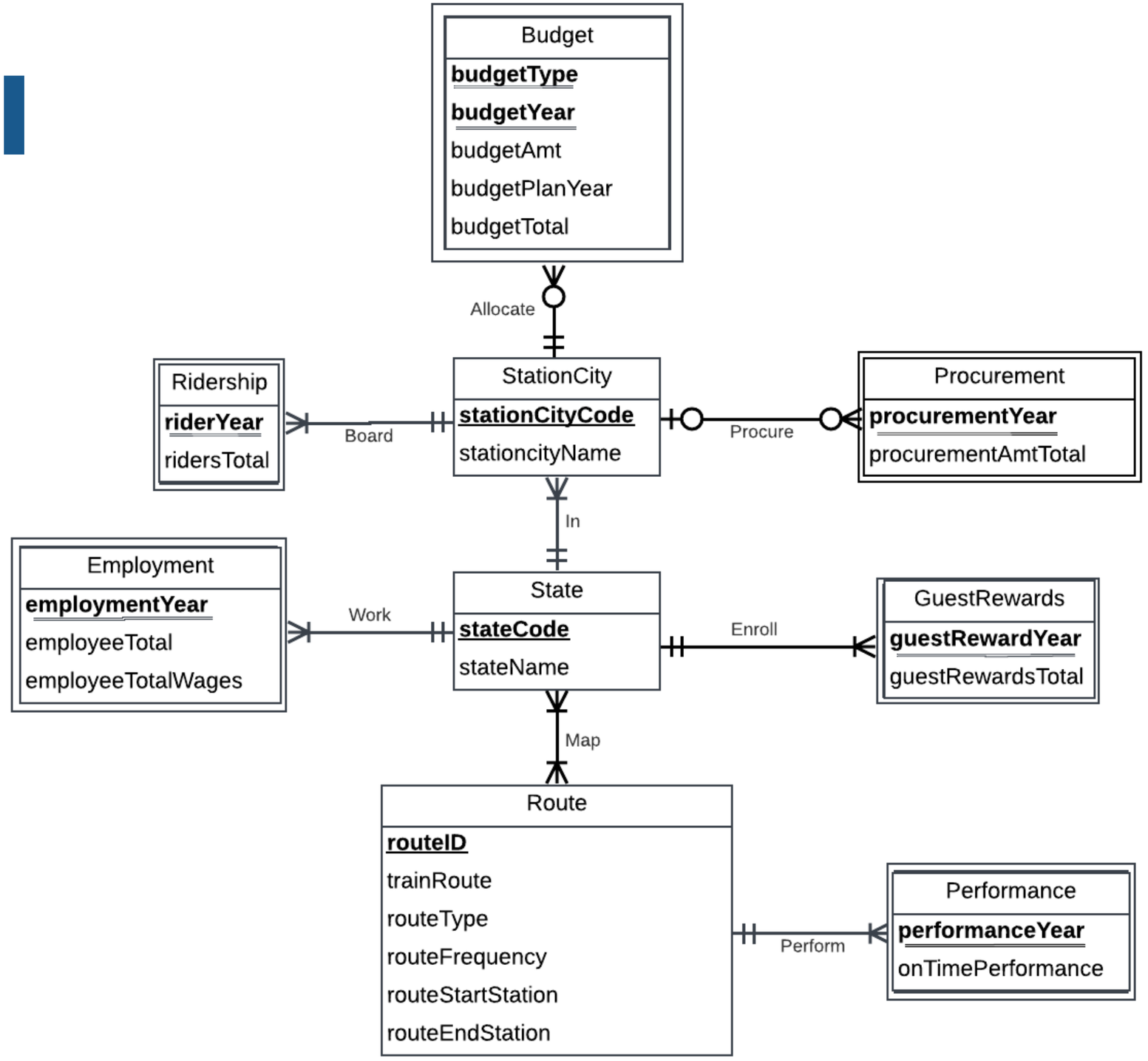
To assess whether budget allocations are aligned with ridership levels at various stations and identify areas for optimizing resource distribution.

4

To examine the relationship between staffing and on time performance reliability by analyzing employment trends in high-performing states.

Conceptual Database Design

✦ Entity Relationship Diagram



Logical Database Design

- State(**stateCode**, stateName)
- StationCity(**stationCityCode**, stationCityName, *stateCode*)
- Route(**routeID**, trainRoute routeType, routeFrequency, routeStartStation, routeEndStation)
- Performance(***routeID*, performanceYear**, onTimePerformance)
- Employment(***stateCode***, **employmentYear**, employeeTotal, employeeTotalWages)
- GuestRewards(***stateCode***, **guestRewardsYear**, guestRewardsTotal)
- Ridership(***stationCityCode***, **riderYear**, ridersTotal)
- Procurement(***stationCityCode***, **procurementYear**, procurementAmtTotal)
- Budget(***stationCityCode***, **budgetType**, **budgetYear**, budgetAmt, budgetPlanYear, budgetTotal)
- Map(***stateCode* , *routeID***)

Physical Database Design

✦ **Creating a table for all Amtrak Routes:**

```
CREATE TABLE [OnTrack.Route](
      routeID CHAR(4) NOT NULL,
      trainRoute VARCHAR(40),
      routeType VARCHAR(30),
      routeFrequency INTEGER,
      routeStartStation VARCHAR(30),
      routeEndStation VARCHAR(30),
     StateCode CHAR(2) NOT NULL,
     CONSTRAINT pk_Route_routeID PRIMARY KEY (routeID),
     CONSTRAINT fk_Route_StateCode FOREIGN KEY (StateCode)
            REFERENCES [OnTrack.State] (StateCode)
            ON DELETE NO ACTION ON UPDATE CASCADE)
```

```
INSERT INTO [OnTrack.Route] VALUES
('R001','Crescent','Long Distance',7,'New York','New Orleans','AL'),
```

	routeID	trainRoute	routeType	routeFrequency	routeStartStation	routeEndStation
1	R001	Crescent	Long Distance	7	New York	New Orleans
2	R002	Southwest Chief	Long Distance	7	Los Angeles	Chicago
3	R003	Texas Eagle	Long Distance	3	Chicago	San Antonio
4	R004	Texas Eagle	Long Distance	3	Chicago	San Antonio
5	R005	California Zephyr	Long Distance	7	San Francisco Bay Area	Chicago
6	R006	Coast Starlight	Long Distance	7	Los Angeles	Seattle
7	R007	Southwest Chief	Long Distance	7	Los Angeles	Chicago
8	R008	Texas Eagle	Long Distance	3	Chicago	San Antonio

