CLAIMS

1. A method comprising:

retrieving reconstruction data from a repository, the retrieved reconstruction data encoded in accordance with a tiered hierarchy including multiple levels of quality;

transmitting the retrieved reconstruction data to a decoder, the decoder configured to reconstruct renditions of a signal based on the transmitted reconstruction data; and

during the transmitting, varying a level of quality of the reconstruction data retrieved and transmitted to the decoder.

2. The method as in claim 1, wherein varying the level of quality includes:

transmitting a first set of reconstruction data to the decoder for play back of a first portion of the signal, the first set of reconstruction data indicating how to reconstruct a rendition of the first portion of the signal up to a first level of quality in the tiered hierarchy; and

transmitting a second set of reconstruction data to the decoder for play back of a second portion of the signal, the second set of reconstruction data indicating how to reconstruct a rendition of the second portion of the signal up to a second level of quality in the tiered hierarchy.

3. The method as in claim 2, wherein the first level of quality is higher than the second level of quality; and

wherein the second set of reconstruction data is transmitted at the second level of quality instead of the first level of quality in response to detecting the bandwidth currently available in a transmission channel.

4. The method as in claim 2, wherein the second set of reconstruction data is transmitted at the second level of quality in response to receiving a request to transmit the second set of reconstruction data at the second level of quality instead of the first level of quality.

5. The method as in claim 2, wherein the second set of reconstruction data is transmitted at the second level of quality in response to detecting a characteristic of the decoding resource.

6. The method as in claim 1, wherein each of multiple levels of quality of the reconstruction data for a image/frame of the signal indicates how to reconstruct a rendition

of the signal in accordance with a different level of quality.

7. The method as in claim 1, wherein varying the level of quality includes:

for a first portion of the signal, producing a first set of reconstruction data to include a sequence of reconstruction data from a lowest level of quality in the hierarchy to the first level of quality;

transmitting the first set of reconstruction data to the decoder for play back of the first portion of the signal in accordance with the first level of quality;

for a second portion of the signal, producing a second set of reconstruction data to include a sequence of reconstruction data from the lowest level of quality in the hierarchy to the second level of quality, the second level of quality being different than the first level of quality; and

transmitting the second set of reconstruction data to the decoder for play back of the second portion of the signal in accordance with the second level of quality.

8. The method as in claim 1, wherein varying the level of quality of the reconstruction data transmitted to the decoder includes:

producing a first set of reconstruction data to include reconstruction data to reconstruct portions of the signal in accordance with a first level of quality in the hierarchy;

transmitting the first set of reconstruction data to the decoder to enable play back and navigation amongst the signal in accordance with the first level of quality;

producing a second set of reconstruction data to include reconstruction data to reconstruct the signal in accordance with a second level of quality in the hierarchy; and

subsequent to transmitting the first set of reconstruction data, transmitting the second set of reconstruction data to the decoder for play back of the signal in accordance with the second level of quality.

9. The method as in claim 8, wherein the second set of reconstruction data is supplemental reconstruction data with respect to the first set of reconstruction data, the second set of reconstruction data indicating how to modify a rendition of the signal generated based on the first set of reconstruction data to reconstruct the signal according to the second level of quality.

10. The method as in claim 1, wherein varying the level of quality of the reconstruction

data transmitted to the decoder includes:

producing a first set of reconstruction data to reconstruct the signal in accordance with a first level of quality in the hierarchy;

transmitting the first set of reconstruction data to the decoder to enable navigation amongst the signal played back at the first level of quality;

receiving a pointer value indicating a location in the signal, the pointer value generated by a user viewing a playback of the signal at the first level of quality as generated based on the first set of reconstruction data;

producing a second set of reconstruction data to include reconstruction data to reconstruct the signal starting at the location as specified by the pointer value, the second set of reconstruction data encoded in accordance with a second level of quality in the hierarchy; and

transmitting the second set of reconstruction data to the decoder to enable play back, at the second level of quality, of portions of the signal following the location as specified by the pointer value.

11. The method as in claim 9, wherein the second set of reconstruction data is supplemental reconstruction data with respect to the first set of reconstruction data, the second set of reconstruction data indicating how to modify a rendition of the signal generated based on the first set of reconstruction data to reconstruct the signal starting at the location as specified by the pointer value according to the second level of quality.

12. The method as in claim 1 further comprising:

varying the level of quality of the reconstruction data to facilitate playback of the signal in substantially real-time by the decoder .

13. The method as in claim 1 further comprising:

implementing a fee schedule or a royalty schedule in which users are charged different fees/royalties depending on a level of quality of the reconstruction data transmitted to the decoders.

