
ORACLE®

Sustainability @ Oracle

Department of Energy Connected Lighting Workshop

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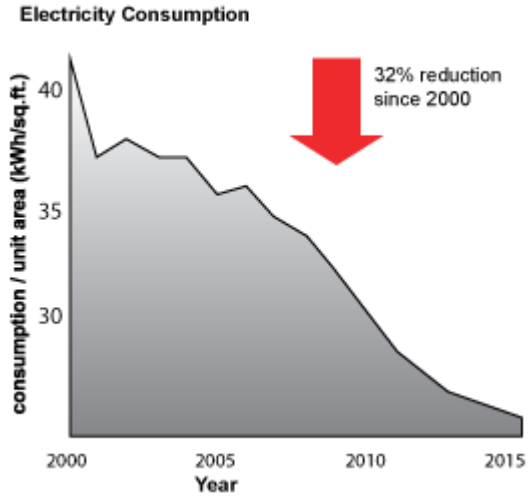
ORACLE

Oracle

- Founded 1977
- Revenues $38.2 Billion (2015)
- Net Income $9.4 Billion (2015)
- Equity $49 Billion (2015)
- 135,000 Employees in 145 Countries
- 7,500 Employees at Redwood Shores Headquarters
- Fortune 500 Rank: 82
- 2nd Largest Software Company
- CDP (Carbon Disclosure Project) Score: 99 (percentile ranking)
- Newsweek Green Companies Ranking, U.S. No. 10, Global No. 17

Oracle Headquarters – Redwood Shores

Energy Efficiency at Oracle Headquarters



Between 2000 and 2015, Oracle reduced electricity and natural gas usage at their headquarters campus by **32 percent** and **46 percent**, respectively on a per capita basis.

Energy Star

- 100 Oracle Parkway - 99
- 200 Oracle Parkway - 95
- 300 Oracle Parkway - 94
- 400 Oracle Parkway - 100
- 500 Oracle Parkway - 91
- 600 Oracle Parkway - 90
- 301 Island Parkway - 89
- 401 Island Parkway - 91
- 501 Island Parkway - 90
- Oracle Plaza - 97
- CAMPUS AVERAGE OF 94

Energy Savings

	Electricity Savings since 2000	Natural Gas Savings since 2000
100 Oracle Parkway	38%	18%
200 Oracle Parkway	19%	44%
300 Oracle Parkway	58%	49%
400 Oracle Parkway	6%	51%
500 Oracle Parkway	45%	61%
600 Oracle Parkway	6%	18%
301 Island Parkway	64%	63%
401 Island Parkway	0%	87%
501 Island Parkway	32%	62%
Oracle Plaza	51%	11%
CAMPUS AVERAGE	32%	46%

