Enhanced Productivity with VolumeShare 7

Reading time reduced by almost 20%[1]!

White Paper*

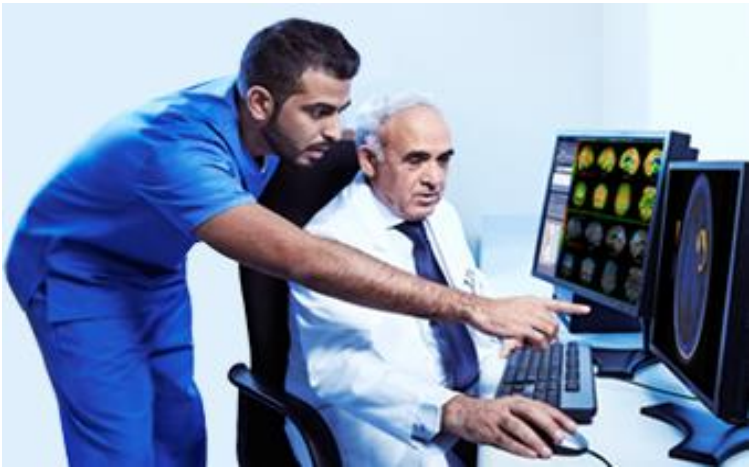
Abstract

Objective: Compare time spent to review 3D images utilizing the AW applications, between the multi-modality advanced visualization solution VolumeShare 7 (VS7) and the prior release VolumeShare 5 Enhanced (VS5).

Methodology: A retrospective multi-center study was initiated to compare reading time between VS7 and VS5 user groups. Application usage analytics were collected to extract and quantify the elapsed time between starting and closing the reading sessions.

Results: This study shows a statistically significant reduction in reading times in VS7 users compared to VS5 users (mean -19.1%; median -19.5%; K-W test p<.0001)2. The reading time is consistently faster within typical working day (7:00am to 7:00pm) in VS7 users compared to VS5 (mean -20%; median -21%; K-W test p<.0001)3.

Conclusion: This study shows that clinicians using VolumeShare 7 reduced their reading time by approximately 20% during their daily practice, which enhances their productivity and efficiency in diagnosing patients.



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Introduction

VolumeShare 7 is a multi-modality advanced visualization workflow solution for image review, comparison and processing to enhance diagnostic precision and productivity. It is available on the standalone AW Workstation and on the AW Server for multiple users. VS7 combines an enhanced user experience and is a highly customizable and streamlined review workflow through the 3D applications.

The applications provide an efficient image review workflow for novice users with the added benefit of being customizable for the unique needs of advanced users. The new user interface has been designed to improve customization of individual user's environment for ease-of-access and recognition of 3D tools, and to reduce mouse travel time, distance and effort.

In order to evaluate the impact of VolumeShare 7 on users, a retrospective multi-center study was initiated, comparing the reading time to the prior software release VolumeShare 5 Enhanced.

Methodology

Eleven healthcare institutions across four European countries (France, Poland, UK, Spain) participated in the study. The systems utilized in the study included eight VS5 systems (seven AW workstations, one AW server) and six VS7 systems (four AW Workstations, two AW Servers).

Customer usage analytics were tracked and collected for a three-month period to extract and quantify the elapsed time between starting and closing a user's individual exam review session.

Extracted data structure for each session consisted of:

- System ID
- System Hardware (AW or AW Server)
- Software Release (VS5 or VS7)
- Date and Time
- Reading Time

All sessions with reading time less than 30 seconds and more than 3600 seconds were excluded to reduce outliers and more accurately reflect a typical clinical practice. A total of 15,350 VS5 sessions and 18,463 VS7 sessions were analyzed and the reading times were recorded for comparison.

Mean and median reading times were evaluated for both VS5 and VS7 groups.
Non-Parametric Kruskal-Wallis Tests[4] were used to evaluate the statistical significance of the difference in mean reading times.

This evaluation reviewed users of VS5 and VS7 systems independently. In addition to the different versions of AW software, other factors (user skill level, hardware, network speed, etc.) may or may not have contributed to the differences in exam reading times. It was outside the scope of this evaluation to look at those factors.

Results

First outcome results indicated an approximate 19% reduction in mean and median reading times in VS7 group compared to VS5 group (*see Figure1*).

	VolumeShare 5 Enhanced *(N = 15,350 sessions) (8 systems)*	**VolumeShare 7** *(N = 18,463 sessions) (6 systems)*	**VS7 vs VS5** *(%)*
Mean reading time *(seconds)*	635	514	-19.1%
Median reading time *(seconds)*	394	317	-19.5%

Figure1 - Mean and median reading times in VS7 group and VS5 group

Statistical testing of the reading time difference

- ANOVA test: The Reading time data for both VS5 and VS7 does not follow Normal Distribution and contains outliers after excluding reading times. In such cases ANOVA is not recommended for statistical hypothesis testing, even if p-values are significant.

- Kruskal-Wallis Non-Parametric test on mean reading time:

  - VS7 vs VS5: all platforms

K-W test done at an overall level *(N = 33,813 sessions)*	**VolumeShare 5 Enhanced** *(N = 15,350 sessions)*
VolumeShare 7 *(N = 18,463 sessions)*	p-value <.0001 *(Significant)*

Figure2 - Kruskal-Wallis Non-Parametric test on mean reading time

  - VS7 vs VS5: AW Workstations and AW Servers level

K-W test done at Server and Workstation level	**AW Workstation VS5** *(7 systems)*	**AW Server VS5** *(1 system)*
AW Workstation VS7 *(4 systems)*	p-value <2.2e-16 *(Significant)*	N/A
AW Server VS7 *(2 systems)*	N/A	p-value <1.356e-09 *(Significant)*

Figure3 - Kruskal-Wallis Non-Parametric test on mean reading time by platform

In all cases, the statistical test confirms that the 19% reading time reduction between VS7 and VS5 is very significant, at both 95% and 99% confidence levels (*see Figure2 and Figure3*).