14. The method as in claim 1 further comprising:

encoding the reconstruction data to include a first set of reconstruction data and a second set of reconstruction data, the first set of reconstruction data configured to enable

reconstruction of the signal up to a first level of quality in the hierarchy, the second set of reconstruction data configured to enable reconstruction of the signal up to a second level of quality in the hierarchy, the second level of quality higher than the first level of quality;

wherein the second set of reconstruction data is supplemental reconstruction data indicating adjustments to make to the signal at the first level of quality as generated based on the first set of reconstruction data in order to reconstruct the signal according to the second level of quality; and

implementing digital rights management with respect to only the first set of reconstruction data to prevent unauthorized decoding of the first set of reconstruction data.

15. The method as in claim 1 further comprising:

encoding the reconstruction data to include a first set of reconstruction data and a second set of reconstruction data, the first set of reconstruction data configured to enable reconstruction of the signal according to a first level of quality in the hierarchy, the second set of reconstruction data configured to enable reconstruction of the signal according to a second level of quality in the hierarchy, the second level of quality higher than the first level of quality;

wherein the second set of reconstruction data is supplemental reconstruction data indicating adjustments to make to the signal at the first level of quality as generated based on the first set of reconstruction data in order to reconstruct the signal according to the second level of quality;

generating the first set of reconstruction data to include redundant encoding to enable playback of the first set of reconstruction data in the event of an error with respect to the first set of reconstruction data; and

generating the second set of reconstruction data to include non-redundant encoding.

16. The method as in claim 1, wherein the reconstruction data is parsed into groupings of reconstruction data, each of the groupings of reconstruction data representing a time-based portion of the signal, each of the groupings of reconstruction data including segments of tiered reconstruction data; and

wherein each of the segments of tiered reconstruction data indicates reconstruction data at a given level of quality for a respective tile of contiguous elements

associated with the signal.

17. The method as in claim 16, wherein transmitting portions of the reconstruction data to the decoder includes:

transmitting each of the multiple sequences in sequential order, one complete sequence after another, in a bit stream to the decoder; and

providing marker information in the bit stream to indicate a respective beginning and end of each complete sequence of segment of tiered reconstruction data.

18. The method as in claim 16, wherein transmitting portions of the reconstruction data to the decoder includes:

transmitting the tiered reconstruction data in a bit stream starting from reconstruction data from the multiple sequences for the lower levels of quality to reconstruction data from the multiple sequences for the higher level of quality for the multiple sequences;

providing marker information in the bit stream to indicate a respective beginning and end of tiered reconstruction data for each level of quality and for each sequence.

19. The method as in claim 1, wherein transmitting portions of the reconstruction data to a decoder further comprises:

varying a highest level of quality of reconstruction data transmitted to the decoder for each portion of the signal in order to transmit a substantially constant bit rate of tiered reconstruction data to the decoder for each portion of multiple successive portions of the signal.

20. The method as in claim 1 further comprising:

partitioning a data stream into multiple segments including at least a first segment and a second segment, the first segment including reconstruction data to playback a first portion of the signal, wherein the first portion of the signal is an image/frame, the second segment including reconstruction data to playback a second portion of the signal, wherein the second portion of the signal includes a set of at least one subsequent images/frames;

populating the first segment of the data stream to include multiple levels of quality of reconstruction data to reconstruct the first portion of the signal; and

populating the second segment of the data stream to include: i) multiple levels of quality of reconstruction data to reconstruct the second portion of the signal, and ii) at least one level

of quality of reconstruction data to reconstruct the first portion of the signal.

21. The method as in claim 20, wherein the decoder is configured to buffer the data stream and reconstruct the first portion of the signal based on the multiple levels of quality of reconstruction data in the first segment and the at least one level of quality of reconstruction data in the second segment.

22. The method as in claim 20, wherein the first portion of the signal is an I-frame (Intra frame) and the second portion includes one or more P-frames (Predicted frames).

23. The method as in claim 22, wherein the decoder reconstructs the rendition of the second portion of the signal and of the subsequent portions of the signal also based on the additional reconstruction data pertaining to the first portion of the signal contained in the second segment.

24. Computer-readable storage hardware having instructions stored thereon, the instructions, when carried out by a processing device, causing the processing device to perform operations of:

retrieving reconstruction data from a repository, the retrieved reconstruction data encoded in accordance with a tiered hierarchy including multiple levels of quality;

transmitting the retrieved reconstruction data to a decoder, the decoder configured to reconstruct renditions of a signal based on the transmitted reconstruction data; and

during the transmitting, varying a level of quality of the reconstruction data retrieved and transmitted to the decoder.