Query executed successfully. | doitsqlx.rhsmith.umd.edu, 9... | AD\sgoyal24 (54) | BUDT703_DB_Student_078 | 00:00:00 | 189 rows

Physical Database Design

✦ Creating a table for all States:

```
CREATE TABLE [OnTrack.State](
    stateCode CHAR(2) NOT NULL,
    stateName VARCHAR(30)
    CONSTRAINT pk_State_stateCode PRIMARY KEY (stateCode))
```

```
INSERT INTO [OnTrack.State] VALUES
('AL', 'Alabama'),
```

Results | Messages

	stateCode	stateName
1	AL	Alabama
2	AR	Arkansas
3	AZ	Arizona
4	BC	British Columbia (Canada)
5	CA	California
6	CO	Colorado
7	CT	Connecticut
8	DC	District of Columbia

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Physical Database Design

✦ Creating a table for all Station City Codes:

```
CREATE TABLE [OnTrack.StationCity](
    stationCityCode CHAR(3) NOT NULL,
    stationCityName VARCHAR(30),
    stateCode CHAR(2) NOT NULL,
    CONSTRAINT pk_StationCity_stationCityCode PRIMARY KEY (stationCityCode),
    CONSTRAINT fk_StationCity_stateCode FOREIGN KEY (stateCode)
        REFERENCES  [OnTrack.State] (stateCode)
        ON DELETE  NO ACTION ON UPDATE CASCADE)
```

```
INSERT INTO [OnTrack.StationCity] VALUES
('ATN','Anniston','AL'),
```

	stationCityCode	stationCityName	stateCode
1	ABE	Aberdeen	ME
2	ABQ	Albuquerque	NJ
3	ACA	Antioch-Pittsburg	CA
4	ACD	Arcadia	MS
5	ADM	Ardmore	OH
6	AKY	Ashland	KS
7	ALB	Albany-Rensselaer	NM
8	ALC	Alliance	ND

Physical Database Design

✦ **Creating a table for all Performances:**

```
CREATE TABLE [OnTrack.Performance](
        routeID CHAR(4) NOT NULL,
        performanceYear INTEGER NOT NULL,   -
        onTimePerformance DECIMAL(3,1),
       CONSTRAINT pk_Performance_routeID_performanceYear PRIMARY KEY (routeID, performanceYear),
       CONSTRAINT fk_Performance_routeID FOREIGN KEY (routeID)
                REFERENCES  [OnTrack.Route] (routeID)
                ON DELETE NO ACTION ON UPDATE CASCADE)
```

```
INSERT INTO [OnTrack.Performance] VALUES
('R001',2021,54.6),('R001',2022,53),('R001',2023,57),
```

	routeID	performanceYear	onTimePerformance
1	R001	2021	54.6
2	R001	2022	53.0
3	R001	2023	57.0
4	R002	2021	36.3
5	R002	2022	28.0
6	R002	2023	34.0
7	R003	2021	52.0
8	R003	2022	49.0

Physical Database Design

✦ **Creating a table for Map, between State and Route:**

```
CREATE TABLE [OnTrack.Map](
        routeID CHAR(4) NOT NULL,
        stateCode CHAR(2) NOT NULL,
        CONSTRAINT pk_Map_stateCode_routeID PRIMARY KEY (stateCode, routeID),
        CONSTRAINT fk_Map_stateCode FOREIGN KEY (stateCode)
                REFERENCES  [OnTrack.State] (stateCode),
                ON DELETE NO ACTION ON UPDATE NO ACTION
        CONSTRAINT fk_Map_routeID FOREIGN KEY (routeID)
                REFERENCES  [OnTrack.Route] (routeID)
                ON DELETE NO ACTION ON UPDATE NO ACTION)
```

```
INSERT INTO [OnTrack.Map] VALUES
('R001','AL'),
```

	routeID	stateCode
1	R001	AL
2	R004	AR
3	R002	AZ
4	R003	AZ
5	R164	AZ
6	R005	CA
7	R006	CA
8	R007	CA

Query executed successfully. | doitsqlx.rhsmith.umd.edu, 9... | AD\sgoyal24 (54) | BUDT703_DB_Student_078 | 00:00:00 | 189 rows

Physical Database Design

✦ Creating a table for all Employees:

```
CREATE TABLE [OnTrack.Employment](
        stateCode CHAR(2) NOT NULL,
        employmentYear INTEGER  NOT NULL,
        employeeTotal INTEGER,
        employeeTotalWages INTEGER,
        CONSTRAINT pk_Employment_stateCode_employmentYear PRIMARY KEY (stateCode, employmentYear),
        CONSTRAINT fk_Employment_stationstateCode FOREIGN KEY (stateCode)
                REFERENCES  [OnTrack.State] (stateCode)
                ON DELETE CASCADE ON UPDATE CASCADE)
```

```
INSERT INTO [OnTrack.Employment] VALUES
('AL',2021,13,1292695),('AL',2022,15,1976833),('AL',2023,27,1983661),
```

	stateCode	employmentYear	employeeTotal	employeeTotalWages
1	AL	2021	13	1292695
2	AL	2022	15	1976833
3	AL	2023	27	1983661
4	AR	2021	26	2876205
5	AR	2022	28	3183395
6	AR	2023	31	2646581
7	AZ	2021	12	1889753
8	AZ	2022	15	1466911

Physical Database Design

✦ **Creating a table for all Guest Rewards:**

```
CREATE TABLE [OnTrack.GuestRewards](
        stateCode CHAR(2) NOT NULL,
        guestRewardsYear INTEGER NOT NULL,
        guestRewardsTotal INTEGER,
        CONSTRAINT pk_GuestRewards_stateCode_guestRewardsYear PRIMARY KEY (stateCode, guestRewardsYear),
        CONSTRAINT fk_GuestRewards_stateCode FOREIGN KEY (stateCode)
                REFERENCES  [OnTrack.State] (stateCode)
                ON DELETE NO ACTION ON UPDATE CASCADE)
```

```
INSERT INTO [OnTrack.GuestRewards] VALUES
('AL',2021,36069),
```

	stateCode	guestRewardsYear	guestRewardsTotal
1	AL	2021	36069
2	AL	2022	50452
3	AL	2023	58084
4	AR	2021	21101
5	AR	2022	26133
6	AR	2023	29331
7	AZ	2021	75061
8	AZ	2022	93961