Discussion

A complete analysis of the average number of sessions per system and mean reading time per session on a 24-hours period revealed a peak for all numbers between 7:00 am and 7:00 pm for both VS5 and VS7 groups, including a slight drop between noon and 1:00 pm. Qualitatively, this is consistent with the standard activity in a medical imaging facility. Therefore, the study focused on this typical working period (*see Figure4*).

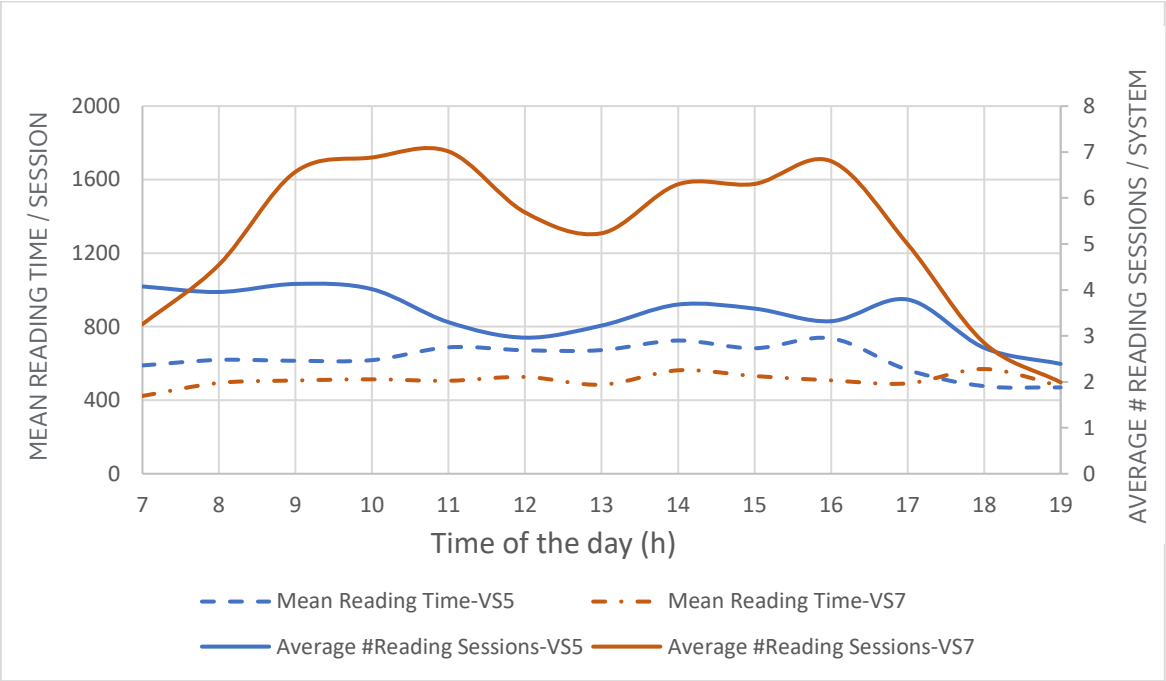

Figure4 - Average number of reading sessions / system & Mean reading time / session

During this period, the mean reading time curves per session for VS5 and VS7 groups maintain a delta over the period. Furthermore, the VS7 mean reading time curve is mostly below the VS5 mean reading time curve, indicating a clear time difference between both groups.

Quantitatively, we observed an approximate 20% reduction in mean reading time and 21% reduction in median reading times in the VS7 group compared to the VS5 group (*see Figure5*). Kruskal-Wallis Non-Parametric test on mean reading time was repeated at this level and confirmed that the observed time difference is still statistically significant at 99% confidence level ($p<.0001$), indicating that the VS7 mean reading time is consistently shorter than VS5 mean reading time during a typical working period.

	VolumeShare 5 Enhanced *(N = 14,598 sessions) (8 systems)*	**VolumeShare 7** *(N = 18,252 sessions) (6 systems)*	**VS7 vs VS5** *(%)*
Mean reading time *(seconds)*	644	514	-20%
Median reading time *(seconds)*	402	318	-21%

Figure5 - Mean and median reading times during a typical working period (07:00am-07:00pm)

Conclusion

Evaluation of VolumeShare 7's (VS7) impact on the mean reading time as compared to prior release VolumeShare 5 Enhanced (VS5) reading time, clearly indicates a significant mean reading time reduction on both the AW Workstation and the AW Server systems, at a 99% confidence level.

VolumeShare 7 improvements streamline the user experience and simplify review processing. This study shows that clinicians using VolumeShare 7 reduced their reading time by approximately 20% which enhances their productivity and efficiency in diagnosing patients.

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References

**Internal economic value study led by Chérif Chalah (Sr Marketing Product Manager AW) and Cédric Hermel (Product Manager AW) with contributions of Market Access, AW Analytics, AW Engineering, Europe sales and Online Center teams.*

[1, 3] *Mean reading time during a typical working day (07:00am - 07:00pm)*

[2] *Mean reading time on 24h activity*

[4] *Value in Health Volume 20, 7, 992-998*

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