

Title: RIVERBEND PUBLIC COMPUTER USAGE ANALYSIS & RECOMMENDATIONS

Submitted by: Daniel Cairns, Planning Assessment and Research

For: Executive Director, Collections, Marketing, and Technology

Date: October 24, 2023

Introduction

As part of designing the space layout for the new Riverbend library building, we need to consider how many public computers to include. Relative to its collection size and number of visits, Riverbend has lower-than-average demand for public computers. This report analyzes recent (Jan. 1 through Sep. 30, 2023) computer usage data at the current Riverbend branch to provide recommendations for the new location.

Scope and Limitations

Computer demand and usage is driven by several factors that are not captured in our data. Most obviously, if demand exceeds the number of available workstations, then we will not be able to capture this excess demand. Furthermore, the physical location and accessibility of the branch and the layout and location of workstations within the library also affect demand, and this will change in the new location.

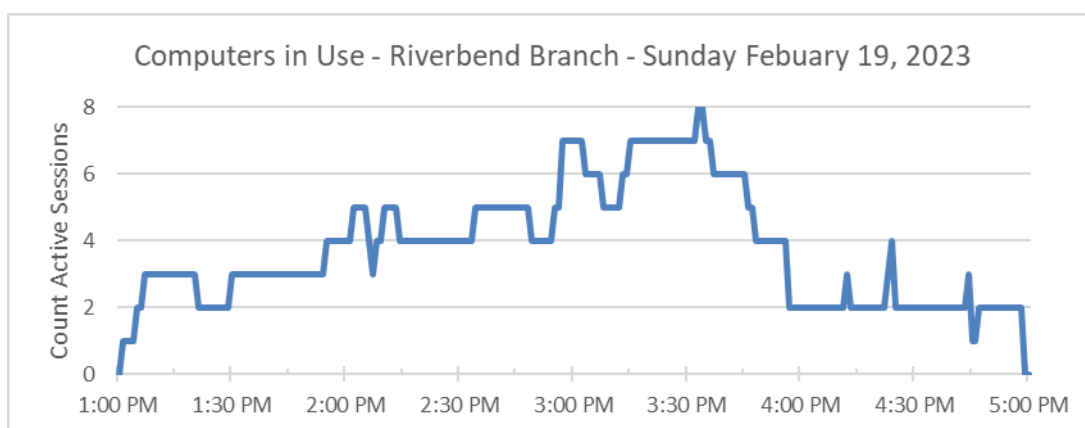
Also, the period of January through September 2023 is less than a full year long and may be missing some seasonal variance as a result. System wide, computer usage, visits, and circulation are all trailing pre-pandemic 2019 levels, and it's uncertain whether we will rise back to those levels in the future. We also did not account for branch staff's ability to manage computer availability by granting extensions and/or making bookings for customers.

Spread the words.

Methods

Past computer usage data is pulled directly from MyPC with high granularity. The data includes the workstation, user, login, and logout time of each individual session at all branches. This data source is collected monthly for the recurring Computer Usage Power BI reports and was not collected separately for this analysis.

This session-level raw data is first transformed into time-series data by counting the number of active sessions each minute by branch. Now we can see demand over time for each day at each branch. See the example below showing the number of computers in use throughout a single Sunday in February:



To make our recommendation, we use two different analyses from this time-series data:

1. What is the **peak** number of concurrent active sessions each day?
2. What is the **distribution** of the number of concurrent active sessions during all open hours? (i.e., how often were there 3 computers in use?)