Physical Database Design

✦ **Creating a table for all Amtrak Ridership:**

```
CREATE TABLE [OnTrack.Ridership](
        stationCityCode CHAR(3) NOT NULL,
        riderYear INTEGER NOT NULL,
        ridersTotal INTEGER,
        CONSTRAINT pk_Ridership_stationCityCode_riderYear PRIMARY KEY (stationCityCode, riderYear),
        CONSTRAINT fk_Ridership_stationCityCode FOREIGN KEY (stationCityCode)
                REFERENCES [OnTrack.StationCity] (stationCityCode)
                ON DELETE CASCADE ON UPDATE CASCADE)
```

```
INSERT INTO [OnTrack.Ridership] VALUES
('ATN',2021,1948),
```

	stationCityCode	riderYear	ridersTotal
1	ABE	2021	13841
2	ABE	2022	32935
3	ABE	2023	42671
4	ABQ	2021	25821
5	ABQ	2022	41692
6	ABQ	2023	51328
7	ACA	2021	19035
8	ACA	2022	24262

Physical Database Design

✦ Creating a table for Procurement:

```
CREATE TABLE [OnTrack.Procurement](
        stationCityCode CHAR(3) NOT NULL,
        procurementYear INTEGER  NOT NULL,
        procurementAmtTotal INTEGER,
        CONSTRAINT pk_Procurement_stationCityCode_procurementYear PRIMARY KEY (stationCityCode, procurementYear),
        CONSTRAINT fk_Procurement_stationCityCode FOREIGN KEY (stationCityCode)
                REFERENCES [OnTrack.StationCity] (stationCityCode)
                ON DELETE CASCADE ON UPDATE CASCADE)
```

```
INSERT INTO [OnTrack.Procurement] VALUES
('ABE',2021,0),
```

	stationCityCode	procurementYear	procurementAmtTotal
1	ABE	2021	0
2	ABE	2022	0
3	ABE	2023	126798
4	ADM	2021	822500
5	ADM	2022	1012875
6	ADM	2023	0
7	ALT	2021	145665
8	ALT	2022	0

Physical Database Design

✦ **Creating a table for Budget:**

```
CREATE TABLE [OnTrack.Budget](
        stationCityCode CHAR(3) NOT NULL,
        budgetType VARCHAR(20) NOT NULL,
        budgetYear INTEGER NOT NULL,
        budgetAmt INTEGER,
        budgetPlanYear INTEGER,
        budgetTotal INTEGER,
        CONSTRAINT pk_Budget_stationCityCode__budgetType_budgetYear PRIMARY KEY (stationCityCode, budgetType,
budgetYear),
        CONSTRAINT fk_Budget_stationCityCode FOREIGN KEY (stationCityCode)
                REFERENCES [OnTrack.StationCity] (stationCityCode)
                ON DELETE CASCADE ON UPDATE CASCADE)
```

```
INSERT INTO [OnTrack.Budget] VALUES
('ATL','Design',2022,658,2016,709),
```

	stationCityCode	procurementYear	procurementAmtTotal
1	ABE	2021	0
2	ABE	2022	0
3	ABE	2023	126798
4	ADM	2021	822500
5	ADM	2022	1012875
6	ADM	2023	0
7	ALT	2021	145665
8	ALT	2022	0

Business Transaction

Which state has demonstrated the lowest average on-time performance across the years, and how do states rank in terms of their average performance over this three-year period?

```
SELECT s.stateCode AS 'State Code', stateName AS 'State Name',
    CAST(AVG(CASE WHEN p.performanceYear = 2021 THEN p.onTimePerformance END) AS DECIMAL(3,1)) AS  'Avg On Time Performance 2021',
    CAST(AVG(CASE WHEN p.performanceYear = 2022 THEN p.onTimePerformance END) AS DECIMAL(3,1)) AS 'Avg On Time Performance 2022',
    CAST(AVG(CASE WHEN p.performanceYear = 2023 THEN p.onTimePerformance END) AS DECIMAL(3,1)) AS 'Avg On Time Performance 2023',
    CAST(AVG(AVG(p.onTimePerformance)) OVER (PARTITION BY s.stateName, m.StateCode)  AS DECIMAL(3,1)) AS 'Total Avg On Time Performance'
FROM [OnTrack.State] s
JOIN [OnTrack.Map] m ON s.stateCode = m.stateCode
JOIN [OnTrack.Route] r ON m.routeID = r.routeID
JOIN [OnTrack.Performance] p ON r.routeID = p.routeID
GROUP BY s.stateName, m.stateCode, s.stateCode
ORDER BY 'Total Avg On Time Performance'
```

