



IAAO



GIS VALUATION

TECHNOLOGIES CONFERENCE

2024



Bringing Income Analytics to Life

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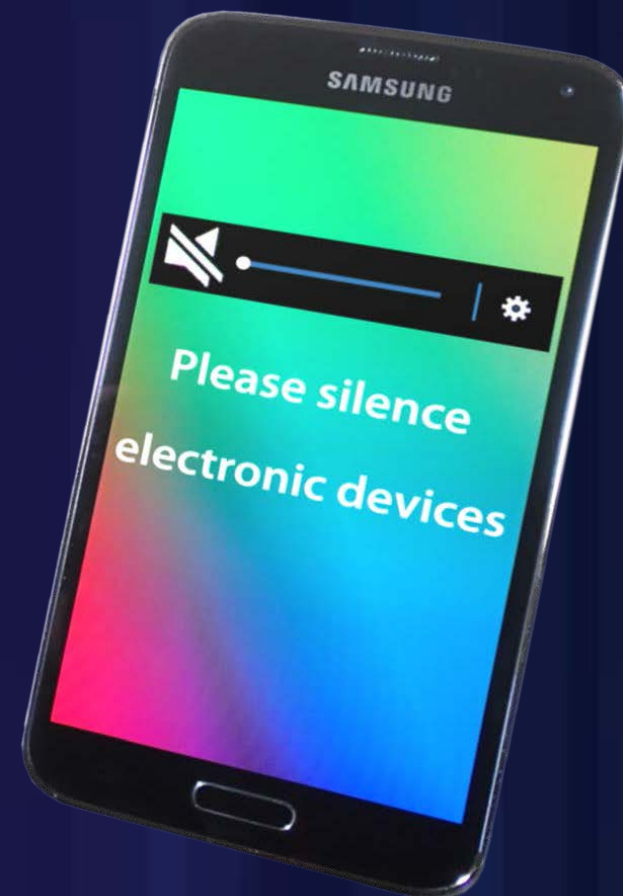


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Agenda

- Part 1 – Assessment in Ontario
 - Ontario's Property Assessment System
 - About MPAC
 - Property Income & Expense Return (PIER) Program

- Part 2 – Catalyst for Developing the Income Trend Application
 - Catalyst
 - The technology
 - Data readiness / automatic filtering

- Part 3 – Introducing the Income Trend Dashboard
 - Graphs and charts
 - Various Search methods: Property Type and Location
 - Benefits of internal & external use
 - Future Development

Ontario's Property Assessment System



Government of Ontario

Establishes the province's assessment and taxation laws and determines the education tax rates.



MPAC

Determines property classifications and assessments for all properties in Ontario, in accordance with legislation set by the Ontario Government.



Municipalities

Determine revenue requirements, set municipal tax rates and collect property taxes to pay for municipal services.*



Property owners

Pay property taxes that fund community services and education taxes that fund public schools.

An aerial photograph of a city, likely Toronto, showing a dense urban core with many skyscrapers in the distance and residential areas with trees in the foreground. Four white callout boxes with thin white lines pointing to specific locations are overlaid on the image. The background is a clear blue sky with some light clouds.

Municipal Property Assessment Corporation

We are
1,800+ employees
across Ontario

Responsible for
assessing more than
5.6 million properties in
Ontario

Representing more
than **\$3 trillion** in
property value

Serving all of Ontario's
444 municipalities

2023 Assessment Roll

New Assessment



New Assessment by Property Type

In 2023, MPAC captured more than **\$42 billion** in new assessment. New assessment refers to new construction and/or additions to existing property that have been recently completed and assessed during the year.



Property Income and Expense Return (PIER)

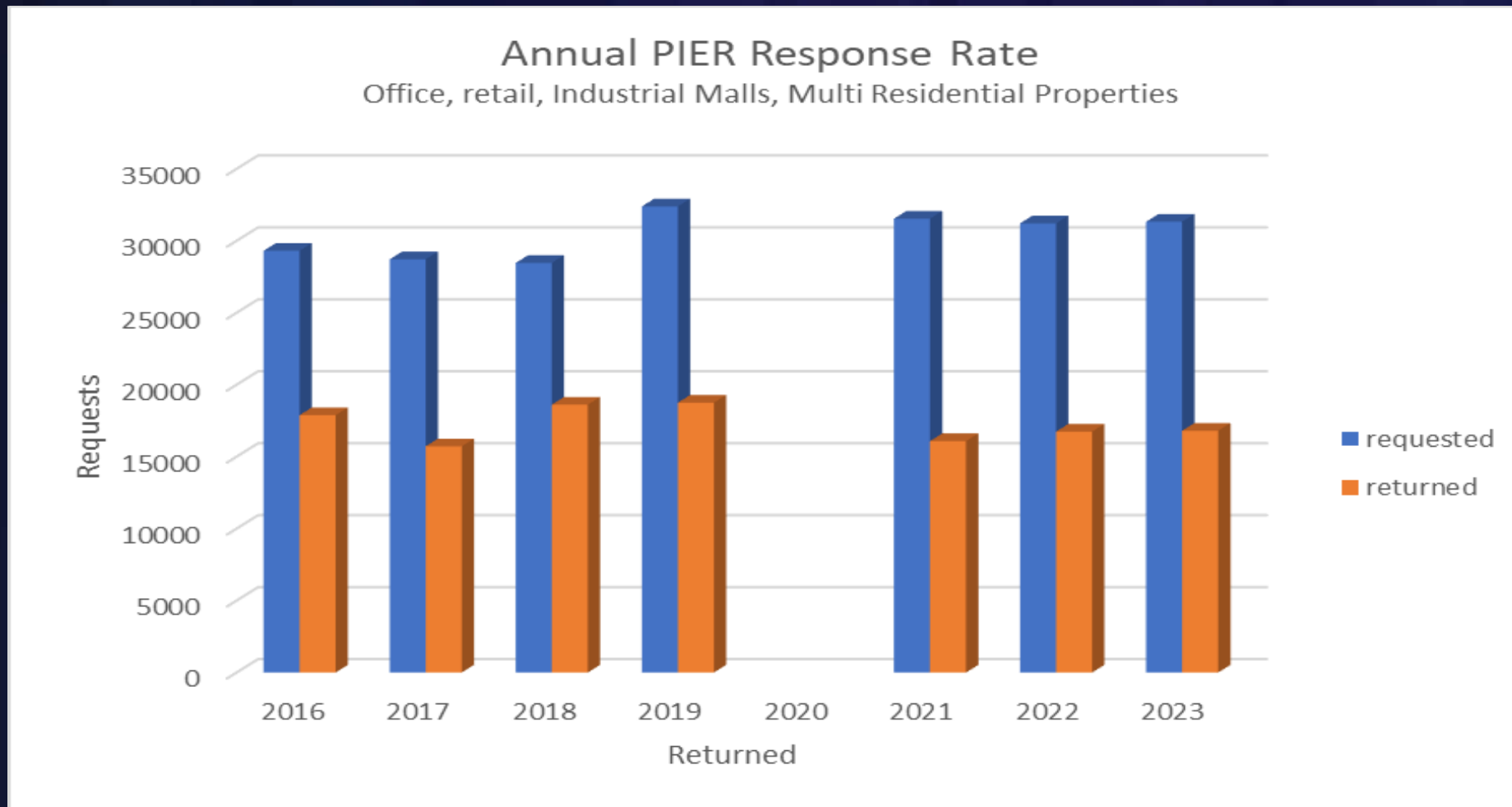
- MPAC's Property Income and Expense Return (PIER) program is the largest data collection initiative undertaken through the Assessment Information Request Program, established to centralize the collection of assessment information from property owners and stakeholders.
- Each year, MPAC requests property owners to submit rent, income and expense information. Property owners and representatives are encouraged to submit their income and expense information through our online portal, AboutMyProperty™.
- The PIER request is sent to approximately 35,000 properties every year.
- The information requested by MPAC is collected under authority of section 11 of the *Assessment Act* and used for property assessment purposes.

