

The background of the slide is a light orange color with a faint, stylized industrial scene. It features several smokestacks emitting plumes of smoke, and various gears of different sizes are scattered throughout the design. The overall aesthetic is clean and modern, with a focus on mechanical and industrial themes.

Database Final Project: **Airline System**

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Highlights

You can delete this slide when you're done editing the presentation

Security Concern	Use md5() to encode password in database
Additional View	Use views on top agent/top customers to prevent repeat query request
Procedures and Triggers	Procedures to get staff airline instead of queries, triggers on insert constraint
User-friendly API	Clear search bar, pie/bar-chart, login/register forms
Extra Functionality	Agent can request limited information from customers they served before
Optimized SQL Queries	Optimization on join, select and indexing

The background of the slide features a light beige, textured surface. Scattered across this background are several faint, stylized illustrations of industrial elements: large gears of various sizes, some with internal patterns, and a silhouette of a factory with multiple smokestacks emitting plumes of smoke. The overall aesthetic is clean and modern, with a focus on mechanical and industrial themes.

06

Optimized SQL Queries

1. Use Join On instead of Cartesian Product

/FlightSearch

enter departure airport and arrival city

```
SELECT airline_name, flight_num, departure_airport, arrival_airport, departure_time, arrival_time, price, status
FROM airport AS a, flight AS b
WHERE a.airport_name = b.arrival_airport
AND b.departure_airport = 'NRT'
AND a.airport_city = 'Shanghai'
AND departure_time LIKE '2000-12-13%'
```

Original

✓ 正在显示第 0 - 1 行 (共 2 行, 查询花费 0.0007 秒。)

```
SELECT airline_name, flight_num, departure_airport, arrival_airport, departure_time, arrival_time, price, status FROM airport AS a, flight AS b
WHERE a.airport_name = b.arrival_airport AND b.departure_airport = 'NRT' AND a.airport_city = 'Shanghai' AND departure_time LIKE '2000-12-13%';
```

1. Use Join On instead of Cartesian Product

/FlightSearch

enter departure airport and arrival city

```
SELECT airline_name, flight_num, departure_airport, arrival_airport, departure_time, arrival_time, price, status
FROM flight AS b JOIN airport AS a
  on (a.airport_name = b.arrival_airport)
WHERE
  b.departure_airport = 'NRT'
  AND a.airport_city = 'Shanghai'
  AND departure_time LIKE '2000-12-13%'
```

Optimized

✓ 正在显示第 0 - 1 行 (共 2 行, 查询花费 0.0003 秒。)

```
SELECT airline_name, flight_num, departure_airport, arrival_airport, departure_time, arrival_time, price, status FROM flight AS b JOIN airport AS
a on (a.airport_name = b.arrival_airport) WHERE b.departure_airport = 'NRT' AND a.airport_city = 'Shanghai' AND departure_time LIKE '2000-12-
13%';
```

2. Use Small Table as Outer Table During JOIN

/FlightSearch

enter departure airport and arrival city

```
SELECT airline_name, flight_num, departure_airport, arrival_airport, departure_time, arrival_time, price, status  
FROM airport AS a JOIN flight AS b  
on (a.airport_name = b.arrival_airport)  
WHERE  
b.departure_airport = 'NRT'  
AND a.airport_city = 'Shanghai'  
AND departure_time LIKE '2000-12-13%'
```

More-Optimized

✓ 正在显示第 0 - 1 行 (共 2 行, 查询花费 0.0002 秒。)

```
SELECT airline_name, flight_num, departure_airport, arrival_airport, departure_time, arrival_time, price, status FROM airport AS a JOIN flight AS  
b on (a.airport_name = b.arrival_airport) WHERE b.departure_airport = 'NRT' AND a.airport_city = 'Shanghai' AND departure_time LIKE '2000-12-  
13%';
```


3. Remove Filtering from Group By

/StaffComparison

Get direct sales in one year

```
SELECT IFNULL(sum(price),0) as direct_sum from purchases NATURAL JOIN ticket NATURAL JOIN flight
WHERE airline_name = 'All Nippon Airways' and purchase_date BETWEEN '2000-01-01' and '2024-01-01'
GROUP BY booking_agent_id
HAVING booking_agent_id is Null
```

Original

✓ MySQL 返回的查询结果为空 (即零行)。 (查询花费 0.0010 秒。)

```
SELECT IFNULL(sum(price),0) as direct_sum from purchases NATURAL JOIN ticket NATURAL JOIN flight WHERE airline_name = 'All Nippon Airways' and
purchase_date BETWEEN '2000-01-01' and '2024-01-01' GROUP BY booking_agent_id HAVING booking_agent_id is Null;
```

3. Remove Filtering from Group By

/StaffComparison

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and booking_agent_id is Null
GROUP BY booking_agent_id
```

Optimized

✓ MySQL 返回的查询结果为空 (即零行)。 (查询花费 0.0002 秒。)

```
SELECT IFNULL(sum(price),0) as direct_sum from purchases NATURAL JOIN ticket NATURAL JOIN flight WHERE airline_name = 'All Nippon Airways' and
purchase_date BETWEEN '2000-01-01' and '2024-01-01' and booking_agent_id is Null GROUP BY booking_agent_id;
```


4. Add Index on Tables

← 服务器: localhost » 数据库: Air » 表: flight

← 服务器: localhost » 数据库: Air » 表: works_for

浏览 结构 SQL 搜索 插入 导出 导入 权限 操作

索引 ?

操作	键名	类型	唯一	紧凑	字段	基数	排序规则	空	注释
 编辑	PRIMARY	BTREE	是	否	email	8	A	否	
 改名					airline_name	8	A	否	
 删除	airline_name	BTREE	否	否	airline_name	8	A	否	
 编辑					airline_name	8	A	否	

4. Add Index on Tables

Use Explain to see whether the index is actually being used....

您的 SQL 语句已成功运行。

```
EXPLAIN SELECT IFNULL(sum(price),0) as direct_sum from purchases NATURAL JOIN ticket NATURAL JOIN flight WHERE airline_name = 'All Nippon Airways' and purchase_date BETWEEN '2000-01-01' and '2024-01-01' and booking_agent_id is not Null GROUP BY booking_agent_id;
```

[\[编辑内嵌 \]](#) [\[编辑 \]](#) [\[略过解析 SQL \]](#) [\[分析解释了mariadb.org \]](#) [\[创建 PHP 代码 \]](#)

额外选项

id	select_type	table	type	possible_keys	key	key_len	ref	rows	Extra
1	SIMPLE	ticket	ref	PRIMARY,airline_name	airline_name	52	const	2	Using where; Using index; Using temporary; Using f...