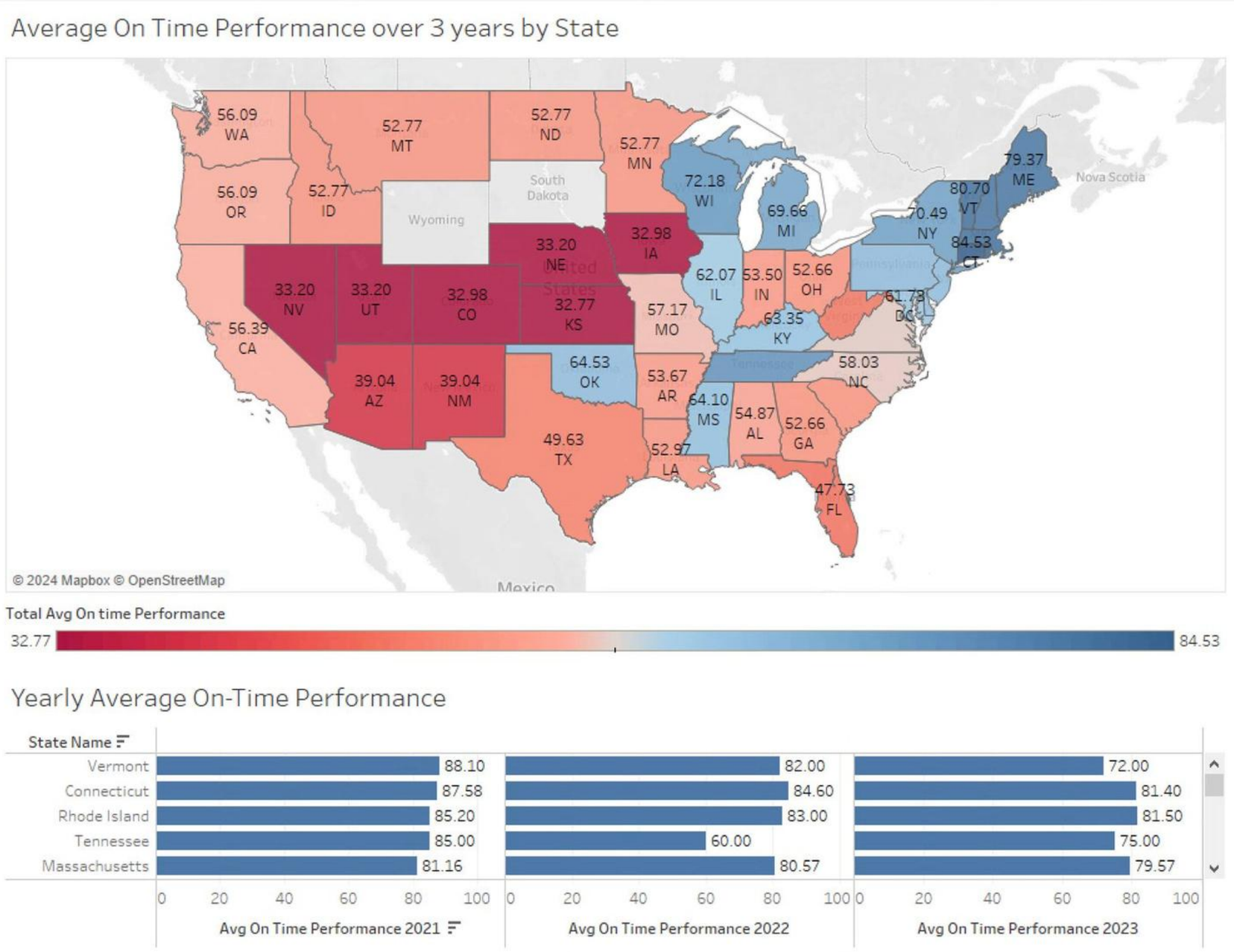
	State Name	Net Employee Count 2021-22	Net Avg On Time Performance 2021-22	Net Employee Count 2022-23	Net Avg On Time Performance 2022-23
1	Pennsylvania	202	-3.26	606	6.85
2	Maryland	163	-4.71	586	7.11
3	New Jersey	162	-5.15	449	4.10
4	New York	156	-3.28	472	1.56
5	Delaware	68	-5.25	259	3.33
6	Connecticut	65	-2.98	150	-3.20
7	Florida	65	-16.54	104	20.67
8	Indiana	54	-0.17	111	18.34

On-Time Performance

✦ Midwest and Southern U.S. states show the worst performance, primarily due to delays caused by shared freight tracks this more prevalent on the railroads like BNSF, and Union Pacific.

✦Long-distance routes, like California Zephyr, Southwest Chief and Sunset limited face consistent issues with low reliability.

✦Freight trains are prioritized over Amtrak, causing 70% of delays.



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Business Transaction

How does ridership levels compare to Amtrak Guest Rewards enrollment across states, and what patterns can be observed in loyalty program participation relative to passenger trends?

```
SELECT s.stateName AS 'State Name',
    (rewards.[2023] + rewards.[2022] + rewards.[2021]) AS 'Guest Rewards Total',
    (riders.[2023] + riders.[2022] + riders.[2021]) AS 'Total Riders',
 CAST((rewards.[2023] - rewards.[2021]) * 100.0 / (rewards.[2021]) AS DECIMAL(5,2)) AS 'Guest Rewards 21-23 %age',
 CAST((riders.[2023] - riders.[2021]) * 100.0 / (riders.[2021]) AS DECIMAL(5,2)) AS 'Riders 21-23 %age',
  (riders.[2023] + riders.[2022] + riders.[2021])/(rewards.[2023] + rewards.[2022] + rewards.[2021]) as 'Rider-to-Reward Ratio',
  CAST(AVG(AVG(p.onTimePerformance)) OVER (PARTITION BY s.stateName, m.StateCode)  AS DECIMAL(3,1)) AS 'Total Avg On Time
Performance'
FROM [OnTrack.Map] m, [OnTrack.Performance] p, [OnTrack.State] s
LEFT JOIN (SELECT c.StateCode,
       SUM(CASE WHEN r.riderYear = 2021 THEN r.ridersTotal END) AS [2021],
       SUM(CASE WHEN r.riderYear = 2022 THEN r.ridersTotal END) AS [2022],
       SUM(CASE WHEN r.riderYear = 2023 THEN r.ridersTotal END) AS [2023]
   FROM [OnTrack.Ridership] r
   JOIN [OnTrack.StationCity] c ON r.stationCityCode = c.stationCityCode
   GROUP BY c.StateCode) riders
ON s.StateCode = riders.StateCode
LEFT JOIN (SELECT g.StateCode,
       SUM(CASE WHEN g.guestRewardsYear = 2021 THEN g.guestRewardsTotal END) AS [2021],
       SUM(CASE WHEN g.guestRewardsYear = 2022 THEN g.guestRewardsTotal END) AS [2022],
       SUM(CASE WHEN g.guestRewardsYear = 2023 THEN g.guestRewardsTotal END) AS [2023]
   FROM [OnTrack.GuestRewards] g
   GROUP BY  g.StateCode) rewards
ON s.StateCode = rewards.StateCode
WHERE (rewards.[2021] IS NOT NULL) AND (rewards.[2023] IS NOT NULL) AND (m.routeID = p.routeID) AND (m.stateCode = s.stateCode)
GROUP BY s.stateName, rewards.[2021], rewards.[2022], rewards.[2023], riders.[2021], riders.[2022], riders.[2023], m.stateCode
ORDER BY 'Guest Rewards Total' DESC, 'Riders 21-23 %age' DESC, 'Total Avg On Time Performance' DESC
```

Business Transaction

How does ridership levels compare to Amtrak Guest Rewards enrollment across states, and what patterns can be observed in loyalty program participation relative to passenger trends?