Ensures MPAC's
database is up-to-
date

Supports the
development of
accurate
assessments

Provides insights
as to how various
property sectors
are changing

Property Income and Expense Return (PIER)



*** Due to the global pandemic, MPAC suspended the PIER request in 2020*

Catalyst for Developing Income Trends

- Annually, MPAC receives approximately 17,000 PIER returns for office, retail, industrial malls and multi-residential properties.
- PIER submissions require vetting by local assessors to determine accuracy and validity for use in analysis.
- As the PIER request date distances from the legislated date of valuation, assisting local assessors with the ability to quantify market activity in real time was the catalyst of developing the income trends.
- The Income Trend application can assist local assessors to understand the market activity of their respective property types and locations.

The Technology - Amazon Redshift and React

To develop an effective application, the right technology needed to be leveraged.

Amazon Redshift

- Fully managed data warehouse service in the cloud
- Where all PIER collection data is stored
- As new rents occur, they are pushed into the redshift tables nightly

React

- The technology used for the user interface (UI)
- A JavaScript-based UI development library in Python
- One of the most used frontend libraries for web development
- Used by Meta, Netflix, Uber, Airbnb, and The New York Times

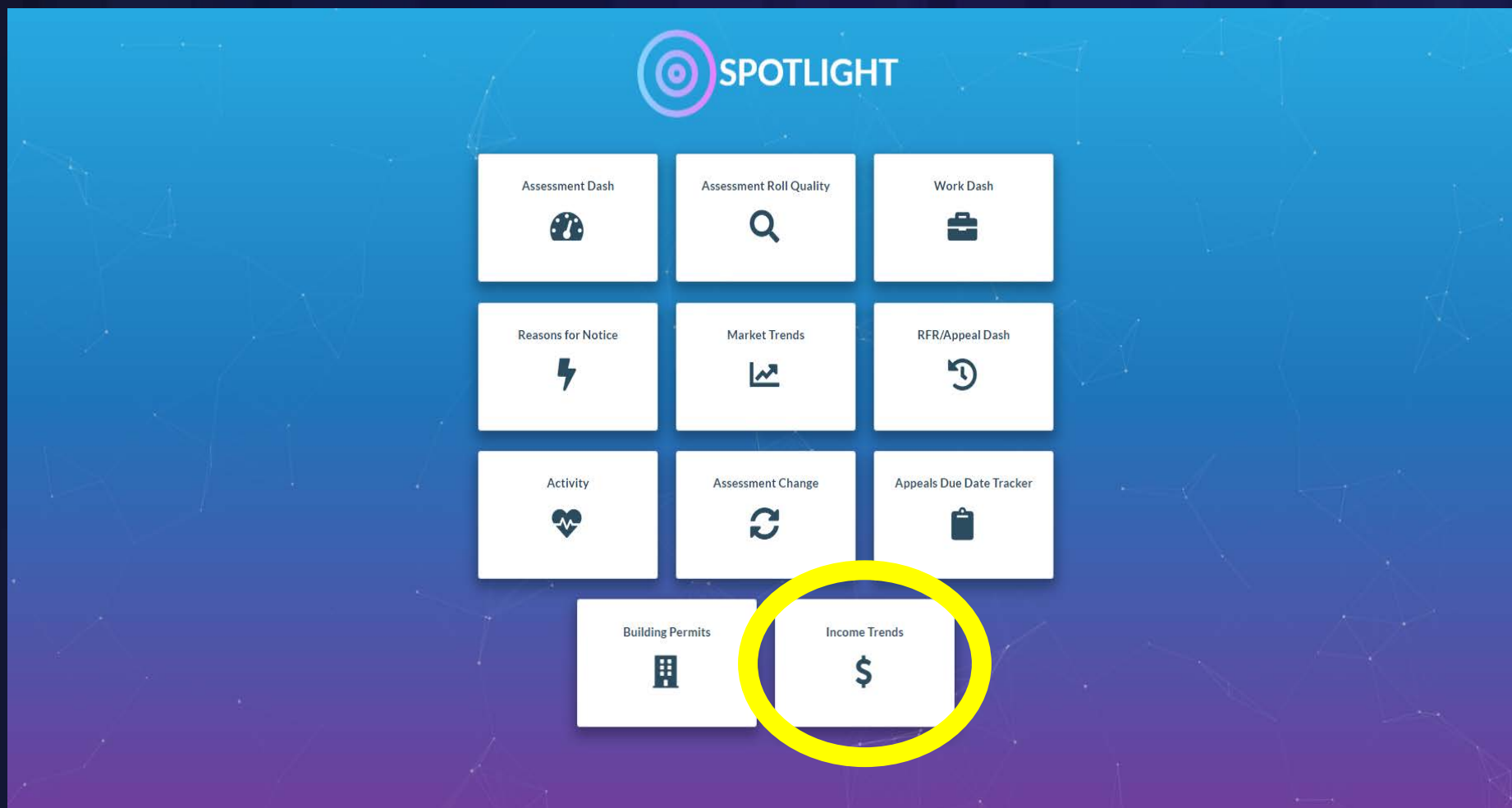
Automated Lease Filtering in Real Time

- Data readiness is the most time-consuming and laborious task requirement
- New leases are being added to the data repository every year
- Assessors are pressed for time to review each reported lease annually
- Leases that were previously reviewed in prior years and coded for analysis are automatically coded and not required to be reviewed.
- Set of base filters are applied to remove any potential outliers from entering into the analysis

Automated Lease Filtering in Real Time

- Some filters include:
 - Analysis code is “Y” or “X”
 - Property status is active
 - Lease type is “New”
 - Remove extreme lease amounts
 - Duplicate leases are eliminated
 - i.e. A five year lease can be reported five consecutive times. The filter applied keeps the lease the first time it is reported and removes the other four years of reporting.