25. A computer system comprising:

a processor;

a memory unit that stores instructions associated with an application executed by the processor; and

an interconnect coupling the processor and the memory unit, enabling the computer system to execute the application and perform operations of:

retrieving reconstruction data from a repository, the retrieved reconstruction data encoded in accordance with a tiered hierarchy including multiple levels of quality;

transmitting the retrieved reconstruction data to a decoder, the decoder configured to reconstruct renditions of a signal based on the transmitted reconstruction data; and

during the transmitting, varying a level of quality of the reconstruction data retrieved and transmitted to the decoder.

We claim:

1. A method comprising:

retrieving reconstruction data and metadata, the retrieved reconstruction data and metadata being a subset of available data selected from a repository for distribution to a decoder, the retrieved reconstruction data encoded in accordance with a tiered hierarchy including multiple available levels of quality in which portions of a signal are encoded;

transmitting the retrieved reconstruction data to a decoder, the decoder configured to reconstruct renditions of the signal based on the transmitted reconstruction data; and

during the transmission, varying a level of quality of the reconstruction data retrieved and transmitted to the decoder.

2. The method as in claim 1, wherein varying the level of quality includes:

transmitting a first set of reconstruction data to the decoder for playback of a first portion of the signal, the first set of reconstruction data indicating how to reconstruct a rendition of the first portion of the signal up to a first level of quality in the tiered hierarchy; and

transmitting a second set of reconstruction data to the decoder for playback of a second portion of the signal, the second set of reconstruction data indicating how to reconstruct a rendition of the second portion of the signal up to a second level of quality in the tiered hierarchy, the second level of quality being of different resolution quality than the first level of quality.

3. The method as in claim 2, wherein the second set of reconstruction data is transmitted at the second level of quality instead of the first level of quality in response to detecting the bandwidth currently available in a transmission channel.

4. The method as in claim 2, wherein the second set of reconstruction data is transmitted at the second level of quality in response to receiving a request to transmit the second set of reconstruction data at the second level of quality instead of the first level of quality.

5. The method as in claim 2, wherein the second set of reconstruction data is transmitted at the second level of quality in response to detecting a characteristic of the decoding resource.

6. The method as in claim 1, wherein each of multiple levels of quality of the reconstruction data for a image/frame of the signal indicates how to reconstruct a rendition of the signal in accordance with

a different level of quality.

7. The method as in claim 1, wherein varying the level of quality includes:

for a first portion of the signal, producing a first set of reconstruction data to include a sequence of reconstruction data from a lowest level of quality in the hierarchy to the first level of quality;

transmitting the first set of reconstruction data to the decoder for playback of the first portion of the signal in accordance with the first level of quality;

for a second portion of the signal, producing a second set of reconstruction data to include a sequence of reconstruction data from the lowest level of quality in the hierarchy to the second level of quality, the second level of quality being different from the first level of quality; and

transmitting the second set of reconstruction data to the decoder for playback of the second portion of the signal in accordance with the second level of quality.

8. The method as in claim 1, wherein varying the level of quality of the reconstruction data transmitted to the decoder includes:

producing a first set of reconstruction data to include reconstruction data to reconstruct portions of the signal in accordance with a first level of quality in the hierarchy;

transmitting the first set of reconstruction data to the decoder to enable playback and navigation amongst the signal in accordance with the first level of quality;

producing a second set of reconstruction data to include reconstruction data to reconstruct the signal in accordance with a second level of quality in the hierarchy; and

subsequent to transmitting the first set of reconstruction data, transmitting the second set of reconstruction data to the decoder for playback of the signal in accordance with the second level of quality.

9. The method as in claim 8, wherein the second set of reconstruction data is supplemental reconstruction data with respect to the first set of reconstruction data, the second set of reconstruction data indicating how to modify a rendition of the signal generated based on the first set of reconstruction data to reconstruct the signal according to the second level of quality.

10. The method as in claim 1, wherein varying the level of quality of the reconstruction data transmitted to the decoder includes:

producing a first set of reconstruction data to reconstruct the signal in accordance with a first level of quality in the hierarchy;

transmitting the first set of reconstruction data to the decoder to enable navigation amongst the signal played back at the first level of quality;

receiving a pointer value indicating a location in the signal, the pointer value generated by a user viewing a playback of the signal at the first level of quality as generated based on the first set of reconstruction data;

producing a second set of reconstruction data to include reconstruction data to reconstruct the signal starting at the location as specified by the pointer value, the second set of reconstruction data encoded in accordance with a second level of quality in the hierarchy; and

transmitting the second set of reconstruction data to the decoder to enable playback, at the second level of quality, of portions of the signal following the location as specified by the pointer value.