Following Best Practices

Silicon Valley Chapter & Pacific Southwest Regional Winner

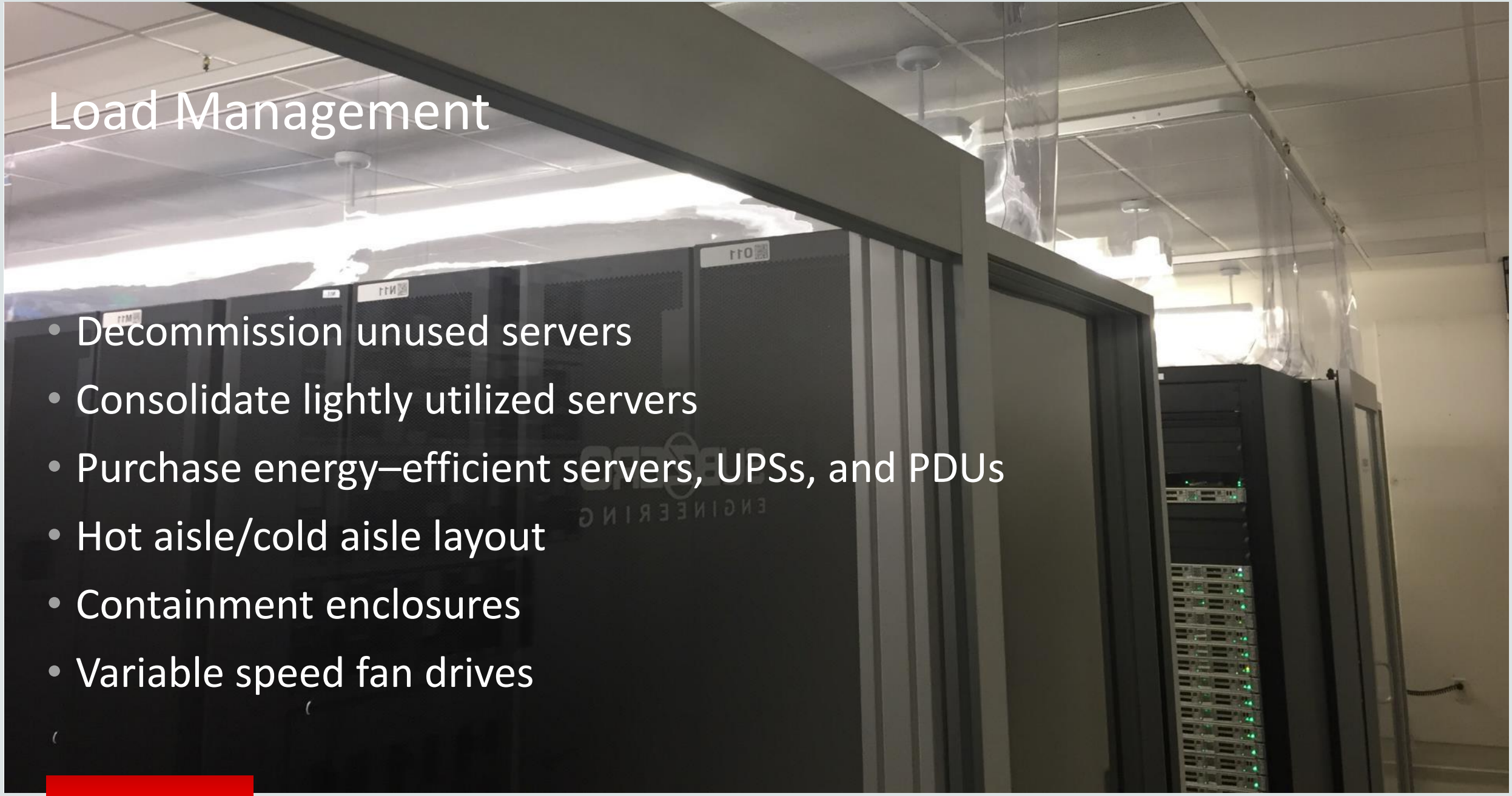
All Ten Buildings Certified

95% Diversion from Landfill

Heating and Cooling Optimization

- Repair of Victaulic fittings to allow boilers to shutdown after hours and weekends
- Optimize and reset office setpoints
- Install VFDs on CRAH units, fans and chillers
- Install water-side & air-side economizers
- Upgrade appliances and equipment with Energy Star certified versions
- Install Occupancy Sensors for HVAC in Open Areas and in Conference Rooms
- Optimized supply air temperature (SAT) reset and duct static reset.
- Elimination of simultaneous heating and cooling by implementing new DDC controls.

Load Management



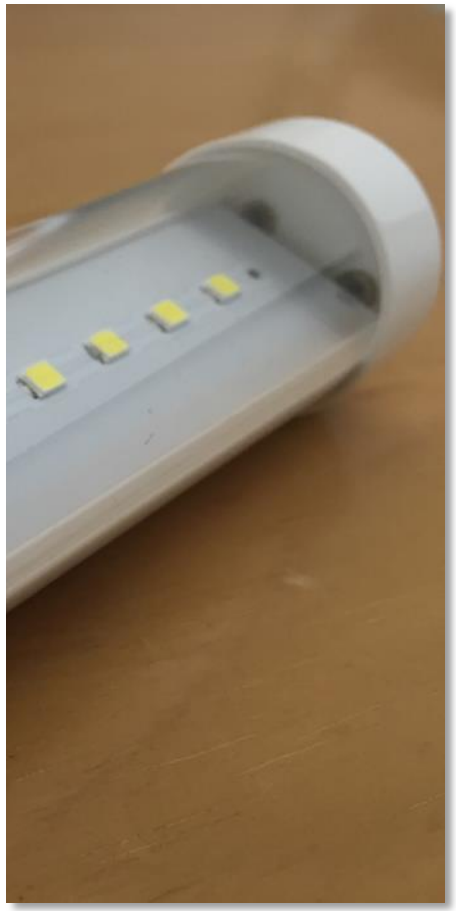
- Decommission unused servers
- Consolidate lightly utilized servers
- Purchase energy–efficient servers, UPSs, and PDUs
- Hot aisle/cold aisle layout
- Containment enclosures
- Variable speed fan drives