Spotlight – Income Trends



Income Trends dashboard can be utilized to analyze current income trends on various property types

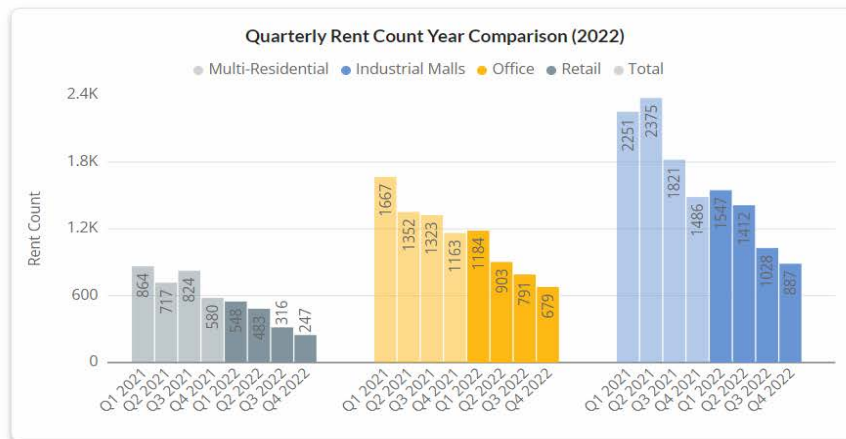
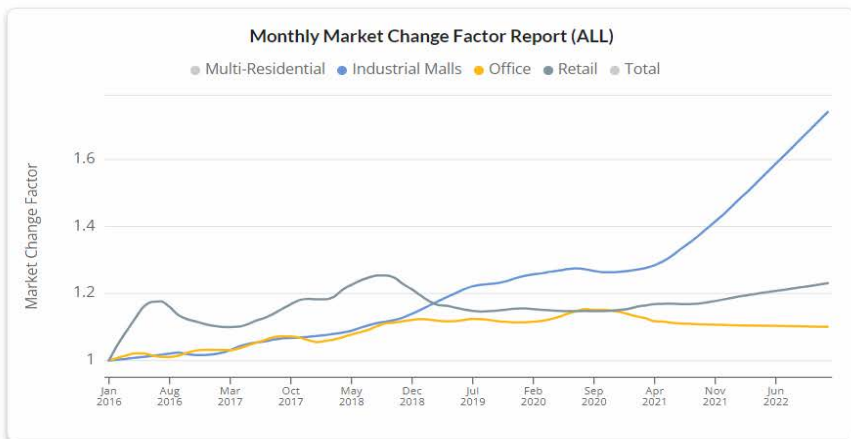
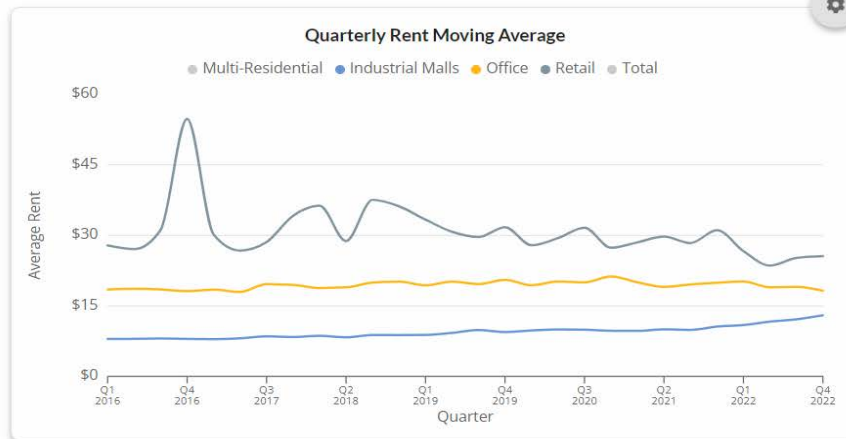
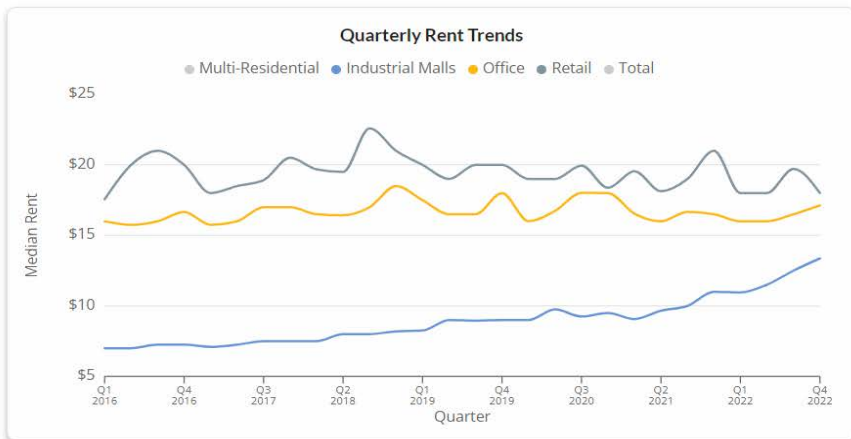
**** For illustrative purposes only ****