11. The method as in claim 9, wherein the second set of reconstruction data is supplemental reconstruction data with respect to the first set of reconstruction data, the second set of reconstruction data indicating how to modify a rendition of the signal generated based on the first set of reconstruction data to reconstruct the signal starting at the location as specified by the pointer value according to the second level of quality.

12. The method as in claim 1 further comprising:

varying the level of quality of the reconstruction data to facilitate playback of the signal in substantially real-time by the decoder.

13. The method as in claim 1 further comprising:

implementing a fee schedule or a royalty schedule in which users are charged different fees/royalties depending on a level of quality of the reconstruction data transmitted to the decoders.

14. The method as in claim 1 further comprising:

encoding the reconstruction data to include a first set of reconstruction data and a second set of reconstruction data, the first set of reconstruction data configured to enable reconstruction of the signal up to a first level of quality in the hierarchy, the second set of reconstruction data

configured to enable reconstruction of the signal up to a second level of quality in the hierarchy, the second level of quality being higher than the first level of quality;

wherein the second set of reconstruction data is supplemental reconstruction data indicating adjustments to make to the signal at the first level of quality as generated based on the first set of reconstruction data in order to reconstruct the signal according to the second level of quality; and

implementing digital rights management with respect to only the first set of reconstruction data to prevent unauthorized decoding of the first set of reconstruction data.

15. The method as in claim 1 further comprising:

encoding the reconstruction data to include a first set of reconstruction data and a second set of reconstruction data, the first set of reconstruction data configured to enable reconstruction of the signal according to a first level of quality in the hierarchy, the second set of reconstruction data configured to enable reconstruction of the signal according to a second level of quality in the hierarchy, the second level of quality being higher than the first level of quality;

wherein the second set of reconstruction data is supplemental reconstruction data indicating adjustments to make to the signal at the first level of quality as generated based on the first set of reconstruction data in order to reconstruct the signal according to the second level of quality;

generating the first set of reconstruction data to include redundant encoding to enable playback of the first set of reconstruction data in the event of errors with respect to the first set of reconstruction data; and

generating the second set of reconstruction data to only include non-redundant encoding.

16. The method as in claim 1, wherein the reconstruction data is organized into groupings of reconstruction data, each of the groupings of reconstruction data representing a time-based portion of the signal, each of the groupings of reconstruction data including space-based portions segments of tiered reconstruction data; and

wherein each of the segments of tiered reconstruction data indicates reconstruction data at a given level of quality for a respective tile of contiguous elements associated with the signal.

17. The method as in claim 16, wherein transmitting the retrieved reconstruction data to the decoder includes:

transmitting each of the multiple space-based segments in sequential order, one complete segment after another, in a bitstream to the decoder; and

providing marker and/or index information in the bitstream to indicate a respective beginning and end of each complete space-based segment.

18. The method as in claim 16, wherein transmitting the retrieved reconstruction data to the decoder includes:

transmitting the space-based segments of tiered reconstruction data in a bitstream starting from reconstruction data for the multiple segments for the lower levels of quality to reconstruction data for the multiple segments for the higher level of quality;

providing information in the bitstream to indicate a respective beginning and end of tiered reconstruction data for each level of quality and for each segment.

19. The method as in claim 1, wherein transmitting the retrieved reconstruction data to a decoder further comprises:

varying a highest level of quality of reconstruction data transmitted to the decoder for each portion of the signal in order to transmit a substantially constant bit rate of tiered reconstruction data to the decoder for each portion of multiple successive portions of the signal.

20. The method as in claim 1 further comprising:

partitioning a data stream into multiple segments including at least a first segment and a second segment, the first segment including reconstruction data to play back a first portion of the signal, wherein the first portion of the signal is an image/frame, the second segment including reconstruction data to play back a second portion of the signal, wherein the second portion of the signal includes a set of at least one subsequent images/frames;

populating the first segment of the data stream to include multiple levels of quality of reconstruction data to reconstruct the first portion of the signal; and

populating the second segment of the data stream to include: i) multiple levels of quality of reconstruction data to reconstruct the second portion of the signal, and ii) at least one level of quality of additional reconstruction data to reconstruct the first portion of the signal.

21. The method as in claim 20, wherein the decoder is configured to buffer the data stream and reconstruct the first portion of the signal based on the multiple levels of quality of reconstruction data in the first segment and the at least one level of quality of additional reconstruction data in the

second segment.

22. The method as in claim 20, wherein the first portion of the signal is an I-frame (Intra frame) and the second portion includes one or more P-frames (Predicted frames).