	State Name	Riders Total	Riders 21-23 %age	Guest Rewards Total	Guest Rewards 21-23 %age	Rider-to-Reward Ratio
1	Vermont	833270	253.27	95093	51.88	8
2	Washington	2219665	189.26	958264	42.72	2
3	Oregon	1608277	176.67	589439	42.44	2
4	New Hampshire	986727	170.78	171566	48.29	5
5	Delaware	11428659	170.69	229062	41.36	49
6	Pennsylvania	11916369	165.57	2016494	38.56	5
7	New Jersey	2838793	160.06	1567419	34.52	1
8	Maine	844384	155.86	181387	60.44	4

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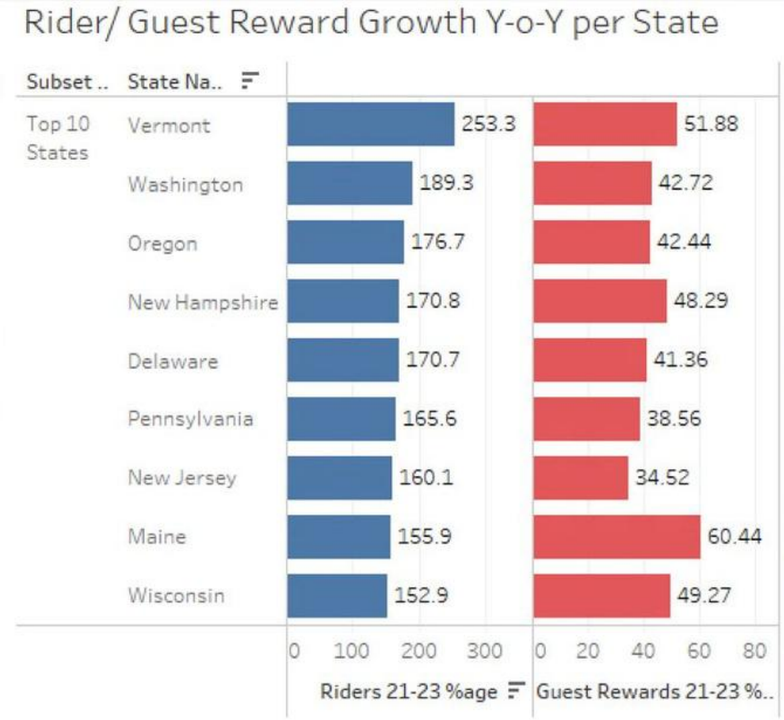
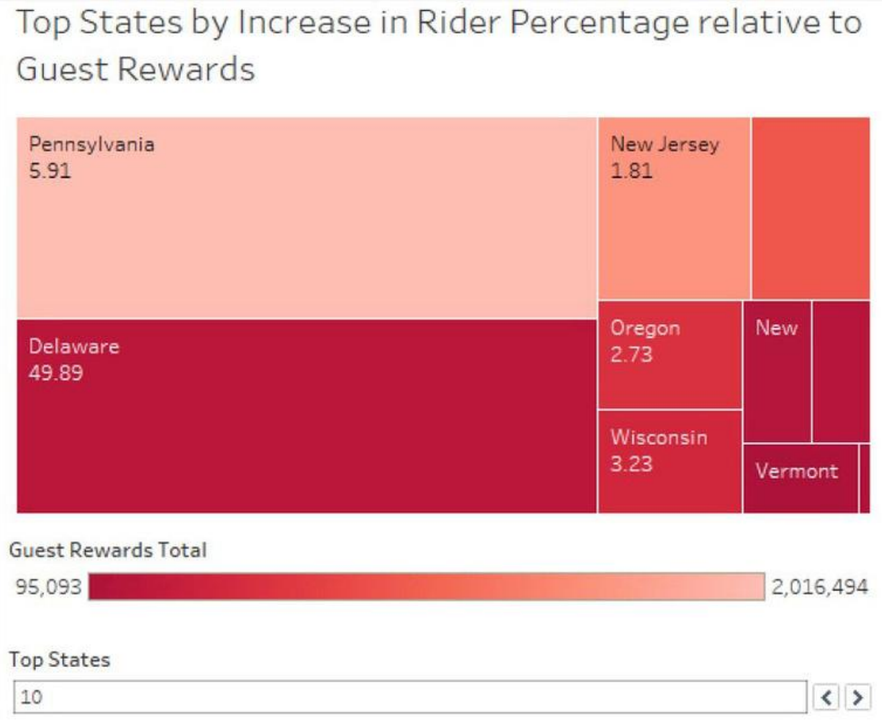
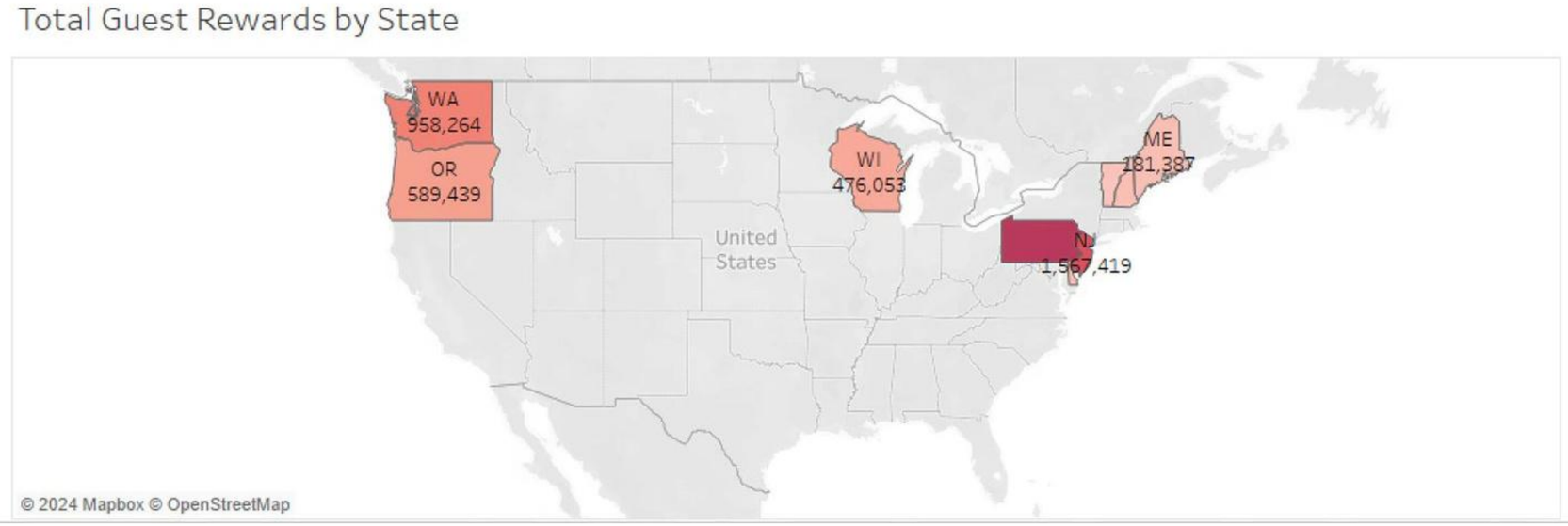
Ridership to Guest Rewards Ratio

✦ States in the northeastern and northwestern regions, such as Vermont, Maine, Oregon, and Washington, show strong performance in both rider and guest reward growth

✦ Vermont, Delaware and Pennsylvania see high commuter traffic on Amtrak, particularly along the Northeast Corridor.