Income Trends - Landing Page



> Income Trends

Logout



**** For illustrative purposes only ****



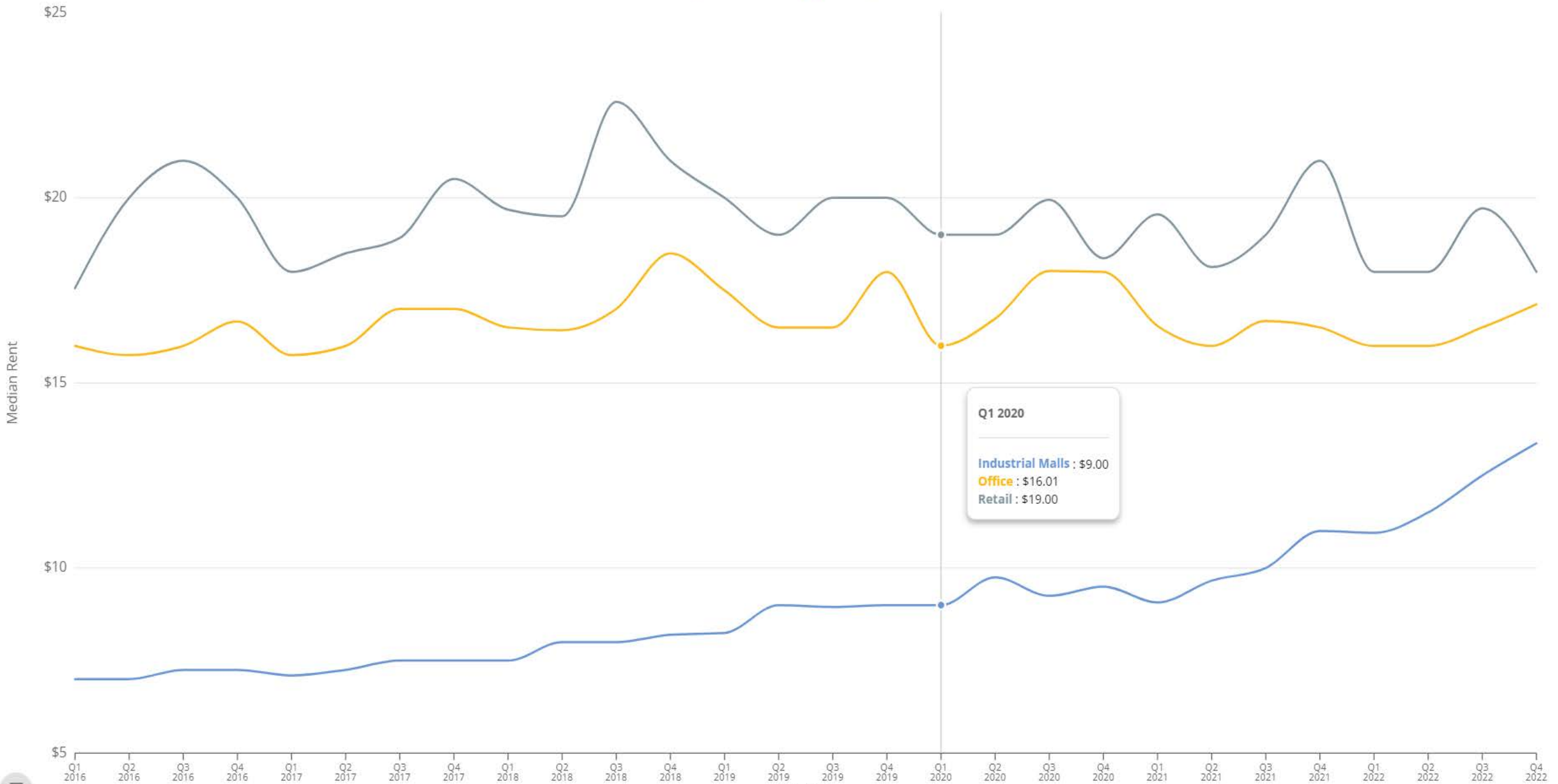
Rent Trends

1. Rent Trends

- **Income Metric View:**
 - **Total rent count:** periodic counting of new leases/rents at defined intervals.
 - **Median Rent:** graphical display of median rent of leases signed in defined period.
 - **Average Rent:** average rent of new leases signed in defined period.
- **Date Range:**
 - User can define the range and interval (quarterly or annually).
- **Line or Bar Chart**
- **Comparison Table**

Quarterly Rent Trends

● Multi-Residential ● Industrial Malls ● Office ● Retail ● Total



Q1 2020
Industrial Malls : \$9.00
Office : \$16.01
Retail : \$19.00

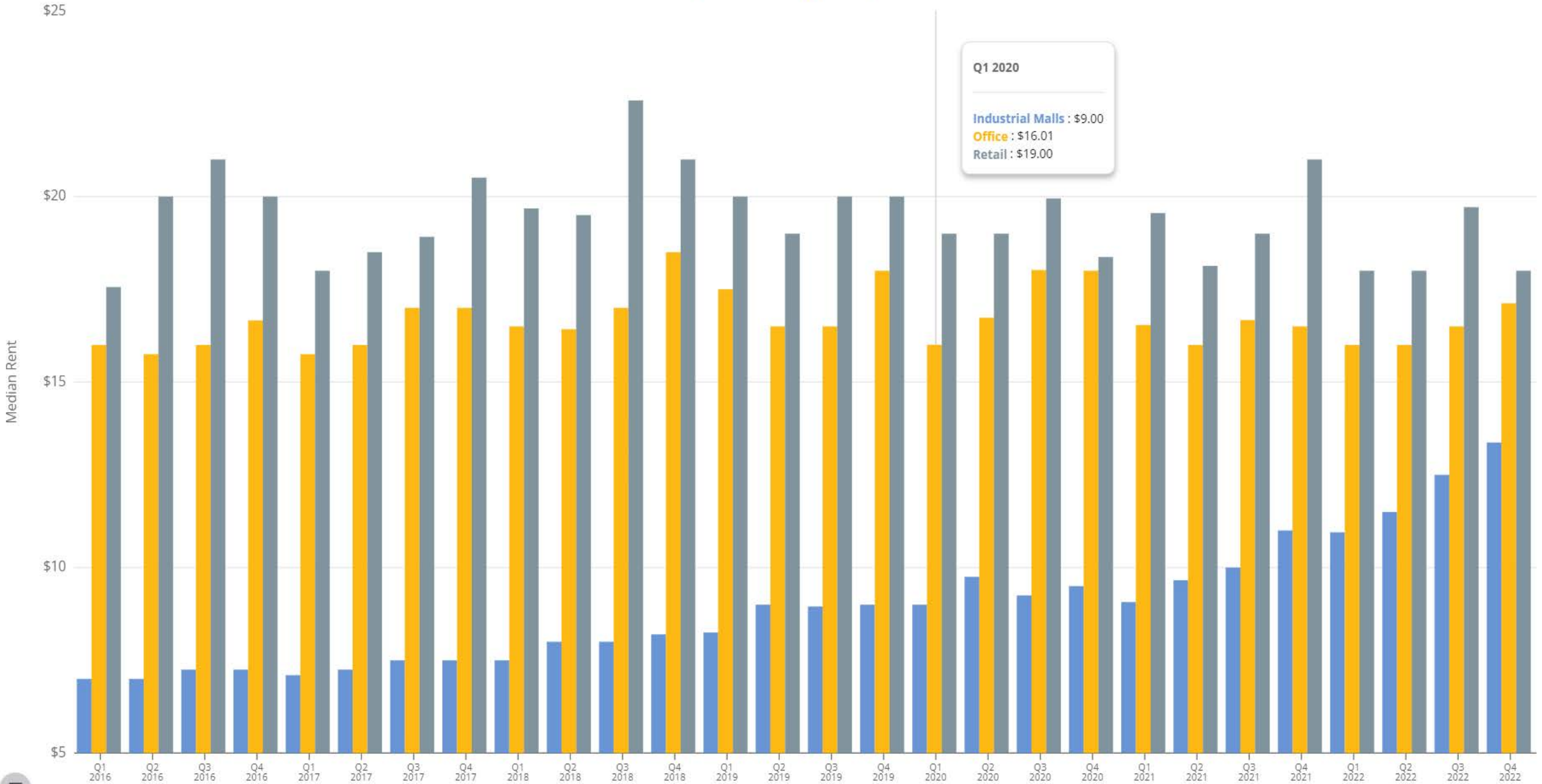
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Quarterly Rent Trends

● Multi-Residential ● Industrial Malls ● Office ● Retail ● Total

Q1 2020

Industrial Malls : \$9.00
Office : \$16.01
Retail : \$19.00



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Rent Trends – Comparison Table

