

Digitales Kinopaket

Englisch: Digital Cinema Package

KAMERA/TECHNIK

Ein Digital Cinema Package (DCP) ist das standardisierte Format für die digitale Kinoverteilung, enthaltend verschlüsseltes Video, Audio, Untertitel und Metadaten. DCPs sind das primäre Verteilungsformat für das Kino weltweit.

Digital Cinema Package (DCP) A Digital Cinema Package (DCP) represents the industry-standard format for delivering theatrical film content to cinema chains for theatrical projection. Containing standardized video, audio, subtitles and extensive metadata, the DCP has become the universal theatrical distribution format, replacing 35mm film prints. DCP Definition Core Components : Video : Encrypted DCI-compliant video file (typically 2K or 4K) Audio : Multiple synchronized audio tracks (5.1, 7.1, mono, etc.) Subtitles : Optional subtitle tracks with positioning metadata Metadata : Comprehensive distribution and projection information Encryption : Security key management system DCP History Development : Standardization : DCI (Digital Cinema Initiatives) standards (2005) Adoption : Phased theater conversion through 2010s Current Status : Universal theatrical distribution format Replacement : Replaced 35mm film distribution DCP Specifications Video Specifications : Resolution : DCI 2K (2048×1080) or DCI 4K (4096×2160) Frame Rate : 24fps (standard), 30fps, 60fps possible Color Space : DCI-P3 (not Rec.709) Bit Depth : 12-bit (10-bit common) Codec : JPEG2000 (lossless compression) Audio Specifications : 5.1 Surround : Typical configuration 7.1 Surround : Premium option Stereo : Minimal option Mono : Legacy option Sampling Rate : 48kHz standard DCP File Format Technical Structure : Container : XML-based specification Video Files : JPEG2000 compressed images Audio Files : WAV format (uncompressed) Subtitle Files : XML or PNG-based Manifest : Complete delivery specification Security : Encryption key embedded in KDM DCI Color Space DCI-P3 Standard : Wider color gamut than Rec.709 Optimized for theatrical displays Professional color grading reference Calibrated cinema monitors essential Color Management : Grading performed in DCI-P3 LUT conversion from Rec.709 if needed Color accuracy critical for theatrical impact Professional monitoring essential KDM (Key Delivery Message) Content Protection : Encryption : DCP content encrypted KDM : Unique decryption key per theater Security : Prevents unauthorized playback Duration : KDM valid for defined theatrical window Practical Impact : Theater requires KDM for each DCP KDM generation by distributor Theater inserts KDM for playback Timeline-locked to theatrical release DCP Creation Workflow Post-Production Process : Color Grading : Professional DI suite in DCI-P3 Media Export : Uncompressed or lossless masters JPEG2000 Encoding : DCP-compliant compression Audio Finishing : Final audio mix and encoding Manifest Creation : Complete delivery specification QC Verification : Quality control testing Encryption : KDM generation and delivery DCP Versions Common Configurations : DCP 2K : 2048×1080 (theatrical standard, lower bandwidth) DCP 4K : 4096×2160 (premium, higher quality/bandwidth) DCP with Scope : 2.39:1 aspect ratio masking DCP Flat : 1.85:1 aspect ratio masking Audio in DCP Audio Tracks : 5.1 Surround : Left, Center, Right, Left Surround, Right Surround, LFE 7.1 Surround : Additional Left Rear, Right Rear channels Stereo : Minimal (unusual for theatrical) Mono : Legacy (rare modern use) Audio Quality : 24-bit 48kHz standard PCM uncompressed Lossless format Professional audio mixing DCP Quality Control QC Testing

: Image Quality : Frame-by-frame verification Color Accuracy : DCI-P3 reference checking Audio Sync : Lip-sync verification Metadata Validity : Specification compliance Playback Testing : Cinema system compatibility DCP Mastering Facilities Professional Creation : DI (Digital Intermediate) Suites : Color grading Post Houses : DCP creation and encoding Subtitling Houses : Subtitle creation and formatting QC Labs : Quality verification Facility Requirements : DCI-P3 grading monitors JPEG2000 encoding capability KDM generation systems Quality control equipment DCP Distribution Theater Delivery : Physical Media : Hard drives or cinema servers Network Delivery : Increasing adoption Cloud Distribution : Emerging technology Theatrical Window : Time-locked playback Distribution Partners : Studio Distribution : Major studios Independent Distributors : Art house, indie films Festival Distribution : Film festival DCPs Archival Distribution : Library and archive distribution DCP vs. IMF Digital Cinema Package : Theatrical exhibition format Theater-specific delivery Encryption and KDM required Limited flexibility Interoperable Master Format (IMF) : Master format for distribution Multiple deliverable generation More flexible specifications Emerging replacement for some uses DCP Costs Production Factors : Grading Suite : Per-day facility cost DCP Encoding : Per-minute encoding cost QC Services : Quality control verification KDM Generation : Per-theater licensing fee Archive Masters : Additional mastering copies Budget Planning : Typically \$10,000-\$30,000 for feature DCP Indie productions may outsource for lower cost Color grading most expensive element Multiple version creation increases cost DCP Archival Preservation Considerations : JPEG2000 compression: long-term stability concerns Uncompressed masters preferred for archival DCI-P3 color space preservation Metadata documentation essential Archive Strategy : DCP for theatrical distribution Uncompressed master for preservation Source materials retained Future re-mastering possible DCP Playback Theater Equipment : DCI-Compliant Projector : Required for DCP playback Cinema Server : Stores and manages DCP files KDM Insertion : Required for encryption Audio Processor : 5.1 or 7.1 surround output Theater Considerations : Equipment cost significant Maintenance required Software updates necessary Technical support essential DCP Standards Evolution Current Standards : DCI 2K and 4K established JPEG2000 compression standard KDM security proven Wide theater deployment Future Development : IMF emerging as alternative Higher frame rate exploration (48fps, 60fps) HDR cinema development Immersive audio formats (Dolby Atmos) Creating Your First DCP Essential Steps : Complete color grading in DCI-P3 Export uncompressed masters (or lossless) Engage post house with DCP capabilities Audio final mix QC testing and certification KDM generation for theaters Delivery to theatrical distributor DCP Resource The Digital Cinema Initiatives (DCI) consortium maintains specifications and standards for theatrical cinema technology. Professional post houses provide comprehensive DCP creation and delivery services. Digital Cinema Packages represent the future and current standard of theatrical film distribution, essential for any theatrical release.