Monitoring and Reporting

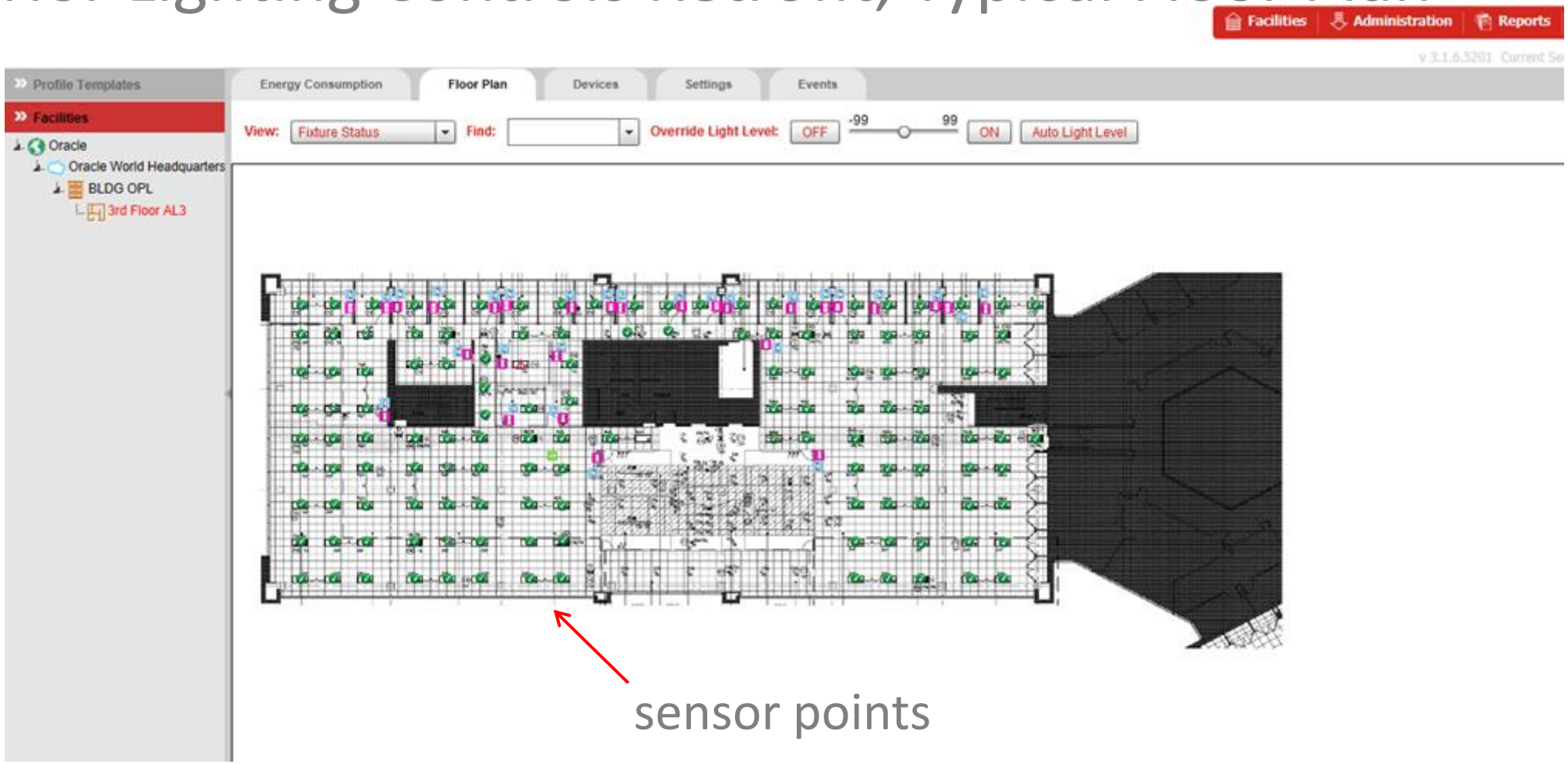
- electricity
- natural gas
- water
- irrigation
- by campus
- by building
- by floor
- predictability
- real-time commissioning

Improving Lighting Efficiency

- Occupancy controls by zone
  - Daylighting
  - Dimming
- Transitioning all office, lobby, and accent lighting to LED
  - 12,000 lamps and growing
- Convert Garage and Parking Lot lighting to LED with smart controls
- Convert Building Monument Signs and accent lighting to LED
- Integrating Smart Controls
  - Daylight Harvesting
  - Occupancy Sensors
  - Sensors Tied To HVAC VAV



Interior Lighting Controls Retrofit, Typical Floor Plan



Interior Lighting Controls Savings Analysis, Summary (kWh)

Floor	Total Consumption	Task Tuning Savings	Ambient Savings	Occupancy Savings	Total Savings	Extrapolated Energy Use Pre-Project
Floor A3	629,964	1,241,100	20,922	612,513	1,874,535	2,504,499
Floor B2	491,512	1,234,020	1,312	923,704	2,159,037	2,650,550
Floor C1-4	1,490,760	4,025,883	64,165	3,306,586	7,396,634	8,887,394
Total Savings kWh	2,612,237	6,501,003	86,399	4,842,804	11,430,205	14,042,442
Total Savings %	18.6%				81.4%	100.0%
% Savings by Type		56.9%	0.8%	42.4%	100%	