Provincial

Multi-Residential Industrial Malls Office Retail Total

Quarter	Total Rent Count	Average Monthly Rent Count	Average Weekly Rent Count	Average Rent	Quarter over Quarter Change	Change Compared to Q1 2016
Q1 2016	4,221	352	81	18.16	0.00%	0.00%
Q2 2016	3,044	254	59	18.81	3.58%	3.58%
Q3 2016	3,087	257	59	17.89	-4.89%	-1.49%
Q4 2016	3,123	260	60	18.86	5.42%	3.85%
Q1 2017	3,471	289	67	17.93	-4.93%	-1.27%
Q2 2017	2,824	235	54	18.98	5.86%	4.52%
Q3 2017	3,586	299	69	19.49	2.69%	7.32%
Q4 2017	2,973	248	57	19.69	1.03%	8.43%
Q1 2018	3,252	271	63	18.20	-7.57%	0.22%
Q2 2018	2,986	249	57	19.91	9.40%	9.64%
Q3 2018	2,759	230	53	19.50	-2.06%	7.38%
Q4 2018	2,512	209	48	20.40	4.62%	12.33%
Q1 2019	2,546	212	49	19.78	-3.04%	8.92%
Q2 2019	1,914	160	37	19.35	-2.17%	6.55%
Q3 2019	1,829	152	35	19.83	2.48%	9.20%
Q4 2019	1,607	134	31	21.25	7.16%	17.02%
Q1 2020	1,894	158	36	19.10	-10.12%	5.18%
Q2 2020	1,342	112	26	19.53	2.25%	7.54%
Q3 2020	1,691	141	33	20.80	6.50%	14.54%
Q4 2020	1,626	136	31	21.30	2.40%	17.29%
Q1 2021	1,667	139	32	19.24	-9.67%	5.95%
Q2 2021	1,352	113	26	19.42	0.94%	6.94%
Q3 2021	1,323	110	25	19.26	-0.82%	6.06%
Q4 2021	1,163	97	22	20.99	8.98%	15.58%
Q1 2022	1,184	99	23	19.14	-8.81%	5.40%
Q2 2022	903	75	17	18.73	-2.14%	3.14%
Q3 2022	791	66	15	18.83	0.53%	3.69%
Q4 2022	660	55	13	19.92	5.79%	9.69%

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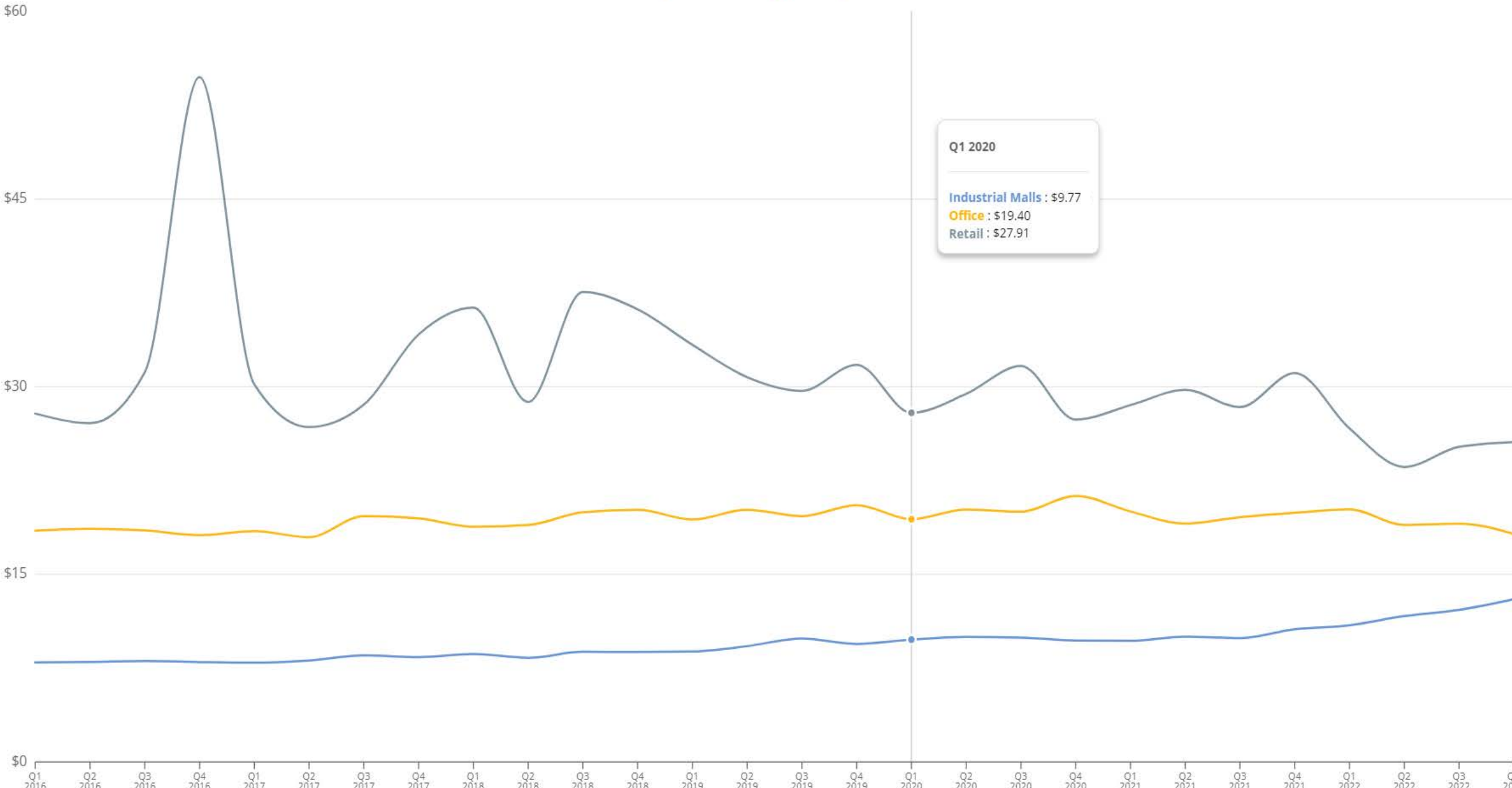
Rent Moving Average

2. Average Rent per time period as a moving average

- *a statistical tool used to smooth out erratic price movement over a period of time. In the Market Trends dashboard, the moving average is being calculated using the trailing 90-days*
- **Date Range:**
 - User can define the range and interval (quarterly or annually).
- **Loess Smoother**
 - Given points on a scatterplot, a loess regression predicts a nonparametric curve (cannot be represented by a mathematical equation) of best fit through those points
 - Major advantage of a loess regression is the user does not have to specify the function ahead modelling the data unlike linear, quadratic, or exponential functions
 - The smoothing coefficient is defined as a number between 0 and 1 – where 0 is no smoothing and 1 is smoothed to essentially a linear regression.