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Business Transaction

During the 2022-2023 fiscal year, have states experiencing notable increases in ridership been allocated proportional increases in their budgetary funding to support this growth?

```
SELECT s.stateName AS 'State Name',
 (ISNULL(budget.[2022], 0) + ISNULL(budget.[2023], 0)) AS 'Budget Construction Total',
    CAST((riders.[2023] - riders.[2022]) * 100.0 / (riders.[2022]) AS DECIMAL(5,2)) AS 'Riders 22-23 %age'
FROM [OnTrack.State] s
LEFT JOIN (SELECT c.StateCode,
        SUM(CASE WHEN r.riderYear = 2021 THEN r.ridersTotal END) AS [2021],
        SUM(CASE WHEN r.riderYear = 2022 THEN r.ridersTotal END) AS [2022],
        SUM(CASE WHEN r.riderYear = 2023 THEN r.ridersTotal END) AS [2023]
   FROM [OnTrack.Ridership] r
    JOIN [OnTrack.StationCity] c ON r.stationCityCode = c.stationCityCode
    JOIN [OnTrack.Budget] b ON r.stationCityCode = b.stationCityCode
    WHERE b.budgetType = 'Construction'
    GROUP BY c.StateCode) riders
ON s.StateCode = riders.StateCode
JOIN (SELECT c.stateCode, b.budgetType,
        SUM(CASE WHEN b.budgetYear = 2022 THEN b.budgetAmt ELSE 0 END) AS [2022],
        SUM(CASE WHEN b.budgetYear = 2023 THEN b.budgetAmt ELSE 0 END) AS [2023]
    FROM [OnTrack.Budget] b
 JOIN [OnTrack.StationCity] c ON b.stationCityCode = c.stationCityCode
    GROUP BY c.stateCode, b.budgetType) AS budget
ON s.stateCode = budget.stateCode
WHERE budget.budgetType = 'Construction'
ORDER BY  'Riders 22-23 %age' DESC
```

Business Transaction

During the 2022-2023 fiscal year, have states experiencing notable increases in ridership been allocated proportional increases in their budgetary funding to support this growth?

	State Name	Budget Construction Total	Riders 22-23 %age
1	Ontario (Canada)	3266	71.90
2	Kentucky	2551	56.64
3	Tennessee	2419	49.66
4	Alabama	0	47.95
5	Mississippi	4406	46.76
6	Florida	0	44.89
7	Delaware	758	44.14
8	California	22062	43.93

Query executed successfully. | doitsqlx.rhsmith.umd.edu, 9... | AD\sgoyal24 (63) | BUDT703_DB_Student_078 | 00:00:00 | 37 rows

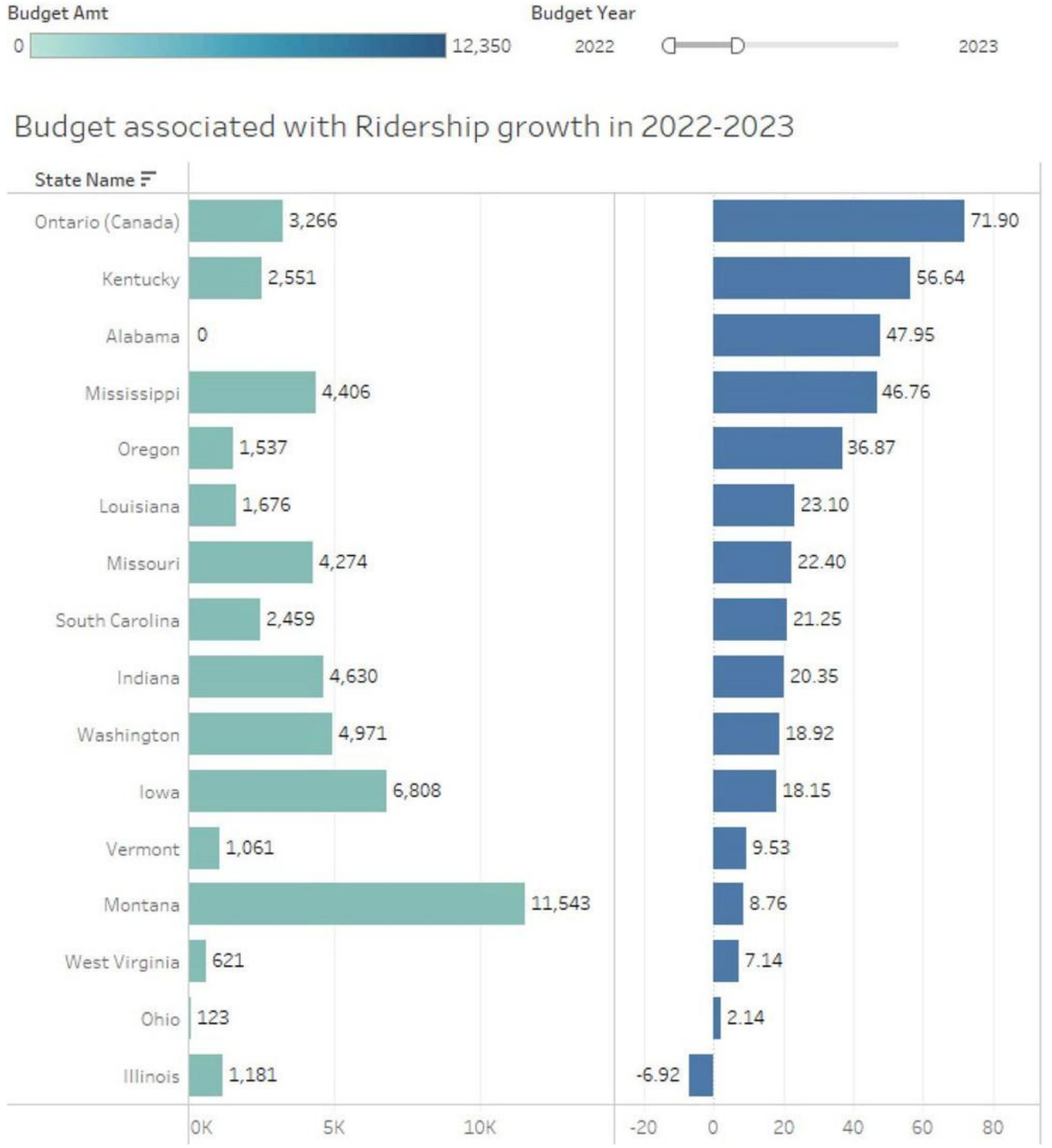
Ridership to Budget Allocation

✦ States experiencing notable increases in ridership, such as Ontario (71.90%), Kentucky (56.64%), and Alabama (47.95%), but received relatively modest budget allocations.