23. The method as in claim 22, wherein the decoder reconstructs the rendition of the second portion of the signal and of the subsequent portions of the signal also based on the additional reconstruction data pertaining to the first portion of the signal contained in the second segment.

24. The method as in claim 7, further comprising:

producing the first set of reconstructions data to specify a manner in which to upsample a rendition of the first portion of the signal at the lowest level of quality to a rendition of the first portion of the signal at the first level of quality; and

producing the second set of reconstructions data to specify a manner in which to upsample a rendition of the second portion of the signal at the lowest level of quality to a rendition of the second portion of the signal at the second level of quality.

25. The method as in claim 24, wherein producing the first set of reconstruction data and the second set of reconstruction data includes:

iteratively downsampling a rendition of the first portion of the signal from a highest level of quality to produce the first set of reconstruction data; and

iteratively downsampling a rendition of the second portion of the signal from the highest level of quality to produce the second set of reconstruction data.

26. The method as in claim 1, wherein varying the level of quality includes:

for a first portion of the signal, producing a first set of reconstruction data to include a first sequence of reconstruction data specifying how to upsample a lowest resolution of the first portion of the signal to a first resolution in the tiered hierarchy;

transmitting the first set of reconstruction data to the decoder for playback of the first portion of the signal in accordance with the first resolution;

for a second portion of the signal, producing a second set of reconstruction data to include a second sequence of reconstruction data specifying how to upsample a lowest resolution of the second portion of the signal to a second resolution in the tiered hierarchy; and

transmitting the second set of reconstruction data to the decoder for playback of the second portion of the signal in accordance with the second resolution.

27. The method as in claim 1, further comprising:

iteratively downsampling a rendition of a first portion of the signal at a highest resolution in the tiered hierarchy to successively lower resolutions in the tiered hierarchy to produce a first sequence of reconstruction data, the first sequence of reconstruction data encoded to specify how to upsample a rendition of the first portion of the signal from a lowest resolution in the tiered hierarchy; and

iteratively downsampling a rendition of a second portion of the signal at the highest resolution in the tiered hierarchy to successively lower resolutions in the tiered hierarchy to produce a second sequence of reconstruction data, the second sequence of reconstruction data encoded to specify how to upsample a rendition of the second portion of the signal from the lowest resolution in the tiered hierarchy.

28. The method as in claim 27, wherein the tiered hierarchy includes a first resolution level and a second resolution level that reside between the lowest resolution and the highest resolution in the tiered hierarchy; and

wherein varying the level of quality of the reconstruction data transmitted to the decoder includes: i) transmitting fewer-than-all portions of the first sequence of reconstruction data to the decoder to upsample a rendition of the first portion of the signal up to the first resolution level; and ii) transmitting fewer-than-all portions of the second sequence of reconstruction data to the decoder to upsample a rendition of the second portion of the signal up to the second resolution level.

29. The method as in claim 1, wherein varying the level of quality includes:

transmitting a first set of reconstruction data to the decoder for reproducing a first image frame of the signal, the first set of reconstruction data specifying upsample operations indicating how to upsample and reconstruct a rendition of the first image frame of the signal up to a first level of quality in the tiered hierarchy; and

transmitting a second set of reconstruction data to the decoder for reproducing a second image frame of the signal, the second set of reconstruction data specifying upsample operations indicating how to upsample and reconstruct a rendition of the second image frame of the signal up to a second level of quality in the tiered hierarchy, the second level of quality being of different

resolution quality than the first level of quality.

30. Computer-readable storage hardware having instructions stored thereon, the instructions, when carried out by a processing device, causing the processing device to perform operations of:

retrieving reconstruction data from a repository, the retrieved reconstruction data encoded in accordance with a tiered hierarchy including multiple available levels of quality in which portions of a signal are encoded;

transmitting the retrieved reconstruction data to a decoder, the decoder configured to reconstruct renditions of a signal based on the transmitted reconstruction data; and

during the transmission, varying a level of quality of the reconstruction data retrieved from the tiered hierarchy and transmitted to the decoder.

31. A computer system comprising:

a processor including processing hardware;

a hardware storage unit that stores instructions associated with an application executed by the processor; and

an interconnect coupling the processor and the hardware storage unit, causing the processing hardware to execute the application and perform operations of:

retrieving reconstruction data from a repository, the retrieved reconstruction data encoded in accordance with a tiered hierarchy including multiple available levels of quality in which portions of the signal are encoded;

transmitting the retrieved reconstruction data to a decoder, the decoder configured to reconstruct renditions of the signal based on the transmitted reconstruction data; and

during the transmission, varying a level of quality of the reconstruction data retrieved from the tiered hierarchy and transmitted to the decoder.