Validating the black point compensation standardization
Black Point Compensation becomes a standard

Q: Who invented black point compensation?
Timeline

Photoshop 5.0 - 1998
ICC/ISO TC130 to create a document to standardize the algorithm - 2013
Black point compensation: what does
Black point compensation: what does
Without BPC:

- Input sample
- aRGB
- Printer dynamic range
- Output
- Output sample

Loss of detail

With BPC:

- Input sample
- aRGB
- Printer dynamic range
- Output
- Output sample

Keeps details in all the dynamic range
Black point compensation: How it works

\[
X_0 = a_x * X_i + b_x \\
Y_0 = a_y * Y_i + b_y \\
Z_0 = a_z * Z_i + b_z \\
\]

\[
0.96 = a_x * 0.96 + b_x \\
1.00 = a_y * 1.00 + b_y \\
0.82 = a_z * 0.82 + b_z \\
\]

\[
X_{\text{black_dest}} = a_x * X_{\text{black_src}} + b_x \\
Y_{\text{black_dest}} = a_y * Y_{\text{black_src}} + b_y \\
Z_{\text{black_dest}} = a_z * Z_{\text{black_src}} + b_z \\
\]
Black point compensation: What makes it so difficult?

\[
\begin{align*}
X_{\text{black\_dest}} &= a_x \times X_{\text{black\_src}} + b_x \\
Y_{\text{black\_dest}} &= a_y \times Y_{\text{black\_src}} + b_y \\
Z_{\text{black\_dest}} &= a_z \times Z_{\text{black\_src}} + b_z
\end{align*}
\]
Test implementation done by HP

- Using just the BPC paper
- Based on the Icms framework
- Checked against 238 ICC profiles
Test implementation done by HP

Why?

- To check robustness of the algorithm.
- To check consistency with the Adobe color engine

How?

- Transforms from known profiles: RGB (sRGB IEC61966-2.1) and CMYK (U.S. Web Coated SWOP v2) to every single profile in the test.

- 238 profiles * 3 intents * 2 input = 1428 single tests
Test Images
Differences
Conclusions

- A number of **qualification tests** have been performed by HP using the **proposed BPC specification**.
- The tests have found the results to be **robust** and **highly consistent** with the black point compensation feature offered by Adobe products.
Now for the discussion

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