Quarterly Rent Moving Average

● Multi-Residential ● Industrial Malls ● Office ● Retail ● Total

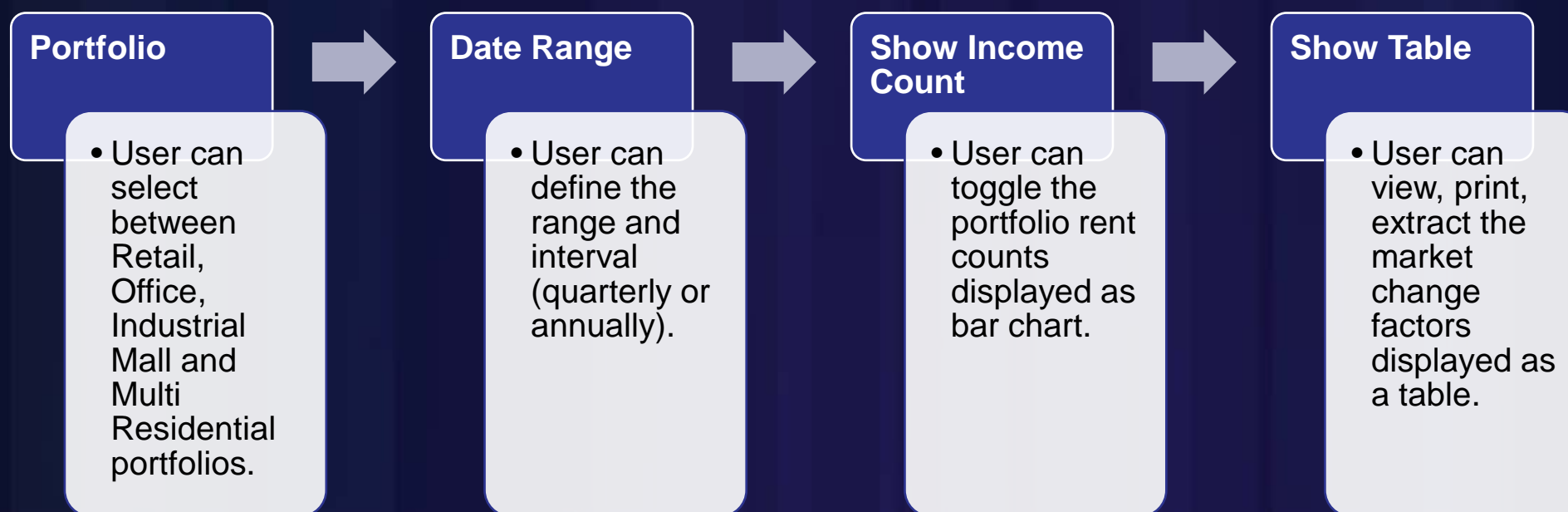


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Market Change Factor

3. A smoothed rent to assessed fair market rent ratios per time period called the Market Change Factor

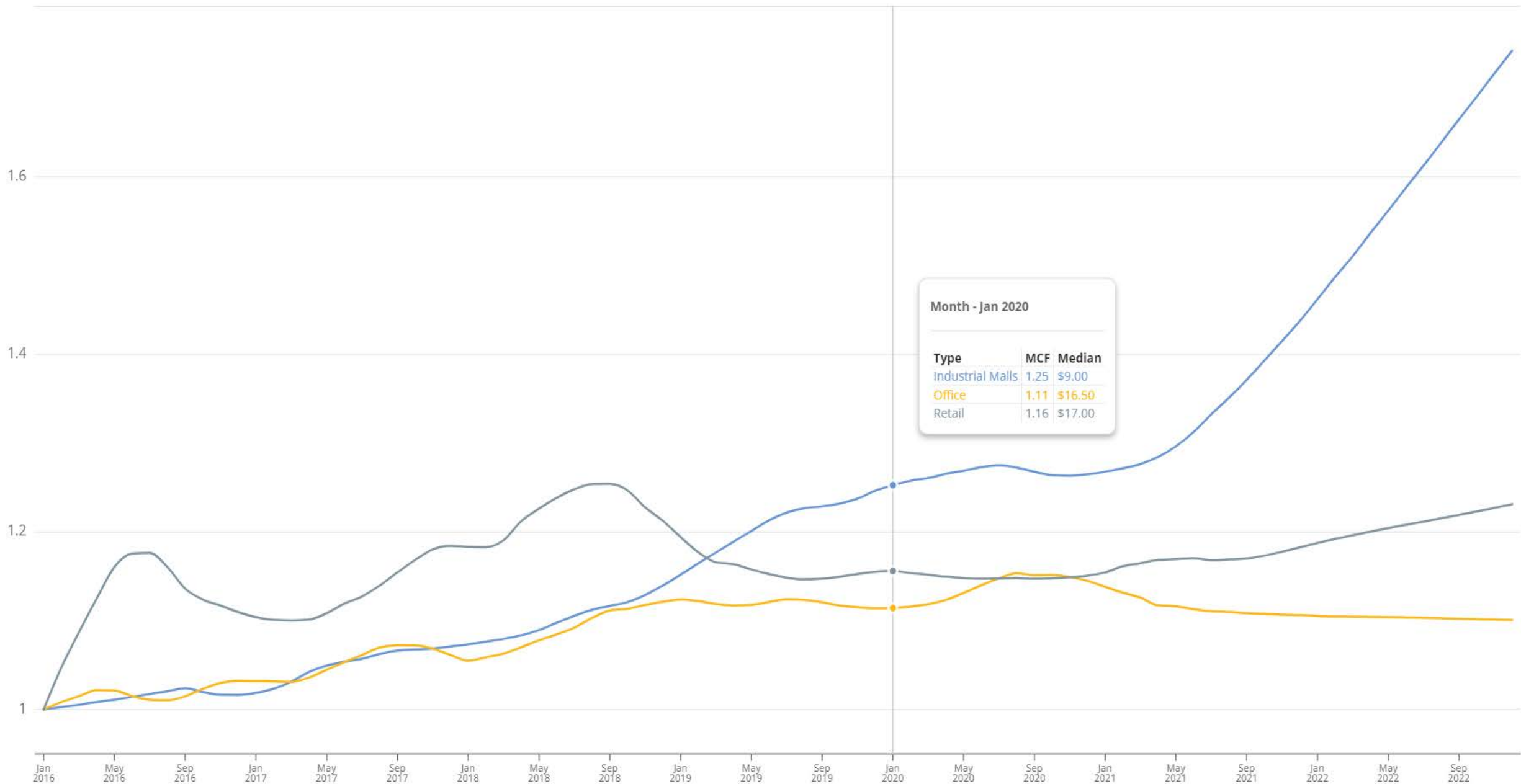
- *Market Change Factor is the result of fitting a best fit curve using a loess regression through all the rents to assessed fair market rent ratios. It represents the change in price levels over time.*



Monthly Market Change Factor Report (ALL)

