

NOTE N. INTANGIBLE ASSETS INCLUDING GOODWILL

Intangible Assets

The following table presents the company's intangible asset balances by major asset class.

(\$ in millions)

	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
At December 31, 2019:*			
Intangible asset class			
Capitalized software	\$ 1,749	\$ (743)	\$ 1,006
Client relationships	8,921	(1,433)	7,488
Completed technology	6,261	(1,400)	4,861
Patents/trademarks	2,301	(445)	1,856
Other**	56	(31)	24
Total	\$19,287	\$(4,052)	\$15,235

(\$ in millions)

	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
At December 31, 2018:			
Intangible asset class			
Capitalized software	\$1,568	\$ (629)	\$ 939
Client relationships	2,068	(1,123)	945
Completed technology	2,156	(1,296)	860
Patents/trademarks	641	(330)	311
Other**	56	(23)	32
Total	\$6,489	\$(3,402)	\$3,087

* Amounts as of December 31, 2019 include a decrease of \$42 million in net intangible asset balances due to foreign currency translation. There was no foreign currency impact on net intangible assets for the year ended December 31, 2018.

**Other intangibles are primarily acquired proprietary and nonproprietary business processes, methodologies and systems.

The net carrying amount of intangible assets increased \$12,147 million during the year ended December 31, 2019, primarily due to the acquisition of Red Hat and additions resulting from capitalized software, partially offset by intangible asset amortization. Intangible assets of \$13,472 million generated from the acquisition of Red Hat were allocated to the segments as follows:

(\$ in millions)

Segment	Intangible Assets Allocated*
Cloud & Cognitive Software	\$10,729
Global Technology Services	1,819
Global Business Services	617
Systems	306
Total	\$13,472

* For additional information on the acquisition of Red Hat, refer to note E, "Acquisitions & Divestitures."

There was no impairment of intangible assets recorded in 2019 and 2018. The aggregate intangible amortization expense was \$1,850 million and \$1,353 million for the years ended December 31, 2019 and 2018, respectively. In addition, in 2019 and 2018, respectively, the company retired \$946 million and \$1,469 million of fully amortized intangible assets, impacting both the gross carrying amount and accumulated amortization by this amount. In 2019, the company divested select intangible assets with a gross carrying amount of \$335 million and \$260 million of accumulated amortization.

The future amortization expense relating to intangible assets currently recorded in the Consolidated Balance Sheet is estimated to be the following at December 31, 2019:

(\$ in millions)

	Capitalized Software	Acquired Intangibles	Total
2020	\$529	\$1,855	\$2,384
2021	352	1,747	2,099
2022	123	1,684	1,808
2023	1	1,371	1,372
2024	0	1,322	1,322
Thereafter	—	6,250	6,250