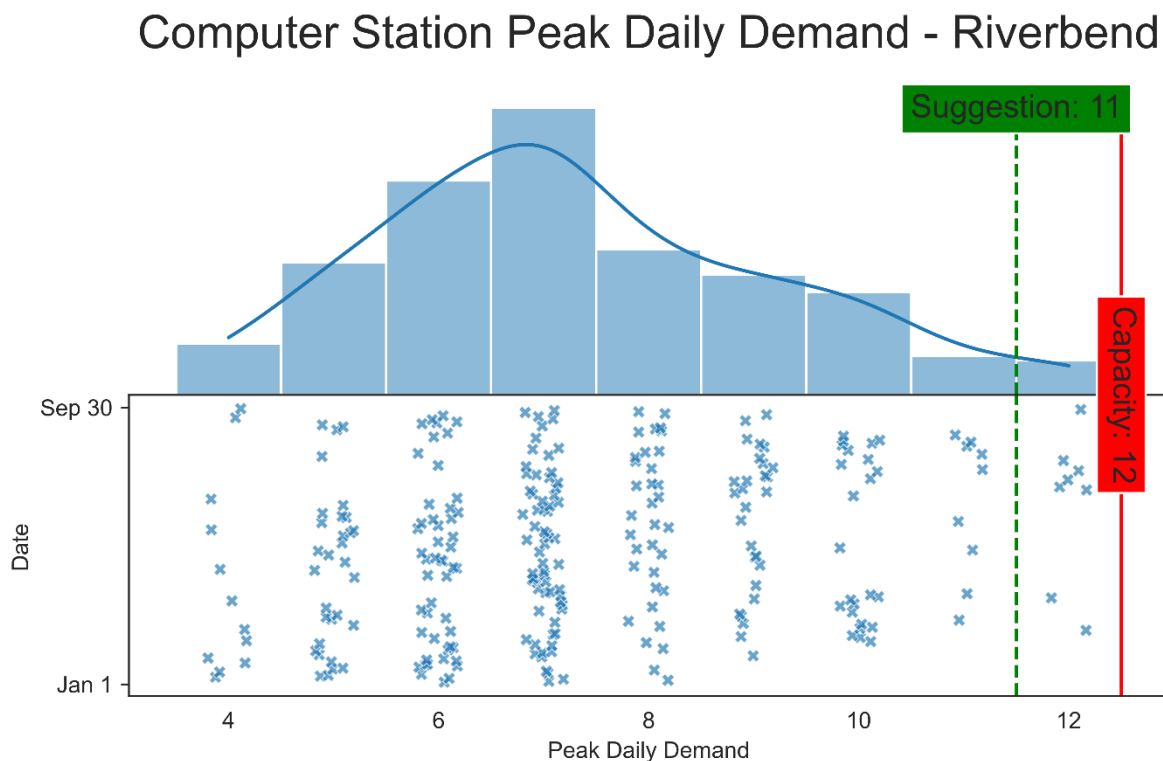
Peak demand is more relevant because the number of workstations in a branch is fixed in the short term (we can't just pop up another station if it gets busy). The distribution is important so we can understand the bigger picture of computer usage. Was the peak reached for only a few minutes, or are we often near peak capacity?

Note that throughout this report, what we call “daily peak usage” is more precisely the *daily 98th percentile of the per minute counts of concurrent active sessions*. True “peak usage” would be the 100th percentile, or the single minute with the most usage. We chose this to be more robust against very short periods of high usage. For example, on February 19th, the true peak (8 sessions) only lasts for a few minutes, so we would record 7 sessions as the peak usage on this day. On a typical 11-hour day, this means we will only consider a value as the peak if there are more than 13 minutes throughout the day with that many concurrent active sessions.

Results and Observations

Peak Daily Demand

The chart below presents the peak daily computer stations in use at Riverbend in 2023. It is split vertically into two halves. The lower half contains many x's, each representing an individual day's peak stations in use. Days with higher peak demand are located farther to the right, and the days are sorted vertically with more recent days shown closer to the top. The upper half summarizes the x's, counting the number of days for each peak daily demand value. For reference, we included a capacity line in red representing the total number of public workstations in the branch (including 20-minute stations). The green "suggestion" line shows how many computers are needed to meet peak demand on at least 95% of the days.

