Validating the black point compensation standardization
Timeline

BPC introduced in 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
Black point compensation: How it works

\[ X_o = a_x \times X_i + b_x \]
\[ Y_o = a_y \times Y_i + b_y \]
\[ Z_o = a_z \times Z_i + b_z \]

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

\[ X_{black\_dest} = a_x \times X_{black\_src} + b_x \]
\[ Y_{black\_dest} = a_y \times Y_{black\_src} + b_y \]
\[ Z_{black\_dest} = a_z \times Z_{black\_src} + b_z \]
Black point compensation: What makes it so difficult?

\[ X_{black\_dest} = a_x * X_{black\_src} + b_x \]
\[ Y_{black\_dest} = a_y * Y_{black\_src} + b_y \]
\[ Z_{black\_dest} = a_z * Z_{black\_src} + b_z \]
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
Distribution by class

- input: 2%
- display: 26%
- output: 38%
- link: 14%
- abstract: 7%
- colorspace: 5%
- named: 8%
Distribution by colorspace

- RGB: 46%
- CMYK: 31%
- Gray: 6%
- Other: 17%
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.
Thank you!