✦ Montana saw a lower ridership growth rate of 8.76%, and received one of the highest budget allocations. Ohio, with a mere 2.14% increase in ridership, was allocated $123M.

Top / Bottom 10 States by Budget

Sta..	Station City Code	Budget Type Construction
California	BAR	6,000
	COX	2,000
	DUN	7,819
	FMT	2,637
	GAC	4,499
	HAY	3,853
	LOD	500
	MTZ	5,524
	ONA	761
	POS	1,500
	PSN	1,200
	RIC	3,000
	RLN	4,103
	SNS	3,600
	TRU	1,800
	VRV	1,500
Missouri	JEF	1,333
	KCY	7,750
	KWD	6,380
	WAR	1,915
Montana	GPK	5,358
	HAS	3,149
	HAV	5,617
	WGL	2,790
North Dakota	FAR	2,882
	RUG	5,798
	STN	1,200
	WTN	6,997
Iowa	MTP	4,501
	OTM	12,350
West Virginia	CBS	3,393
	PRC	6,880



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Business Transaction

What is the impact of employment trends in states characterized by consistently high on-time performance, and what patterns or correlations can be identified?

```
SELECT s.stateName AS 'State Name',
    (employee.[2022] - employee.[2021]) AS 'Net Employee Count 2021-22',
 (avgPerformance.[2022] - avgPerformance.[2021]) AS 'Net Avg On Time Performance 2021-22',
  (employee.[2023] - employee.[2022]) AS 'Net Employee Count 2022-23',
  (avgPerformance.[2023] - avgPerformance.[2022]) AS 'Net Avg On Time Performance 2022-23'
FROM [OnTrack.State] s
JOIN (SELECT t.stateCode,
        SUM(CASE WHEN e.employmentYear = 2021 THEN e.employeeTotal END) AS [2021],
        SUM(CASE WHEN e.employmentYear = 2022 THEN e.employeeTotal END) AS [2022],
        SUM(CASE WHEN e.employmentYear = 2023 THEN e.employeeTotal END) AS [2023]
    FROM [OnTrack.State] t
    JOIN [OnTrack.Employment] e ON t.stateCode = e.stateCode
    GROUP BY t.stateCode) employee
ON s.stateCode = employee.stateCode
JOIN (SELECT s.stateCode, s.stateName AS 'State Name',
    CAST(AVG(CASE WHEN p.performanceYear = 2021 THEN p.onTimePerformance END) AS DECIMAL(4,2)) AS [2021],
    CAST(AVG(CASE WHEN p.performanceYear = 2022 THEN p.onTimePerformance END) AS DECIMAL(4,2)) AS [2022],
    CAST(AVG(CASE WHEN p.performanceYear = 2023 THEN p.onTimePerformance END) AS DECIMAL(4,2)) AS [2023]
 FROM [OnTrack.State] s
 JOIN [OnTrack.Map] m ON s.stateCode = m.stateCode
 JOIN [OnTrack.Route] r ON m.routeID = r.routeID
 JOIN [OnTrack.Performance] p ON r.routeID = p.routeID
 GROUP BY s.stateName, m.stateCode, s.stateCode) avgPerformance ON avgPerformance.stateCode = s.stateCode
JOIN [OnTrack.Map] m ON s.stateCode = m.stateCode
JOIN  [OnTrack.Route] r ON r.routeID = m.routeID
JOIN[OnTrack.Performance] p ON r.routeID = p.routeID
GROUP BY s.stateName,  employee.[2021],  employee.[2022],  employee.[2023], avgPerformance.[2023],avgPerformance.[2022],
avgPerformance.[2021]
ORDER BY 'Net Employee Count 2021-22'  DESC, 'Net Employee Count 2022-23' DESC
```

Business Transaction

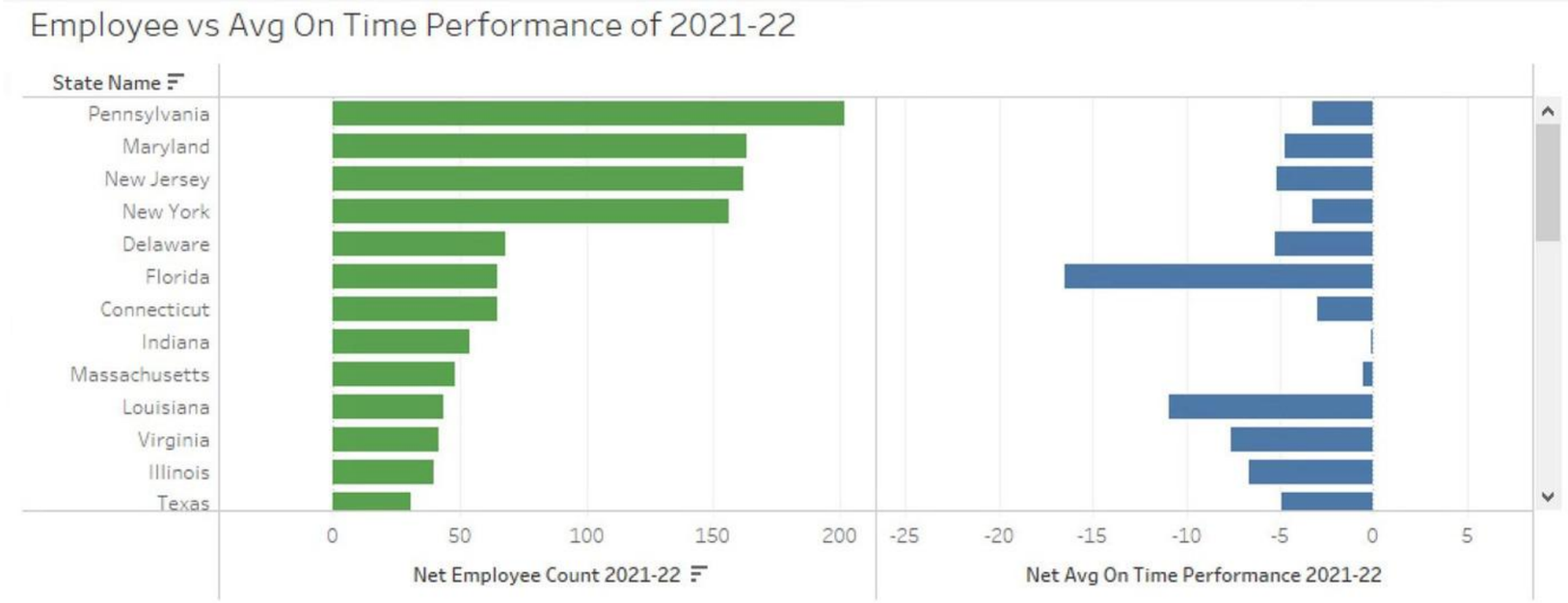
What is the impact of employment trends in states characterized by consistently high on-time performance, and what patterns or correlations can be identified?