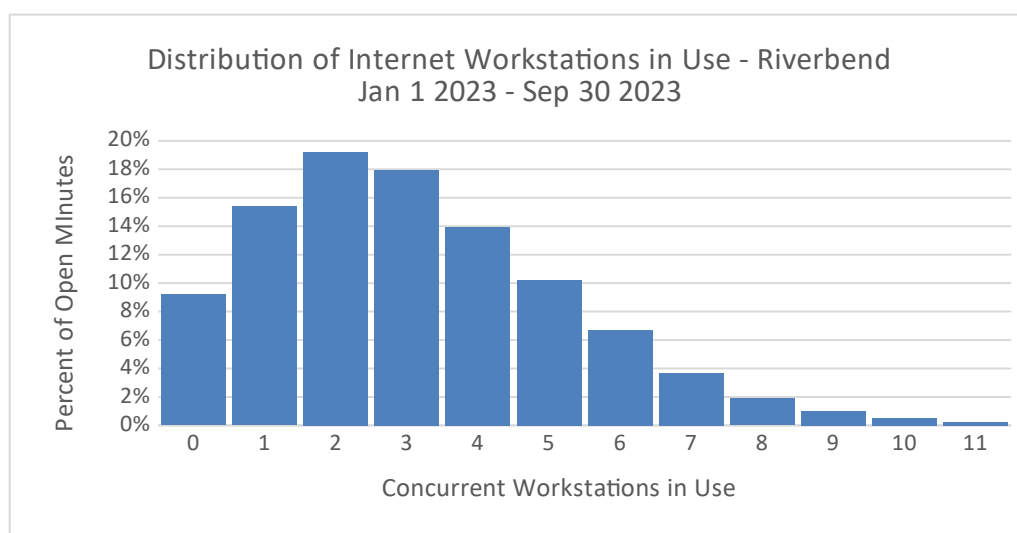


The current number of workstations in the Riverbend branch is 12 (11 regular internet stations and 1 20-minute express station). The chart shows that the most common peak daily demand is 7 concurrent users, and there are very few days where the peak is greater than 10 concurrent users. On the other end, there was never a day where the peak number of concurrent users was less than 4. The demand appears consistent over time, though it is worth noting that most of the days where peak demand exceeded 10 occurred in recent months. It's worth reiterating that these peaks represent the *busiest* minutes of each day, and that we would expect usage to be less than the peak most of the time.

This distribution appears mostly symmetrical and bell-shaped, suggesting peak demand was not strongly affected by the total workstation capacity in the branch. If capacity were a factor, we would expect the distribution to be left-skewed and appear “squished” against the red capacity line. Therefore we should not be concerned about uncaptured unmet demand due to a lack of workstations.

Overall Usage Distribution

The following chart and table show the overall distribution of concurrent workstations in use across all open minutes from January 1st to September 30th, 2023. This analysis shows the overall computer usage at Riverbend without any consideration for peak times or days.



Concurrent Workstation s in Use	% of Open Min.	Cumulative % of Open Min.
0	9.2%	9.2%
1	15.4%	24.6%
2	19.2%	43.8%
3	18.0%	61.8%
4	14.0%	75.7%
5	10.2%	86.0%
6	6.7%	92.7%
7	3.7%	96.3%
8	1.9%	98.2%
9	1.0%	99.2%
10	0.5%	99.7%
11	0.3%	100.0%

We can see from the above data that the most common number of concurrent workstations in use is 2, which occurred in 19% of the open minutes in 2023. The cumulative percentages show that Riverbend had 4 workstations or fewer in use 76% of the time, and 8 workstations or fewer in use 98% of the time.

As expected, this distribution is shifted to the left relative to the peak distribution, confirming that the branch was usually operating with fewer active sessions than the daily peak. It is right-skewed because of the lower bound of 0 active workstations. This suggests that there were usually more computers than required at Riverbend, and that our usage counts are not artificially low due to a lack of workstations.

Note that the overall usage data above considers *Internet Workstations* specifically, which excludes the 20-minute station. There is one 20-minute station at Riverbend, which was in use only 6.4% of the time. This is in line with the low usage of 20-minute stations across the system.

Recommendations

We recommend **10 internet workstations** be planned for the new Riverbend library.

This comes after our analysis of computer usage at the current Riverbend location revealed that the existing capacity of 12 workstations was more than enough to cover peak daily demand, which was usually between 5 and 10 concurrent sessions. Only 17 days (6% of open days) in 2023 had peak demand greater than 10. Furthermore, the overall distribution showed that these busy peaks in demand did not last very long, and most of the time even fewer workstations were in use. As few as 8 workstations would have been enough to cover 98% of the time the branch was open.