● Multi-Residential ● Industrial Malls ● Office ● Retail ● Total

Market Change Factor



**** For illustrative purposes only ****



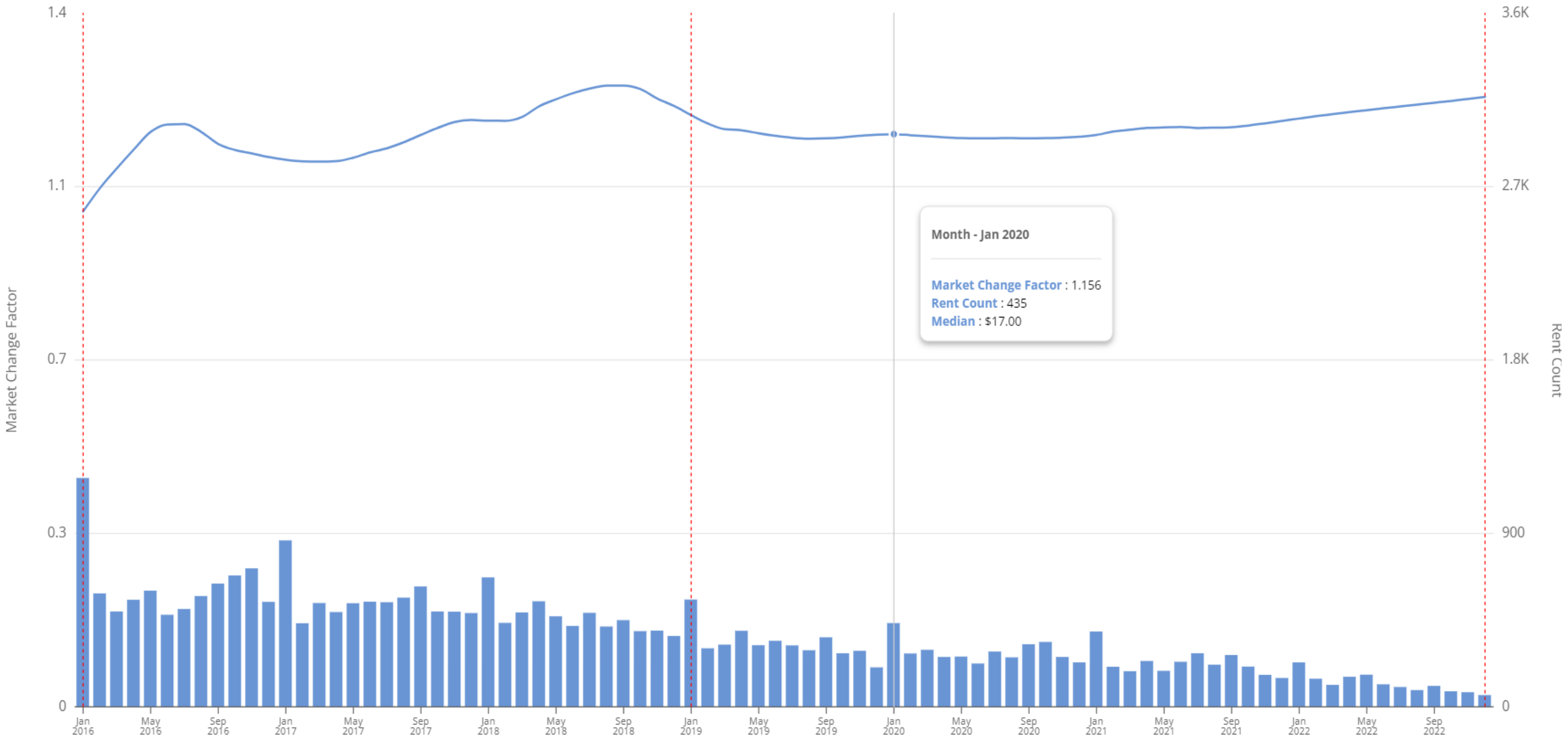
Monthly Market Change Factor Report (Retail)



Jan 2016
Median Price
\$16.00
MCF
1.00

Jan 2019
Median Price
\$20.00
MCF
1.19

Dec 2022
Median Price
\$18.00
MCF
1.23



Month - Jan 2020

Market Change Factor : 1.156
Rent Count : 435
Median : \$17.00

■ Rent Count ● Market Change Factor - - - Jan 2016 - - - Jan 2019 - - - Dec 2022

**** For illustrative purposes only ****



Market Change Factor Report – Table

Market Change Factor Data

Quarter	Industrial Malls		Office		Retail	
	MCF	Median	MCF	Median	MCF	Median
Q2 2021	1.29	\$10	1.14	\$17	1.21	\$17
Q3 2021	1.34	\$10	1.13	\$17	1.22	\$18
Q4 2021	1.39	\$11	1.13	\$16	1.21	\$21
Q1 2022	1.45	\$10	1.12	\$17	1.21	\$18
Q2 2022	1.52	\$11	1.11	\$16	1.20	\$19
Q3 2022	1.57	\$12	1.11	\$18	1.19	\$19
Q4 2022	1.62	\$14	1.10	\$17	1.17	\$17
Q1 2023	1.67	\$11	1.10	\$16	1.15	\$16

Print

CSV

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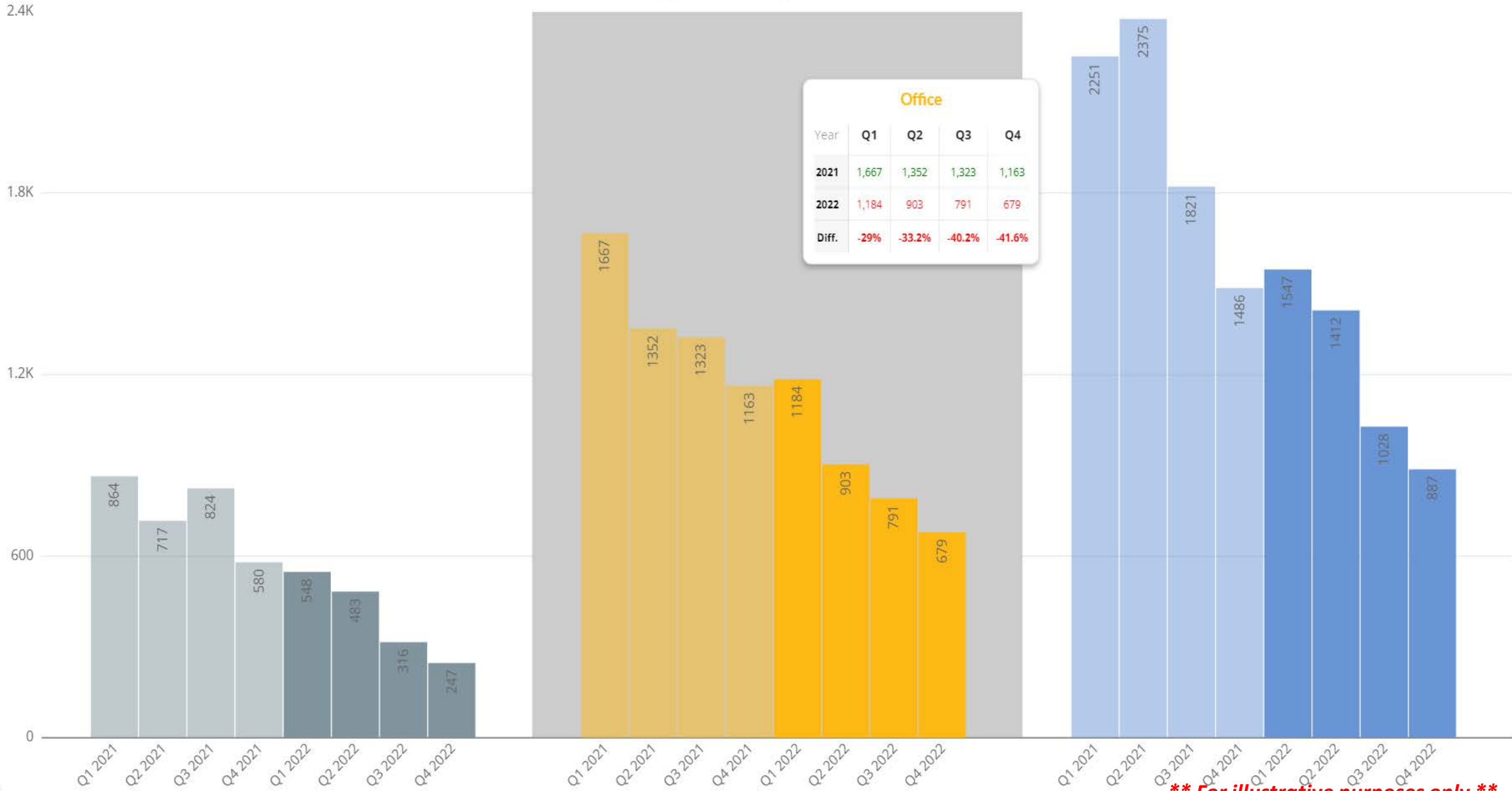
Income Count

