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closed subschemes defined by i' and s_1 , respectively. Since s_1 factors through i' , we have $\mathcal{I}_{D_1} \subset \mathcal{I}_s$. Hence $D_1 - s$ is a relative effective Cartier divisor on $(X_m \times T_1)/T_1$ by Lemma 2.2 (b), that is, there exists a relative effective Cartier divisor D_1' such that $D_1 = s_1 + D_1'$. Now we take $T_2 = D_1'$. We then have a finite flat morphism $T_2 \rightarrow T_1$, a section $s_2: T_2 \rightarrow X_m \times T_2$ of the projection $X_m \times T_2 \rightarrow T_2$, and a relative effective Cartier divisor D_2' on $(X_m \times T_2)/T_2$ such that the pull-back of D_1' to $X_m \times T_2$ is equal to $s_2 + D_2'$. Then we take $T_3 = D_2'$, \dots . In this way we get finite flat morphisms $T_i \rightarrow T_{i-1}$ ($i = 1, \dots, n$), sections $s_i: T_i \rightarrow X_m \times T_i$, such that the pull-back of D to $X_m \times T_n$ is equal to $s_1 + \dots + s_n$, where the s_i denote the relative effective Cartier divisors on $(X_m \times T_n)/T_n$ induced by the sections s_i . This proves our lemma.

Finally we are ready to prove Proposition 3.1.

Proof of Proposition 3.1. By Lemma A.7, there exist a finite flat morphism $\pi: T' \rightarrow T$ and sections $s_i: T' \rightarrow X_m \times T'$ ($i = 1, \dots, n$) of the projection $X_m \times T' \rightarrow T'$ such that the pull-back π^*D of D to $X_m \times T'$ is equal to $s_1 + \dots + s_n$. By Lemma A.6, there exists a unique morphism of schemes $f': T' \rightarrow (X - S)^{(n)}$ such that the pull-back $f'^*\mathcal{D}$ of the universal relative effective Cartier divisor \mathcal{D} to $X_m \times T'$ is $s_1 + \dots + s_n$. Let $p_1, p_2: T' \times_T T' \rightarrow T'$ be the projections. We have

$$(f'p_1)^*(\mathcal{D}) = p_1^*f'^*\mathcal{D} = p_1^*(s_1 + \dots + s_n) = p_1^*\pi^*D = p_2^*\pi^*D = \dots = (f'p_2)^*(\mathcal{D}).$$

that is, $(f'p_1)^*(\mathcal{D}) = (f'p_2)^*(\mathcal{D})$. By Lemma A.6 we have $f'p_1 = f'p_2$. By the theory of descent, ([SGA 1] VIII, Theorem 5.2), there exists a unique morphism of schemes $f: T \rightarrow (X_m - Q)^{(n)}$ such that $f' = f\pi$, and the pull-back of \mathcal{D} to $X_m \times T$ is D .

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