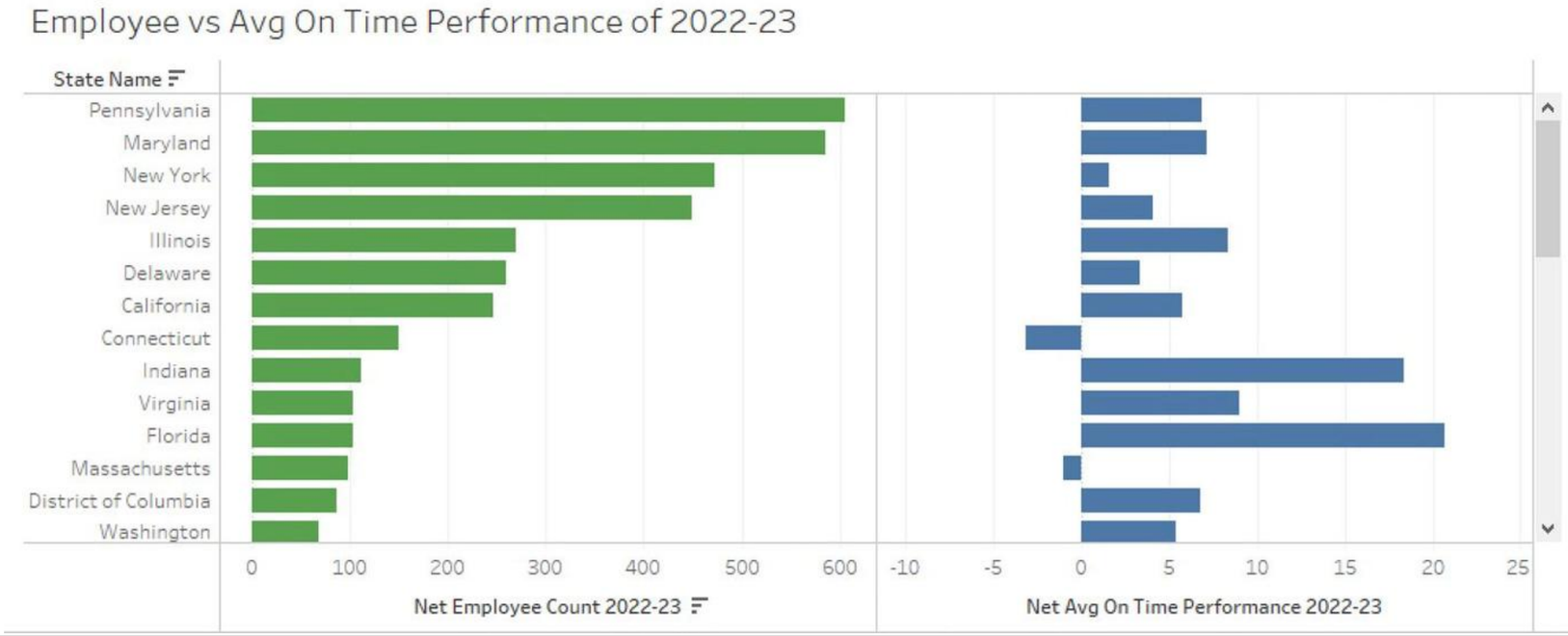
	State Name	Net Employee Count 2021-22	Net Avg On Time Performance 2021-22	Net Employee Count 2022-23	Net Avg On Time Performance 2022-23
1	Pennsylvania	202	-3.26	606	6.85
2	Maryland	163	-4.71	586	7.11
3	New Jersey	162	-5.15	449	4.10
4	New York	156	-3.28	472	1.56
5	Delaware	68	-5.25	259	3.33
6	Connecticut	65	-2.98	150	-3.20
7	Florida	65	-16.54	104	20.67
8	Indiana	54	-0.17	111	18.34

Query executed successfully. | doitsqlx.rhsmith.umd.edu, 9... | AD\sgoyal24 (63) | BUDT703_DB_Student_078 | 00:00:00 | 47 rows

Employment to On-Time Performance

✦ Despite states having high employment levels, on-time performance remained low in several cases, and no consistent patterns were evident.





Presented By: OnTrack Analytics

Recommendations

✦ Our analysis highlights several critical areas impacting Amtrak's operations and customer behavior

✦ Collaborate with federal authorities to prioritize Amtrak passenger trains over freight trains to improve on-time perfromance

✦ Amtrak can focus its marketing efforts on promoting Guest Rewards incentives in high-ridership areas where membership enrollment is currently low.

- Drive engagement on campuses to facilitate enrollment for students
- Perform additional market research in states with low rider to guest reward ratio to understand customer sentiments
- Potentially provide rewards to new Guest Reward sign-up’s

Recommendations

✦ Overfunding of regions with low ridership growth could result in underutilization of resources, as these areas may not need as much immediate financial support for infrastructure or operational enhancements.

- Combine ridership data with an evaluation of the infrastructure needs in each state (such as station improvements, track capacity, and staffing needs)

✦ To improve operational efficiency, it's important to categorize employees by their specific roles, including engineers, conductors, maintenance personnel, and support staff.

Thank You!