Interior Lighting Controls Cost Benefit Analysis

Floor/Wing	Total Cost	Rebate	Tax Incentives	Net Cost	Annual Savings	Simple Payback (yrs)	ROI
C4	$ 48,581	$ 5,985	$ 4,513	$ 38,083	$ 12,861	3.0	34%
A3, B2, C1-3	$184,398	$21,720	$21,426	$141,252	$ 59,193	2.4	42%
Total	$232,979	$27,705	$25,939	$179,335	$ 72,054	2.5	40%

Garage “Smart” Lighting Controls With LED Lamps

- Occupancy sensors reduce lighting 70% when space is not occupied
- Lamps gracefully ramp up ahead of vehicles and pedestrians, ramp down behind them after they pass
- Daylight harvesting dims lighting based on the natural light
- 89% reduction in electricity used for lighting

Electricity Savings – First Phases	
Net Cost	$728,940
Annual Savings	$ 148,115
Simple Payback (years)	4.9
Annual Return On Investment	20%
Percentage Reduction in Electricity	89%

Transitioning to LED

- Existing Fluorescent T8 lamps and ballasts together consume 40 Watts
- New replacement T8 LED lamps consume 10 Watts when occupied…
- …4-5 Watts when unoccupied.

Open Parking Lot Controls

- Converting lamps to LED
- Connected bulbs allow for networking and addressable lamps
  - Dimming
  - Adjustable range
  - Security
  - Reporting outages

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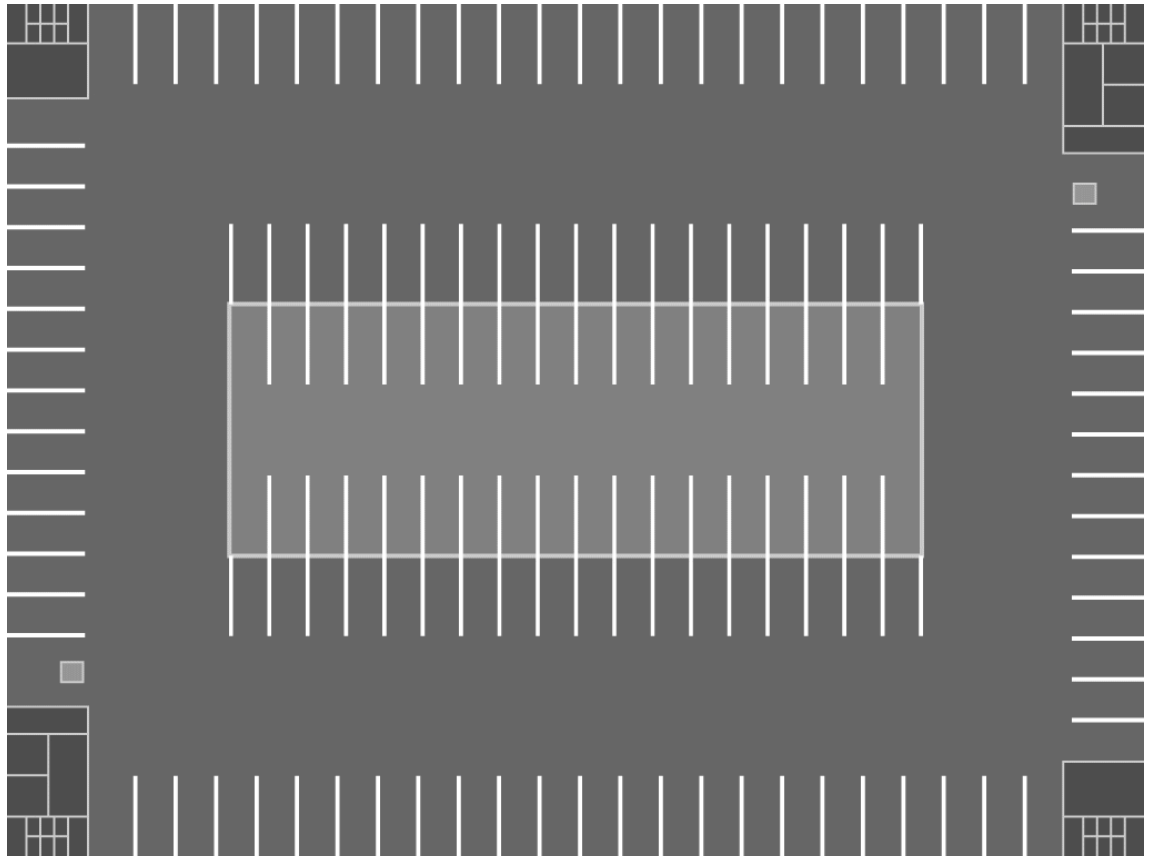

“Environmental and sustainability considerations and best practices today need to be embedded in every aspect of an organization's operations.” – Oracle Green Business Operations Report


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