4. Direct comparison of lease counts, median rent, or average rent achieved in specified year with previous year results

Period View	Year	Metric View	Comparison Table
<ul style="list-style-type: none">User can define the comparison interval (monthly, quarterly)	<ul style="list-style-type: none">User can define year of comparison	<ul style="list-style-type: none">User can choose from Rent Count, Median Rent, Average Rent	<ul style="list-style-type: none">User can view comparison results displayed as a table (all portfolios)

Quarterly Rent Count Year Comparison (2022)

● Multi-Residential ● Industrial Malls ● Office ● Retail ● Total



**** For illustrative purposes only ****

Rent Count Comparison Table

Quarterly Rent Count Comparison of 2021 and 2022

PORTFOLIO	Multi-Residential		Industrial Malls		Office		Retail		Total	
	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022
RENT VOLUME										
Q1	48,800	85,123	2,251	1,547	1,667	1,184	864	548	53,771	88,552
Q2	0	0	2,375	1,412	1,352	903	717	483	4,570	2,867
Q3	0	0	1,821	1,028	1,323	791	824	316	4,068	2,185
Q4	0	0	1,486	887	1,163	679	580	247	3,329	1,871
Total	48,800	85,123	7,933	4,874	5,505	3,557	2,985	1,594	65,738	95,475
% CHANGE (YEAR OVER YEAR)										
Q1	74.43%		-31.27%		-28.97%		-36.57%		64.68%	
Q2	N/A		-40.55%		-33.21%		-32.64%		-37.26%	
Q3	N/A		-43.55%		-40.21%		-61.65%		-46.29%	
Q4	N/A		-40.31%		-41.62%		-57.41%		-43.80%	
Total	74.43%		-38.56%		-35.39%		-46.60%		45.24%	

Print CSV

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Custom Location and Property Type Searches Options

- The application was designed to allow for custom queries by location and portfolio type. This allows the end user to conduct detailed analysis based on their need.
- The search can range from all income property types in the province (macro) to a specific search for business properties within a municipality (micro).
- Allows any locational combination of:
 - zone,
 - region,
 - county/municipality
- Search can be conducted on all four portfolios
 - Multi-Residential
 - Industrial Malls
 - Office
 - Retail

The screenshot shows a web interface titled "Explore Data" with a close button (X) in the top right corner. Below the title, there are four main filter sections:

- Zone:** A single filter button labeled "1" with a close button (X).
- Region:** Three filter buttons labeled "21 - Kitchener", "23 - London", and "27 - Windsor", each with a close button (X).
- County/Municipality:** Four filter buttons labeled "3012 - Kitchener City", "3016 - Waterloo City", "3421 - St Thomas City", and "3739 - Windsor City", each with a close button (X).
- Income Portfolio:** A dropdown menu currently showing "Multi-Residential".

At the bottom of the form, there are two buttons: "Reset" (outlined in red) and "Submit" (outlined in green).

Informing Internal and External Stakeholders

- **Internal**

- Assessors can quickly quantify their local area rental activity
- Leverage the Market Change Factor report to validate time adjustments used on fair market rents for appeals
- Mass appraisal modelers can validate their modeled time adjustments

- **External**

- The data, graphs, and tables from Income Trends are leveraged to inform discussions with stakeholders and will be key in future engagement in support of the next province-wide assessment update.

Future Development

- Further development with the Rent Trends include:
 - Segregation of office rents by classification, age and/or size
 - Analyzing rent trends for different tenancy combinations for retail
 - Distinguishing rent trends for various multi-residential unit types
- Future analytical enhancements include tools to track:
 - Vacancy Rates
 - Non-recoverable Expense Ratios
 - Operating Expense Ratios for multi-residential properties
 - Capitalization Rates
 - Sales activity as a function of gross leasable area or unit count

Questions?

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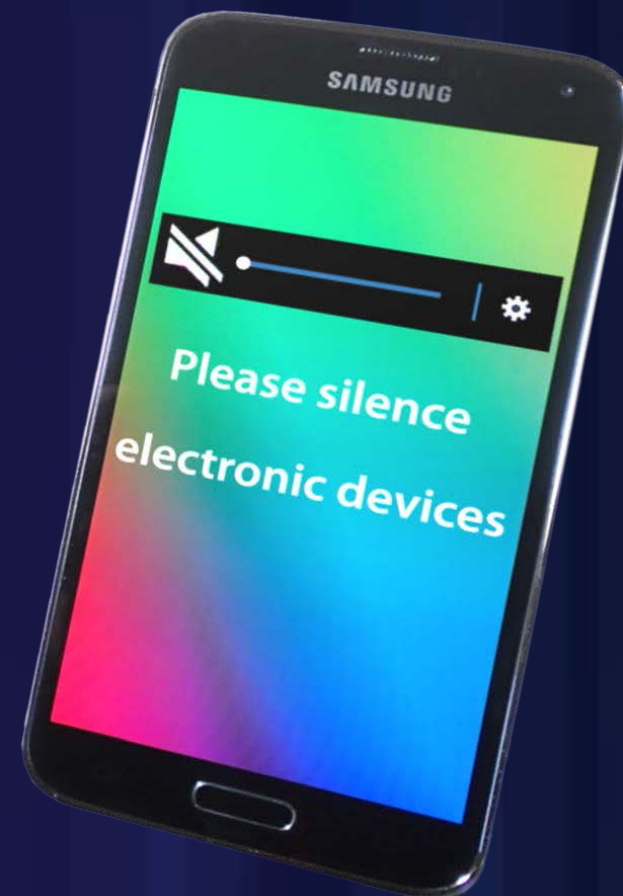


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